15 Timing advance and absolute delay

15.1 GSM Timing advance and absolute delay

15.1.1 Definition

Timing advance (TA) is a time offset in bits as sent to the MS by the BS. The MS shall advance its transmissions to the BS by the timing advance relative to 3 timeslots behind transmissions received from the BS.

The absolute delay is the delay between a common burst reference point within the received and the transmitted RF burst.

NOTE: For normal or dummy bursts, the common burst reference point is defined to be the transition from bit 13 to bit 14 of the midamble. For an access burst it is defined to be the transition from bit 48 to bit 49 of the burst.

Equivalently the delay can be referenced to the modulator input vs. the demodulator output or to the differential encoder input vs. the differential decoder output, provided the measured delay is corrected for the additional delays in the signal path.

15.1.2 Conformance requirement

1) The random access burst transmission, measured at the MS antenna, shall use a TA of 0, and therefore be 3 timeslots behind the transmissions received from the BTS, with an absolute tolerance of ±1 bit period.

   3GPP TS 05.10, subclauses 6.4 and 6.6.

2) The normal burst transmission, measured at the MS antenna, shall be 3 timeslots - TA behind the transmissions received from the BTS, with an absolute tolerance of ±1 bit period.

   3GPP TS 05.10, subclause 6.4.

3) When the MS receives a new value of TA on the SACCH, it shall implement the new value of TA at the first TDMA frame belonging to the next reporting period, after the SACCH frame containing the new TA value.

   3GPP TS 05.10, subclause 6.5.

4) The MS shall signal the used TA to the BS, in the L1 header of the uplink SACCH message.

   3GPP TS 05.10, subclause 6.4, 3GPP TS 04.04, subclause 7.2.

15.1.3 Test purpose

1) To verify that the MS uses a TA value of 0 for the access burst.

2) To verify that the MS meets the absolute receive/transmit delay requirement for the access burst.

3) To verify that the MS meets the absolute receive/transmit delay requirement for normal bursts.

4) To verify that the MS implements a new timing advance value as signalled on the SACCH as in the requirement.

5) To verify that the MS sends the TA used on the uplink SACCH as in the requirement.

15.1.4 Method of test

15.1.4.1 Initial conditions

The SS sends "MAXRETRANS = 7" and "TX-INTEGER = 3" on the BCCH.

The MS is brought into MM state "idle, updated".

15.1.4.2 Procedure

a) The SS pages the MS after 10 s.

b) The SS does not respond to the first 7 CHANNEL REQUEST messages from the MS. The SS responds to the 8th CHANNEL REQUEST from the MS on the RACH by sending an IMMEDIATE ASSIGNMENT message, with TA set to 0.

c) The SS continues to set up a call according to the generic call set up procedure.

d) The SS signals the TA values 10, 20, 30, 40, 50, 60, 63, and one random value other than these values to the MS in consecutive SACCH blocks.

> For GSM 400 MS, the SS signals the TA values 35, 70, 105, 140, 175, 210, 219, and one random value other than these values to the MS in consecutive SACCH blocks.

> The SS determines the TA value set in the L1 header on the uplink SACCH for each timing advance.

> The SS measures the absolute delay for all bursts.

15.1.5   Test requirement

The measured receive/transmit delay for each burst shall equal the following nominal values with an absolute tolerance of ±1 bit period:

access bursts: 3 timeslots (= 45/26 ms).

normal bursts: 3 timeslots (= 45/26 ms) minus the last TA value received from the SS.

The MS shall use the new timing advance at the first TDMA frame belonging to the next reporting period after the SACCH frame containing the new TA value.

The TA field in the uplink SACCH L1 header shall contain to the most recently ordered TA value.

15.2   Void

15.3   Void

15.4   Void

15.5   Void

15.6   GPRS Timing advance and absolute delay

15.6.1   Definition

Timing advance (TA) is a time offset in bits as sent to the MS by the BS. The MS shall advance its transmissions to the BS by the timing advance relative to 3 timeslots behind transmissions received from the BS.

The absolute delay is the delay between a common burst reference point within the received and the transmitted RF burst.

The timing advance procedure is used to derive the correct value for timing advance that the MS has to use for the uplink transmission of radio blocks.

The timing advance procedure comprises two parts:

-   initial timing advance estimation;

-   continuous timing advance update.

NOTE: For normal or dummy bursts, the common burst reference point is defined to be the transition from bit 13 to bit 14 of the midamble. For an access burst it is defined to be the transition from bit 48 to bit 49 of the burst.

Equivalently the delay can be referenced to the modulator input vs. the demodulator output or to the differential encoder input vs. the differential decoder output, provided the measured delay is corrected for the additional delays in the signal path.

15.6.2 Conformance requirement

1) The random access burst transmission, measured at the MS antenna, shall use a TA of 0, and therefore be 3 timeslots behind the transmissions received from the BTS, with an absolute tolerance of ±1 bit period.

   3GPP TS 05.10, subclauses 6.4 and 6.6.

2) The normal burst transmission, measured at the MS antenna, shall be 3 timeslots - TA behind the transmissions received from the BTS, with an absolute tolerance of ± 1 bit period. In case of a multislot configuration, the MS shall use a common timebase for transmission of all channels. In this case, the MS may optionally use a timeslot length of 157 bit periods on timeslots TN = 0 and 4, and 156 bit periods on timeslots with TN = 1, 2, 3, 5, 6 and 7, rather than 156.25 bit periods on all timeslots. In case of a packet switched multislot configuration the common timebase shall be derived from all timeslots monitored by the MS. In this case, the MS may assume that the BTS uses a timeslot length of 156.25 bit periods on all timeslots

   3GPP TS 05.10, subclause 6.4.

3) For an MS in Packet transfer mode, except MS class A in dedicated mode:

   Within the packet resource assignments (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) for uplink or downlink messages the MS gets the Timing Advance Index (TAI). The MS shall send access bursts on the subchannel defined by the TAI on the PTCCH using TA=0.

   3GPP TS 05.10, subclause 6.5.2.

4) For an MS in Packet transfer mode, except MS class A in dedicated mode:

   When the MS receives the updated value of TA from the BTS on the downlink PTCCH, it shall always use the last received TA value for the uplink transmission.

   3GPP TS 05.10, subclause 6.5.2.

5) For an MS in Packet transfer mode, except MS class A in dedicated mode:

   Upon initiation of the continuous timing advance procedure the MS shall disregard the TA values on PTCCH until it has sent its first access burst on PTCCH.

   3GPP TS 05.10, subclause 6.5.2.

6) For an MS in Packet transfer mode, except MS class A in dedicated mode:

   The network may request the MS to send 4 access bursts to calculate a new TA value. For this purpose the network sets the system information element CONTROL_ACK_TYPE to indicate that the MS is to respond with a PACKET_CONTROL_ACKNOWLEDGEMENT consisting of 4 access bursts (see 3GPP TS 04.60), and sends a PACKET_POLLING_REQUEST to the MS. In this case, the MS shall transmit 4 consecutive access bursts on the assigned resources.

   3GPP TS 05.10, subclause 6.5.2.

7) For an MS in Packet transfer mode, except MS class A in dedicated mode:

   If the MS receives a resource assignment or power control/timing advance message (see 3GPP TS 04.60), the MS shall use the included TA value until it receives a new value on PTCCH.

   3GPP TS 05.10, subclause 6.5.2.

8) For an MS in Packet idle mode, except MS class A in dedicated mode:

   If the MS receive a packet downlink assignment (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) indicating to the MS that it can only start the uplink transmission on PDTCH after the timing advance is obtained by a Packet Power Control/Timing Advance message, the MS shall start the packet transfer after the TA value is received on the PACCH.

3GPP TS 05.10, subclause 6.5.2.

9) For an MS in Packet transfer mode, except MS class A in dedicated mode:

    If the MS receives a packet resource assignment (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) indicating that a default timing advance shall be used, the MS shall not use the continuous timing advance procedure.

    3GPP TS 05.10, subclause 6.5.2.

10) For an MS in Packet transfer mode, except MS class A in dedicated mode:

    When the MS receives a new or updated TA value on the downlink PTCCH or downlink PACCH, the MS shall be ready to transmit using the new TA value within 40 ms of the end of the last timeslot of the message block containing the new TA value.

    3GPP TS 05.10, subclause 6.9.

NOTE: A MS class A in dedicated mode has to follow the procedures described in 3GPP TS 05.10 subclause 6.5.1.

15.6.3   Test purpose

1) To verify that the MS uses a TA value of 0 for the access burst.

2) To verify that the MS meets the absolute receive/transmit delay requirement for the access burst.

3) To verify that the MS meets the absolute receive/transmit delay requirement for normal bursts.

4) To verify that an MS in Packet transfer mode, except for a GPRS Class A MS in dedicated mode, when it receives an updated value of TA from the BTS on the downlink PTCCH, uses the last received TA value for the uplink transmission, respecting conformance requirement 10.

5) To verify that an MS in Packet transfer mode, except for a GPRS Class A MS in dedicated mode, upon initiation of the continuous timing advance procedure shall disregard the TA values on PTCCH until it has sent its first access burst on PTCCH.

6) To verify that an MS in Packet transfer mode, except for a GPRS Class A MS in dedicated mode, if it receives a packet polling message as defined in conformance requirement 6, sends 4 access bursts on a network assigned uplink resource.

7) To verify that an MS in Packet transfer mode, except for a GPRS Class A MS in dedicated mode, if it receives a resource assignment or power control/timing advance message (see 3GPP TS 04.60), uses the included TA value until it receives a new value on PTCCH.

8) To verify that an MS in Packet idle mode, except for a GPRS Class A MS in dedicated mode, if it receives a packet downlink assignment (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) indicating to the MS that it can only start the uplink transmission on PDTCH after the timing advance is obtained by the continuous update procedure or a Packet Power Control/Timing Advance message , it starts the packet transfer after the TA value is received from the SS .

9) To verify that an MS in Packet transfer mode, except for a GPRS Class A MS in dedicated mode, if it receives a packet resource assignment (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) indicating that a default timing advance shall be used, does not use the continuous timing advance procedure.

15.6.4   Method of test

15.6.4.1   Initial conditions

The test shall be run under the default GPRS conditions defined in clause 40.

The SS sets the System Information 1 parameter CONTROL_ACK_TYPE to "0".

The MS is brought into packet idle mode.

The MS shall be PDP context activated.

NOTE: The Test Requirements (15.6.5) are based on a One Phase Packet Access protocol, see 3GPP TS 04.60.

15.6.4.2 Procedure

a) The SS pages MS on the PCH. The SS measures the receive/transmit delay for each burst. The SS then sends a Packet Access Reject message.

b) The MS is made to send a Channel Request by triggering the MS to send a minimum of 6000 octets. The SS transmits a packet ressource assignment to the MS with a valid TAI. The SS transmits a TA value on the PTCCH for this TAI which is neither 0 nor 1. The SS measures the receive/transmit delay for several bursts, using the conditions defined in Conformance requirement 10).

c) The SS transmits a number of different TA values on the PTCCH for the TAI assigned to the MS. The SS also changes the TA values on the PTCCH for the other TAI in such a way that there is no correlation between TA values. The SS measures the receive/transmit delay for several bursts, using the conditions defined in Conformance reuirement 10).

d) The SS transmits a new TA value, different by more than 1 from the previously transmitted one, in such a way that the MS can only correctly receive the last (4th) occurrence of the new TA value. The SS measures the receive/transmit delay for several bursts after the 4th (and correctly received) TA transmission, using the conditions defined in Conformance requirement 10).

e) The MS is made to send a Channel Request by triggering the MS to send a minimum of 6000 octets. The SS responds with a Packet Queuing Notification. The SS sends a Packet Polling, addressing the MS with its TFI. The SS measures the receive/transmit delay for each of the 4 access bursts after the Packet Polling message is sent.

f) The SS sends a Packet Uplink Assignment to the MS with valid TIMING_ADVANCE_INDEX, TIMING_ADVANCE_TIMESLOT_NUMBER, and TIMING_ADVANCE_VALUE. As part of the subsequent continuous timing advance update procedure, the SS sends a timing advance value on the downlink PTCCH for the MS, that is different from the TIMING_ADVANCE_VALUE in the Packet Uplink Assignment. The SS measures the receive/transmit delay for several bursts, once after thePacket Uplink Assignment is sent, and once after the MS should be using the updated TA, using the conditions defined in Conformance requirement 10).

g) The MS is brought back to Packet idle mode. The SS sends a Immediate Assignment to the MS with no valid Timing Advance included . The SS polls the MS by sending an RLC Block. The SS waits 2 seconds and then sends a PACKET POWER CONTROL/TIMING ADVANCE message with valid timing advance information. The SS sends further RLC Blocks. The SS measures the receive/transmit delay for several bursts.

h) The MS is made to send a Packet Channel Request by triggering the MS to send a minimum of 6000 octets. The SS sends a Packet Uplink Assignment to the MS with TIMING_ADVANCE_VALUE set to a value different from the last one ordered on the PTCCH, and the TIMING_ADVANCE_INDEX and TIMING_ADVANCE_TIMESLOT_NUMBER fields not present. The SS continues to transmit TA values on the PTCCH. These shall be different from the TA value TIMING_ADVANCE_VALUE in the Packet Uplink Assignment. The SS measures the receive/transmit delay for several bursts, once after the transmission of the Packet Uplink Assignment, and once after the SS transmits the new TA using the continuous update procedure for the TAI chosen in step g), using the conditions defined in Conformance requirement 10).

15.6.5 Test requirement

The measured receive/transmit delay for each burst shall equal the following nominal values with an absolute tolerance of ±1 bit period.

access bursts: 3 timeslots (= 45/26 ms).

normal bursts: 3 timeslots (= 45/26 ms) minus the last TA value received from the SS.

In step a) the MS shall transmit an access burst on the RACH.

In step b) the MS shall send access bursts on the PTCCH on the subchannel defined by the TAI with TA = 0.

In step c) the MS shall use the updated TA values.

In step d) the MS shall use the updated TA value.

In step e) the MS shall transmit 4 access bursts.

In step f) the MS shall use the TIMING_ADVANCE_VALUE in the Packet Uplink Assignment first, and change to the Timing Advance value transmitted on the downlink PTCCH in response to the sending of an access burst on the uplink PTCCH.

In step g) the MS shall not transmit on the allocated resources before it received a Timing Advance value via a PACKET POWER CONTROL/TIMING ADVANCE message on the downlink PACCH.

In step h) the last TA value received from the SS is the TIMING_ADVANCE_VALUE in the Packet Uplink Assignment.

15.7 ECSD Timing advance and absolute delay

15.7.1 Definition

Timing advance (TA) is a time offset in symbols as sent to the MS by the BS. The MS shall advance its transmissions to the BS by the timing advance relative to 3 timeslots behind transmissions received from the BS.

The absolute delay is the delay between a common burst reference point within the received and the transmitted RF burst.

NOTE: For normal bursts for GMSK modulation, the common burst reference point is defined to be the transition from bit 13 to bit 14 of the midamble. For normal bursts for 8-PSK modulation, the common burst reference point is defined to be the transition from symbol 13 to symbol 14 of the midamble. For an access burst it is defined to be the transition from bit 48 to bit 49 of the burst.

Equivalently the delay can be referenced to the modulator input vs. the demodulator output or to the differential encoder input vs. the differential decoder output, provided the measured delay is corrected for the additional delays in the signal path.

15.7.2 Conformance requirement

1) The random access burst transmission, measured at the MS antenna, shall use a TA of 0, and therefore be 3 timeslots behind the transmissions received from the BTS, with an absolute tolerance of ± 1 symbol period.

   3GPP TS 05.10, subclauses 6.4 and 6.6.

2) The normal burst transmission, measured at the MS antenna, shall be 3 timeslots - TA behind the transmissions received from the BTS, with an absolute tolerance of ± 1 symbol period. In case of a multislot configuration, the MS shall use a common timebase for transmission of all channels. In this case, the MS may optionally use a timeslot length of 157 symbol periods on timeslots TN = 0 and 4, and 156 symbol periods on timeslots with TN = 1, 2, 3, 5, 6 and 7, rather than 156,25 symbol periods on all timeslots. In case of a circuit switched multislot configuration, the common timebase shall be derived from the main channel and the TA values received on other channels shall be neglected.

   3GPP TS 05.10, subclause 6.4.

3) When the MS receives a new value of TA on the SACCH, it shall implement the new value of TA at the first TDMA frame belonging to the next reporting period, after the SACCH frame containing the new TA value.

   3GPP TS 05.10, subclause 6.5.1

4) The MS shall signal the used TA to the BS, in the L1 header of the uplink SACCH message.

   3GPP TS 05.10, subclause 6.5.1, 3GPP TS 04.04, subclause 7.2.

15.7.3 Test purpose

1) To verify that the MS uses a TA value of 0 for the access burst.

2) To verify that the MS meets the absolute receive/transmit delay requirement for the access burst.

3) To verify that the MS meets the absolute receive/transmit delay requirement for normal bursts.

4) To verify that the MS implements a new timing advance value as signalled on the SACCH as in the requirement.

5) To verify that the MS sends the TA used on the uplink SACCH as in the requirement.

6) To verify that a multislot capable MS operates in accordance with the conformance requirement 2.

15.7.4 Method of test

Initial conditions

The SS sends "MAXRETRANS = 7" and "TX-INTEGER = 3" on the BCCH.

The MS is brought into MM state "idle, updated".

Procedure

a) The SS pages the MS after 10 s.

b) The SS does not respond to the first 7 CHANNEL REQUEST messages from the MS. The SS responds to the 8th CHANNEL REQUEST from the MS on the RACH by sending an IMMEDIATE ASSIGNMENT message, with TA set to 0.

c) The SS continues to set up a call according to the generic call set up procedure for ECSD. In the case of a multislot cabable MS, the call is set up according to the generic call set up procedure for multislot configuration for ECSD and the SS commands the MS to operate with maximum number of both uplink and downlink timeslots according to the multislot class of the MS. In the case of class A ECSD MS, 8-PSK modulated channels shall be used in the downlink. In the case of class B ECSD MS, GMSK modulated channels shall be used in the downlink and 8-PSK modulated channels in the uplink.

d) The SS signals the TA values 10, 20, 30, 40, 50, 60, 63, and one random value other than these values to the MS in consecutive SACCH blocks.

   For GSM 400 MS, the SS signals the TA values 35, 70, 105, 140, 175, 210, 219, and one random value other than these values to the MS in consecutive SACCH blocks.

   In the case of a multislot capable MS, the TA values defined above are signalled on the main channel of the multislot configuration, and on the subchannels TA values different from those ones are signalled.

   The SS determines the TA value set in the L1 header on the uplink SACCH for each timing advance.

   The SS measures the absolute delay for all bursts.

15.7.5 Test requirement

The measured receive/transmit delay for each burst shall equal the following nominal values with an absolute tolerance of ±1 symbol period:

   access bursts: 3 timeslots (= 45/26 ms).

   normal bursts: 3 timeslots (= 45/26 ms) minus the last TA value received from the SS.

The MS shall use the new timing advance at the first TDMA frame belonging to the next reporting period after the SACCH frame containing the new TA value.

The TA field in the uplink SACCH L1 header shall contain to the most recently ordered TA value.

The multislot capable MS shall use a common TA value for all uplink channels, derived from the main downlink channel of the multislot configuration. The TA value in the uplink SACCH L1 header shall be that one.

15.8 EGPRS timing advance and absolute delay

15.8.1 Definition

Timing advance (TA) is a time offset in symbols as sent to the MS by the BS. The MS shall advance its transmissions to the BS by the timing advance relative to 3 timeslots behind transmissions received from the BS.

The absolute delay is the delay between a common burst reference point within the received and the transmitted RF burst.

The timing advance procedure is used to derive the correct value for timing advance that the MS has to use for the uplink transmission of radio blocks.

The timing advance procedure comprises two parts:

- initial timing advance estimation;

- continuous timing advance update.

NOTE: For normal bursts for GMSK modulation, the common burst reference point is defined to be the transition from bit 13 to bit 14 of the midamble. For normal bursts for 8-PSK modulation, the common burst reference point is defined to be the transition from symbol 13 to symbol 14 of the midamble. For an access burst it is defined to be the transition from bit 48 to bit 49 of the burst.

Equivalently the delay can be referenced to the modulator input vs. the demodulator output or to the differential encoder input vs. the differential decoder output, provided the measured delay is corrected for the additional delays in the signal path.

15.8.2 Conformance requirement

1) The random access burst transmission, measured at the MS antenna, shall use a TA of 0, and therefore be 3 timeslots behind the transmissions received from the BTS, with an absolute tolerance of ±1 symbol period.

3GPP TS 05.10, subclauses 6.4 and 6.6.

2) The normal burst transmission, measured at the MS antenna, shall be 3 timeslots - TA behind the transmissions received from the BTS, with an absolute tolerance of ± 1 symbol period. In case of a multislot configuration, the MS shall use a common timebase for transmission of all channels. In this case, the MS may optionally use a timeslot length of 157 symbol periods on timeslots TN = 0 and 4, and 156 symbol periods on timeslots with TN = 1, 2, 3, 5, 6 and 7, rather than 156.25 symbol periods on all timeslots. In case of a packet switched multislot configuration the common timebase shall be derived from all timeslots monitored by the MS. In this case, the MS may assume that the BTS uses a timeslot length of 156.25 symbol periods on all timeslots

3GPP TS 05.10, subclause 6.4.

3) For an MS in Packet transfer mode, except MS class A in dedicated mode:

Within the packet resource assignments (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) for uplink or downlink messages the MS gets the Timing Advance Index (TAI). The MS shall send access bursts on the subchannel defined by the TAI on the PTCCH using TA=0.

3GPP TS 05.10, subclause 6.5.2.

4) For an MS in Packet transfer mode, except MS class A in dedicated mode:

When the MS receives the updated value of TA from the BTS on the downlink PTCCH, it shall always use the last received TA value for the uplink transmission.

3GPP TS 05.10, subclause 6.5.2.

5) For an MS in Packet transfer mode, except MS class A in dedicated mode:

Upon initiation of the continuous timing advance procedure the MS shall disregard the TA values on PTCCH until it has sent its first access burst on PTCCH.

3GPP TS 05.10, subclause 6.5.2.

6) For an MS in Packet transfer mode, except MS class A in dedicated mode:

The network may request the MS to send 4 access bursts to calculate a new TA value. For this purpose the network sets the system information element CONTROL_ACK_TYPE to indicate that the MS is to respond with a PACKET_CONTROL_ACKNOWLEDGEMENT consisting of 4 access

bursts (see 3GPP TS 04.60), and sends a PACKET_POLLING_REQUEST to the MS. In this case, the MS shall transmit 4 consecutive access bursts on the assigned resources.

3GPP TS 05.10, subclause 6.5.2.

7) For an MS in Packet transfer mode, except MS class A in dedicated mode:

If the MS receives a resource assignment or power control/timing advance message (see 3GPP TS 04.60), the MS shall use the included TA value until it receives a new value on PTCCH.

3GPP TS 05.10, subclause 6.5.2.

8) For an MS in Packet transfer mode, except MS class A in dedicated mode:

If the MS receive a packet resource assignment (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) indicating to the MS that it can only start the uplink transmission on PDTCH after the timing advance is obtained by the continuous update procedure, the MS shall start the packet transfer after the TA value is received on the PTCCH.

3GPP TS 05.10, subclause 6.5.2.

9) For an MS in Packet transfer mode, except MS class A in dedicated mode:

If the MS receives a packet resource assignment (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) indicating that a default timing advance shall be used, the MS shall not use the continuous timing advance procedure.

3GPP TS 05.10, subclause 6.5.2.

10) For an MS in Packet transfer mode, except MS class A in dedicated mode:

When the MS receives a new or updated TA value on the downlink PTCCH or downlink PACCH, the MS shall be ready to transmit using the new TA value within 40 ms of the end of the last timeslot of the message block containing the new TA value.

3GPP TS 05.10, subclause 6.9.

NOTE: A MS class A in dedicated mode has to follow the procedures described in 3GPP TS 05.10 subclause 6.5.1.

15.8.3 Test purpose

1) To verify that the MS uses a TA value of 0 for the access burst.

2) To verify that the MS meets the absolute receive/transmit delay requirement for the access burst.

3) To verify that the MS meets the absolute receive/transmit delay requirement for normal bursts in accordance with the conformance requirement 2.

4) 4) To verify that an MS in Packet transfer mode, except for an MS Class A in dedicated mode, when it receives an updated value of TA from the BTS on the downlink PTCCH, uses the last received TA value for the uplink transmission, respecting conformance requirement 10.

5) To verify that an MS in Packet transfer mode, except for an MS Class A in dedicated mode, upon initiation of the continuous timing advance procedure shall disregard the TA values on PTCCH until it has sent its first access burst on PTCCH.

6) To verify that an MS in Packet transfer mode, except for an MS Class A in dedicated mode, if it receives a packet polling message as defined in conformance requirement 6, sends 4 access bursts on a network assigned uplink resource.

7) To verify that an MS in Packet transfer mode, except for an MS Class A in dedicated mode, if it receives a resource assignment or power control/timing advance message (see 3GPP TS 04.60), uses the included TA value until it receives a new value on PTCCH.

8) To verify that an MS in Packet transfer mode, except for an MS Class A in dedicated mode, if it receives a packet resource assignment (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) indicating to the MS

that it can only start the uplink transmission on PDTCH after the timing advance is obtained by the continuous update procedure, it starts the packet transfer after the TA value is received on the PTCCH respecting conformance requirement 10.

9) To verify that an MS in Packet transfer mode, except for an MS Class A in dedicated mode, if it receives a packet resource assignment (see 3GPP TS 04.08 / 3GPP TS 24.008 and 3GPP TS 04.60) indicating that a default timing advance shall be used, does not use the continuous timing advance procedure.

15.8.4 Method of test

Initial conditions

The SS sets the System Information parameter CONTROL_ACK_TYPE to "0".

The MS is GPRS Attached and PDP context activated.

NOTE:

EGPRS PACKET CHANNEL REQUEST shall be used in the following cases

a. If Release of EGPRS supported is Release 4 or above.

b. If Support of EGPRS Packet Access enhancement is True for a R99 MS.

CHANNEL REQUEST shall be used if support of EGPRS Packet Access enhancement is False for a R99 MS.

Procedure

a) The SS pages MS on the PCH. The SS measures the receive/transmit delay for each burst. MS may send EGPRS PACKET CHANNEL REQUEST or CHANNEL REQUEST (See note). The SS then completes the uplink TBF to receive the Page response.

b) The MS is made to send an EGPRS Packet Channel Request / Channel Request by triggering the MS to send a minimum of 6000 octets. The SS transmits a packet resource assignment to the MS with a valid TAI and EGPRS channel coding command as MCS-5. The SS transmits a TA value on the PTCCH for this TAI which is neither 0 nor 1. The SS measures the receive/transmit delay for each burst.

c) The SS transmits a number of different TA values on the PTCCH for the TAI assigned to the MS. The SS also changes the TA values on the PTCCH for the other TAI in such a way that there is no correlation between TA values. The SS measures the receive/transmit delay for each burst.

d) The SS transmits a new TA value, different by more than 1 from the previously transmitted one, in such a way that the MS can only correctly receive the last (4th) occurrence of the new TA value. The SS measures the receive/transmit delay for each burst. The uplink TBF is terminated.

e) The MS is made to send an EGPRS Packet Channel Request / Channel Request by triggering the MS to send a minimum of 6000 octets. The SS sends a Packet Polling addressing the MS with its TFI. The SS measures the receive/transmit delay for each of the 4 access.

f) The SS sends a Packet Uplink Assignment to the MS with valid TIMING_ADVANCE_INDEX, TIMING_ADVANCE_TIMESLOT_NUMBER, TIMING_ADVANCE_VALUE and EGPRS channel coding command as MCS-5. As part of the subsequent continuous timing advance update procedure, the SS sends a timing advance value on the downlink PTCCH for the MS, that is different from the TIMING_ADVANCE_VALUE in the Packet Uplink Assignment. The SS measures the receive/transmit delay for several bursts, once before the MS should be using the updated TA and once after the MS should be using the updated TA, using the conditions defined in Conformance requirement 10).

g) The MS is brought back to Packet idle mode. The SS sends a Packet Downlink Assignment to the MS with no valid Timing Advance included. The SS polls the MS by sending an RLC Block coded with MCS-5. The SS waits 2 seconds and then sends a PACKET POWER CONTROL/TIMING ADVANCE message with valid timing advance information. The SS sends further RLC Blocks. The SS measures the receive/transmit delay for several bursts.

h) The MS is made to send an EGPRS Packet Channel Request / Channel Request by triggering the MS to send a minimum of 6000 octets. The SS sends a Packet Uplink Assignment to the MS with

TIMING_ADVANCE_VALUE set to a value different from the last one ordered on the PTCCH, EGPRS channel coding command as MCS-5 and the TIMING_ADVANCE_INDEX and TIMING_ADVANCE_TIMESLOT_NUMBER fields not present. The SS continues to transmit TA values on the PTCCH. These shall be different from the TA value TIMING_ADVANCE_VALUE in the Packet Uplink Assignment. The SS measures the receive/transmit delay for several bursts once after the transmission of the Packet Uplink Assignment, and once after the SS transmits the new TA using the continuous update procedure for the TAI chosen in step g), using the conditions defined in Conformance requirement 10).

15.8.4.3 Test requirement

The measured receive/transmit delay for each burst shall equal the following nominal values with an absolute tolerance of ±1 symbol period.

access bursts: 3 timeslots (= 45/26 ms).

normal bursts: 3 timeslots (= 45/26 ms) minus the last TA value received from the SS.

In step a) the MS shall transmit an access burst on the RACH.

In step b) the MS shall send access bursts on the PTCCH on the subchannel defined by the TAI with TA = 0.

In step c) the MS shall use the updated TA values.

In step d) the MS shall use the updated TA value.

In step e) the MS shall transmit 4 access bursts.

In step f) the MS shall use the TIMING_ADVANCE_VALUE in the Packet Uplink Assignment first, and change to the Timing Advance value transmitted on the downlink PTCCH in response to the sending of an access burst on the uplink PTCCH.

In step g) the MS shall not transmit Normal Bursts on the allocated resources before it received a Timing Advance value via a PACKET POWER CONTROL/TIMING ADVANCE message on the downlink PACCH.

In step h) the last TA value received from the SS is the TIMING_ADVANCE_VALUE in the Packet Uplink Assignment.

15.9 Timing Advance whilst in DTM

15.9.1 Conformance requirements

A MS class A in dedicated or dual transfer mode shall the procedures described in sub-clause 6.5.1.

When the MS receives a new value of TA from the BTS on the SACCH, it shall implement the new value of TA at the first TDMA frame belonging to the next reporting period (as defined in 3GPP TS 05.08), after the SACCH frame containing the new TA value. On channels used for a voice group call, the TA value sent by the BTS applies only to an MS currently allocated the uplink.

The MS shall signal the used TA to the BTS on the SACCH.

A mobile station in DTM shall disable the timing advance features for the GPRS side:

- the mobile station shall inhibit the transmission of timing advance access bursts;

- the mobile station shall ignore the reception of GPRS timing advance messages, if any.

References

3GPP TS 05.10/45.010 sub-clauses 6.5.2, 6.5.1

3GPP TS 03.55 sub-clauses 5.1

15.9.2 Test purpose

To verify that the MS disregards any PS timing advance information that it receives and only uses CS TA information.

15.9.3 Method of test

Initial Conditions

System Simulator:

1 cell, DTM supported.

Mobile Station:

The MS is in the active state (U10) of a call.
The MS is GPRS idle with a P-TMSI allocated and the PDP context 1 activated.

Specific PICS Statement(s):

- DTM/GPRS Multislot Class 5 (TSPC_DTM_GPRS_Multislot_Class_5)

- DTM/GPRS Multislot Class 9 (TSPC_DTM_GPRS_Multislot_Class_9)

PIXIT Statements:

-

Test Procedure

The MS is triggered to initiate packet uplink transfer data and sends a DTM REQUEST message to the SS. On receiving the DTM REQUEST message, requesting uplink resources, the SS assigns the MS PS resources in a timeslot adjoining the CS resource. The SS accomplishes the resource assignment by passing a PACKET ASSIGNMENT message to the MS. Once the SS has verified that the MS is correctly sending RLC data blocks to the SS, the SS starts to vary the TA ordered by both PS and CS signalling.

The SS signals the TA values 10, 20, 30, 40, 50, 60, 63, and one random value other than these values to the MS in consecutive SACCH blocks.

The SS then signals the TA values of 10, 20, 30, 40, 50 on the PS domain to the MS.

The SS then sends a PACKET POWER / TIMING ADVANCE message to the MS, ordering the MS to change the TA to a random value (different from previous value) and verifies that the MS does not change the TA of transmissions.

Test requirement

The measured receive/transmit delay for each burst shall equal the following nominal values with an absolute tolerance of ±1 bit period:

normal bursts: 3 timeslots (= 45/26 ms) minus the last TA value received from the SS.

The MS shall use the new CS TA at the first opportunity, but shall not change the TA of the MS for any TA received in signalling on the PTCCH

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	MS		MS in state U10 of Call on Timeslot N (chosen arbitrarily) with Channel Type = TCH/F.
2	MS		Trigger the MS to initiate an uplink packet transfer containing 3k octets.
3	MS->SS	DTM REQUEST	
4	SS->MS	PACKET ASSIGNMENT	Assigning uplink resources on timeslot (N ± 1) MOD 8. Including timing advance index (arbitrarily chosen)
5	MS<->SS	{ Uplink data transfer }	Macro – 1k octets
5A			The SS schedules the TA values 10, 20, 30, 40, 50, 60, 63, and one random value other than these values to the MS in consecutive SACCH blocks. The SS then schedules the TA values of 10, 20, 30, 40, 50 on the downlink PTCCH. After scheduling each TA value on PTCCH/D, assign a valid USF to receive uplink RLC data block.
6	SS->MS	PACKET POWER / TIMING ADVANCE	
7	MS->SS	RLC UPLINK DATA	
8	MS->SS	RLC UPLINK DATA	
9	SS		Verifies that MS has not implemented the TA ordered in the PACKET POWER / TIMING ADVANCE message.
10		{ Uplink Data Transfer }	Macro - Completion of the Data.

Specific Message Contents:

PACKET POWER CONTROL/TIMING ADVANCE message:

MESSAGE_TYPE	000101
Global Packet Timing Advance - {0|1<TIMING_ADVANCE_VALUE>} - TIMING_ADVANCE_VALUE - {0|1<TIMING_ADVANCE_INDEX> <TIMING_ADVANCE_TIMESLOT_NUMBER>}	 1 Random value (different from previous value) 0 (no TIMING_ADVANCE_INDEX)

16 Reception time tracking speed

16.1 Definition

Reception time tracking speed is the speed at which the MS adapts its transmit time to a change in the timing of the received signal.

16.2 Conformance requirement

If the MS determines that the timing difference with signals received from the BS exceeds 2 μs, the MS shall adjust its timebase in steps of 1/4 bit period, in intervals not less than 1 s and not greater than 2 s until the timing difference is less than 1/2 bit period at 3 dB below reference sensitivity and 3 dB less carrier to interference ratio than the reference interference ratios.

3GPP TS 05.10, subclauses 6 and 6.2.

16.3 Test purpose

1) To verify that the MS adapts its transmit time to the timing of the received signal as in the conformance requirement under TU High propagation conditions at 2 dB above reference sensitivity level( ).

2) To verify that the MS adapts its transmit time to the timing of the received signal as in the conformance requirement under RA propagation conditions at 2 dB above reference sensitivity level( ).

NOTE: This test is performed at a level higher than in the conformance requirement because of test implementation problems.

16.4 Method of test

16.4.1 Initial conditions

The SS sets up a call according to the generic call set up procedure on a channel in the Mid ARFCN range.

The SS sets TUHigh.

16.4.2 Procedure

a) After 10 s the SS sets the input signal level to 2 dB above reference sensitivity level( ).

b) For the last second before step c) the SS takes an average receive/transmit delay of all bursts in that 1 s.

c) The SS increases the delay of the transmitted signal to the MS by a 2 bit step (about 7,4 µs) and keeps this delay for 20 s.

d) The SS measures the absolute receive/transmit delay for each burst.

e) The SS increases the input signal level to 5 dB above reference sensitivity level( ) and sets propagation condition RA.

f) The SS repeats steps a) to d).

16.5 Test requirement

The MS shall adjust the timing of its transmit burst back to the correct receive/transmit timing delay. All burst timings shall be within the shaded part of figure 16.1.

bits change
of transmit
timing
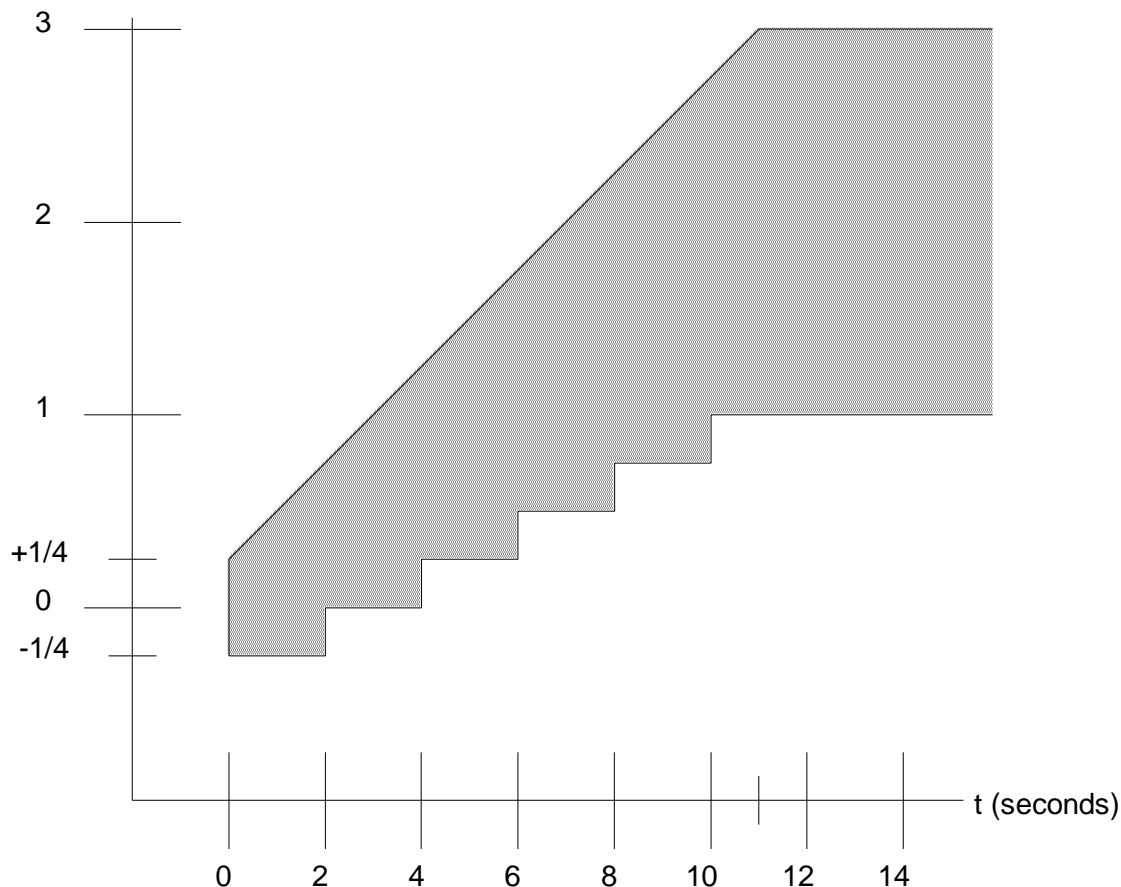
Figure 16.1

NOTE: t = 0 is the time at which the SS makes the transmission timing step change in c) of subclause 16.4.2.

17 Access times during handover

17.1 Intra cell channel change

17.1.1 Definition

The access times are:

- the time between either receipt by the MS of the last timeslot of the message block containing an ASSIGNMENT COMMAND or HANDOVER COMMAND and the time it has to be ready to transmit on the new channel; and

- the time between the end of the last complete speech or data frame or message block sent on the old channel and the time the MS is ready to transmit on the new channel.

For E-GSM 900 and R-GSM 900 MS this test is performed in the P-GSM band (see table 3.3 P-GSM 900ARFCN ranges).

17.1.2 Conformance requirement

1) When for an intracell channel change, the MS receives an ASSIGNMENT COMMAND command or a HANDOVER COMMAND it shall be ready to transmit on the new channel within 120 ms of the last timeslot of the message block containing the command.

> 3GPP TS 05.10, subclause 6.8.

2) For an intracell channel change, the time between the end of the last complete speech or data frame or message block sent on the old channel and the time the MS is ready to transmit on the new channel shall be less than 20 ms.

> 3GPP TS 05.10, subclause 6.8.

17.1.3 Test purpose

1) To verify that the MS, when commanded to perform an intracell channel change to a new ARFCN and/or a new timeslot number within the same cell, if the starting time is not used in the ASSIGNMENT COMMAND, is ready to transmit on the new channel within 120 ms of the last timeslot containing the ASSIGNMENT COMMAND.

2) To verify that the MS, when commanded to perform an intracell channel change to a new ARFCN and/or a new timeslot number within the same cell, if the starting time is not used in the ASSIGNMENT COMMAND, is ready to transmit on the new channel within 20 ms of the last complete speech/data frame or message block sent on the old channel.

17.1.4 Method of test

17.1.4.1 Initial conditions

The SS sets up a call according to the generic call set up procedure on a channel in the Low ARFCN range on timeslot 1.

17.1.4.2 Procedure

a) The SS sends an ASSIGNMENT COMMAND to the MS allocating a channel in the high ARFCN range on timeslot 2, and with a power command of 7. These old and new carriers have a relative frequency tolerance of 0, and a relative timing tolerance of 1/4 bit.

b) The SS, after it has sent the ASSIGNMENT COMMAND, measures the reception time of bursts received on the new channel, and the time at which transmission ceases on the old channel.

t = 120 ms
(26 frames)

t = 0

DOWNLINK
(Source)

last timeslot containing   t = 0
ASSIGNMENT COMMAND

IDLE
frame

MS able to transmit

UPLINK
(Destination)

UPLINK
(timeslots)

t = 120 ms
MS ready to transmit

1st transmission
on new channel
MS able to transmit

DOWNLINK
(timeslots)

MS not allowed to transmit, as
this is last burst of a traffic
channel block.
Reference GSM 05.02 Section 7
Table 1 of 5
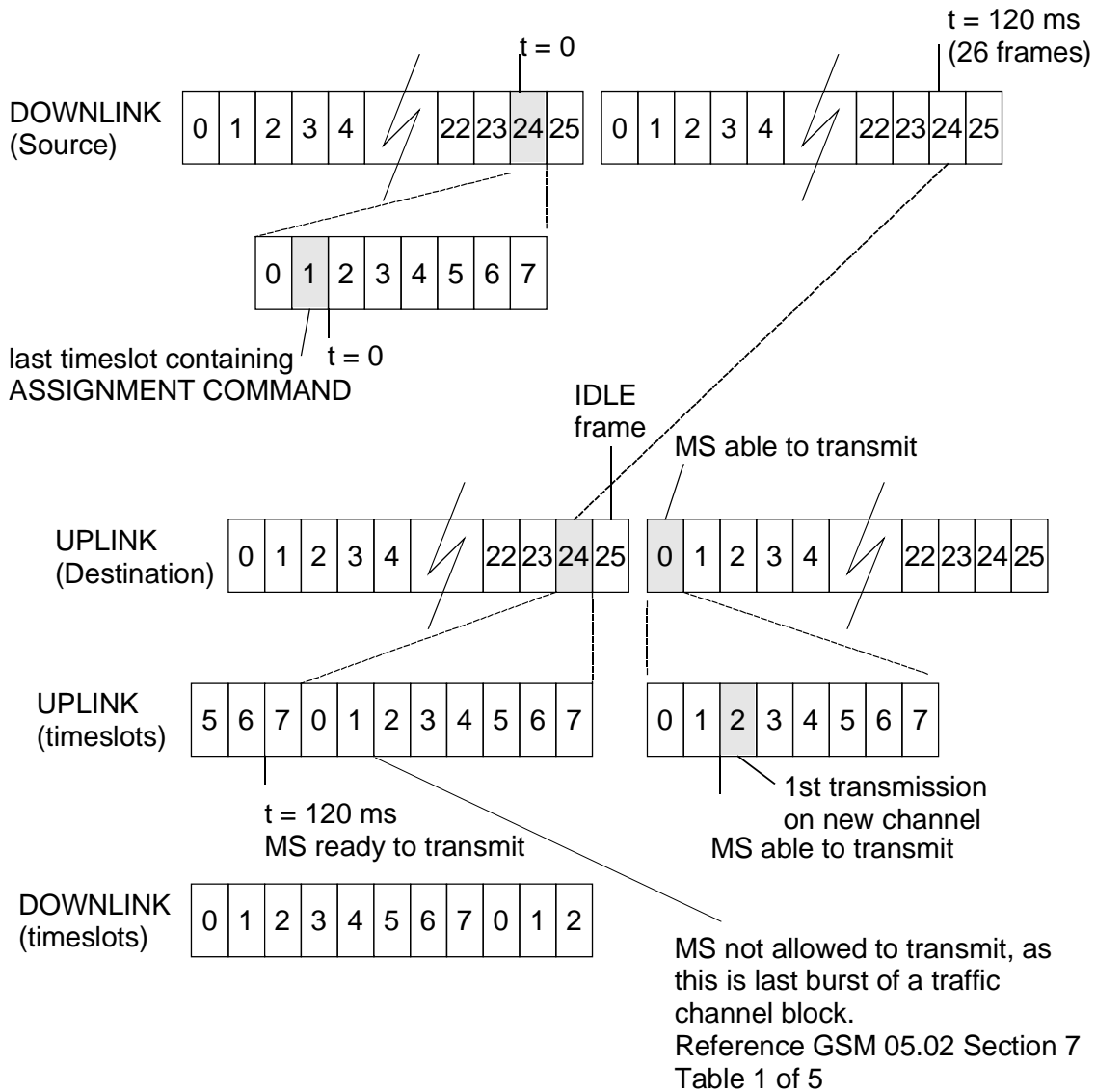
Timing difference between
Downlink and Uplink is 3
timeslots.

Relative timing difference
between the 2 carriers is a
1/4 bit period.

Maximum time to first
transmission on the new
channel is 131 ms (120ms
+ 2 frames + 3 timeslots
+ 1/4 bit period)

Figure 17-1: Access time - Intra cell channel change (Test Requirement 1)
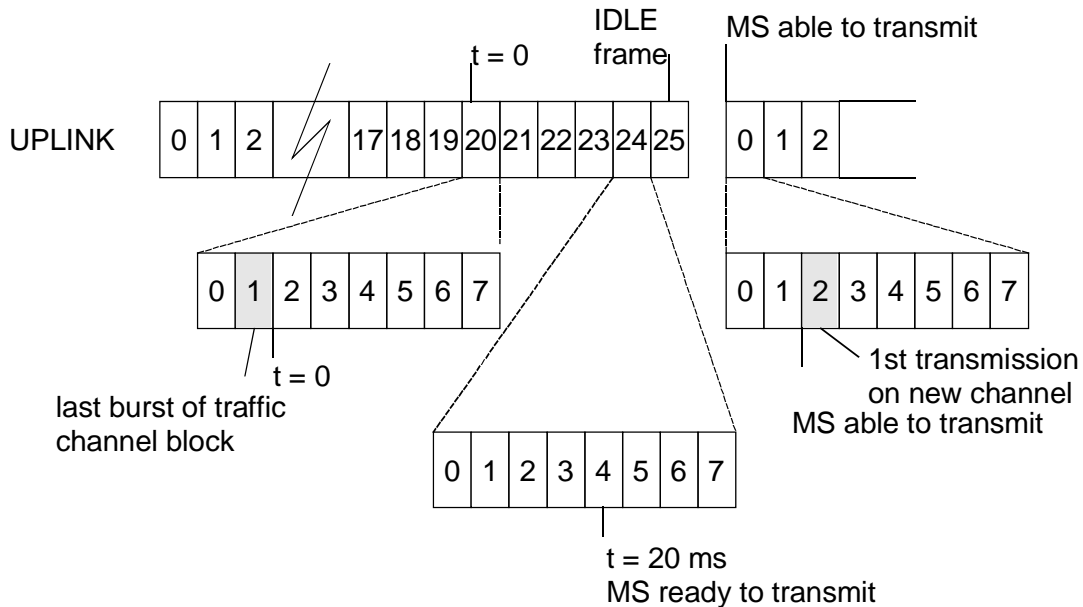
Figure 17-2: Access time - Intra cell channel change (Test Requirement 2)

17.1.5 Test requirement

1) The MS shall transmit its first burst on the new channel within 131 ms from the last timeslot of the message block containing the ASSIGNMENT COMMAND.

NOTE 1: The requirement time of 120 ms, at which the MS shall be ready to transmit, will expire right at the beginning of a new downlink burst on timeslot 2, which will be the last burst of a traffic channel block, The following frame could be an IDLE frame and the MS would then transmit in the next frame. Taking into account the 3 timeslot shift between up and downlink, and the 1/4 bit relative timing tolerance between the carriers, means that the MS may first transmit on the new channel after 131 ms (120 ms + 2 frames + 3 timeslots + 1/4 bit period). See figure 17-1.

2) The MS shall transmit its first burst on the new channel within 27,7 ms from the last complete speech or data frame or message block sent on the old channel.

NOTE 2: The requirement time of 20 ms, at which the MS shall be ready to transmit, will expire at just over 4 frames after the sending of the last bit on the old channel. The next frame could be an IDLE frame and the MS would then transmit in the following frame. This equates to 6 frames so in the worst case, including the 1/4 bit relative timing tolerance between the carriers, the MS may take 27,7 ms before starting transmissions on the new channel.

17.2 Inter cell handover

17.2.1 Definition

The access times are:

- the time between receipt by the MS of the last timeslot of the message block containing a HANDOVER COMMAND and the time it has to be ready to transmit on the new channel; and

- the time between the end of the last complete speech or data frame or message block sent on the old channel and the time the MS is ready to transmit on the new channel.

17.2.2 Conformance requirement

1) When the MS receives a HANDOVER COMMAND it shall be ready to transmit on the new channel within 120 ms of the last timeslot of the message block containing the HANDOVER COMMAND.

3GPP TS 05.10, subclause 6.8

2) The time between the end of the last complete speech or data frame or message block sent on the old channel and the time the MS is ready to transmit on the new channel shall be less than 20 ms.

 3GPP TS 05.10, subclause 6.8.

3) When the MS receives a new TA value in response to a handover access burst, the MS shall be ready to transmit using the new TA value within 40 ms of the end of the last timeslot of the message block containing the new TA.

 3GPP TS 05.10, subclause 6.9.

4) The MS shall use a TA value of 0 for the handover access bursts sent.

 3GPP TS 05.10, subclause 6.6.

17.2.3 Test purpose

1) To verify that the MS, when commanded to handover on a new ARFCN and a new timeslot number in a new, not synchronized cell, starting time not used in the HANDOVER COMMAND, will be ready to transmit on the new channel within 120 ms of the last timeslot containing the HANDOVER COMMAND.

2) To verify that the MS, when commanded to handover on a new ARFCN and a new timeslot number in a new, not synchronized cell, starting time not used in the HANDOVER COMMAND, will be ready to transmit on the new channel within 20 ms of the last complete speech or data frame or message block sent on the old channel.

3) To verify that the MS, when it receives a new TA value in response to a handover access burst, is ready to transmit using the new TA value within 50 (40+10) ms of the end of the last timeslot of the message block containing the new TA value.
 Note: The required response time of 40 ms is increased by 10 ms to take the time into account when the next opportunity to transmit the updated values occurs, also considering a possible idle frame.

4) To verify that the MS uses a TA value of 0 for the handover access burst sent.

17.2.4 Method of test

17.2.4.1 Initial conditions

The SS establishes two non-synchronized cells, A and B, under ideal radio conditions. A is the old cell and B is the target for the handover.

The SS uses two traffic channels with the following properties:

Band	Cell A			Cell B		
	TN	**ARFCN**	**Offset (Hz)**	**TN**	**ARFCN**	**Offset (Hz)**
GSM 450	2	259	+240	0	293	-240
GSM 480	2	306	+260	0	340	-260
GSM 710	2	438	+244	0	511	-244
GSM 750	2	438	+250	0	511	-250
T-GSM 810	2	438	+244	0	511	-244
GSM 850	2	128	+252	0	251	-252
GSM 900	2	1	+267	0	124	-267
DCS 1800	2	512	+320	0	885	-320
PCS 1900	2	512	+366	0	810	-366

NOTE 1: In each band, Cell A uses the lowest and Cell B the highest allowed carrier. For GSM710 and T-GSM810 the ARFCNs above are based on the values below (see 3GPP TS 45.005, 3GPP TS 44.018) to achieve the same result.

Parameter	3GPP TS 04.08 / 3GPP TS 44.018 reference	Abbr.	Normal Setting

Parameter	3GPP TS 04.08 / 3GPP TS 44.018 reference	Abbr.	Normal Setting
GSM_Band (4 bit field)	10.5.2.11b	-	0110 – GSM 710 Or 0111 – T-GSM 810
ARFCN_FIRST	10.5.2.11b	-	1
BAND_OFFSET	10.5.2.11b	-	438
ARFCN_RANGE	10.5.2.11b	-	90

NOTE 2: The offset is representing worst cases:

for Doppler shift due to a velocity chosen according to the band:

Band	Velocity (kph)
GSM 450, GSM 480	500
GSM 710, GSM 750	300
T-GSM 810, GSM 850, GSM 900	250
DCS 1800, PCS 1900	130

and a frequency inaccuracy of 0,05 ppm.

The BCCH for the two cells have the following differences in timing:

Timer T1   50;

Timer T2   15;

Timer T3   40;

1/4 bit number   17;

Timeslots   2.

The SS sets up a call according to the generic call set up procedure on the channel in cell A.

17.2.4.2   Procedure

a) The SS sends a HANDOVER COMMAND on the main DCCH on cell A ordering the MS to go to the channel in cell B. The power command is set to 7.

b) After the SS has sent HANDOVER COMMAND it measures the reception time of bursts received on the new channel and the time at which transmission ceases on the old channel.

c) The SS also measures the absolute transmit/receive delay for the access bursts on the new channel.

d) The SS sends the PHYSICAL INFORMATION with TA set to 50. The SS then measures the reception time and absolute delay of the bursts transmitted on the new cell.

17.2.5   Test requirement

1) The MS shall transmit its first burst on cell B within 142,6 ms from the last timeslot of the message block containing the HANDOVER COMMAND.

NOTE 1: The requirement time of 120 ms, at which the MS shall be ready to transmit, will expire right at the end of the last burst of a downlink traffic channel block on the old channel. Due to the two timeslot difference in cell timing, the two timeslots difference in the channel allocation and the 15 frames difference in multiframe timing, this point could occur 2,5 frames before the end of the last burst of a downlink traffic channel block on the new channel. The following frame could be an IDLE frame and the MS would then transmit in the next frame. Taking into account the three timeslot shift between up and downlink, and the 17 1/4 bit periods timing difference between the two carriers, means that the MS may first transmits on the new channel after 142,6 ms (120 ms + 2,5 frames + 2 frames + 3 timeslots + 17 1/4 bit periods).

2) The MS shall transmit its first burst on cell B within 39,2 ms from the last complete speech or data frame or message block sent on cell A.

NOTE 2: The requirement time of 20 ms, at which the MS shall be ready to transmit, will expire at just over 4 frames after the sending of the last bit on the old channel. Due to the two timeslot difference in cell timing, the two timeslots difference in the channel allocation and the 15 frames difference in multiframe timing, this point could occur 2 frames before the end of the last burst of an uplink traffic channel block on the new channel. The following frame could be an IDLE frame and the MS would then transmit in the next frame. This equates to 8,5 frames so in the worst case the MS may take 39,2 ms between cessation of transmission on the old channel and transmission beginning on the new channel.

3) The MS shall transmit using the TA value in the PHYSICAL INFORMATION within 50 ms from the end of the last timeslot of the message block containing the new TA value.

4) The measured absolute delay for the access bursts in steps c) and d) shall equal 3 timeslots (=45/26 ms), with an absolute tolerance of ±1 bit.

18 Temporary reception gaps

18.1 Temporary reception gaps, single slot

18.1.1 Definition

A temporary reception gap is a limited period of time in which the RF reception is interrupted. During this gap the MS shall maintain the frequency and timing of its transmission within specifications.

18.1.2 Conformance requirement

1) During a temporary total loss of signal, of up to 64 SACCH block periods, the MS shall update its timebase with a clock which is accurate to within 0,2 ppm, or to within 0,2 ppm of the signals previously received from the BTS. The MS shall use the same frequency source for both RF frequency generation and clocking the timebase.

   3GPP TS 05.10, subclauses 6.1 and 6.7.

2) The MS shall time its transmissions to the BTS according to signals received from the BTS. The MS transmissions to the BTS, measured at the MS antenna, shall be 3 timeslots - TA behind the transmissions received from the BTS, where TA is the last timing advance received from the current serving BTS.

   3GPP TS 05.10, subclause 6.4.

3) During a temporary total loss of signal, of up to 64 SACCH block periods, the MS shall update its timebase with a clock which is accurate to within 0,2 ppm, or to within 0,2 ppm of the signals previously received from the BTS.

   3GPP TS 05.10, subclause 6.7.

18.1.3 Test purpose

1) To verify that, during a temporary total loss of signal of up to 63 SACCH block periods, the MS carrier frequency is accurate to within 0,2 ppm of the signals previously received from the BTS.

2) To verify that, the MS transmissions to the BTS, measured at the MS antenna, is 3 timeslots behind the transmissions received from the BTS, with a tolerance of ±1 bit period.

3) To verify that, during a temporary total loss of signal, of up to 63 SACCH block periods, the MS transmission timing may have drifted resulting in an error not greater than ±6,048 μs (0,2 ppm of 63 SACCH blocks).

18.1.4 Method of test

18.1.4.1 Initial conditions

The SS signals RADIO_LINK_TIMEOUT = 64 and "DTX OFF" on the BCCH.

The MS is brought into MM state "idle, updated".

After 10 s, the SS continues to set up a call according to the generic call set up procedure.

18.1.4.2 Procedure

a) The SS, in a TDMA frame immediately following the transmission of a complete SACCH block, removes the downlink signal for 63 SACCH blocks.

NOTE: This gives the maximum temporary reception gap.

b) The SS measures the frequency and timing of the MS transmissions immediately before, and at least 5 times at approximately equally spaced intervals during the gap, one of these measurements being at the end of the gap.

c) The SS resumes transmission for a period sufficient to allow the MS reception of 1 SACCH block.

d) The SS again removes downlink transmission for a period equal to at least 3 SACCH blocks. The SS measures the frequency and timing of the MS transmissions immediately before and during this second reception gap.

18.1.5 Test requirement

1) The MS carrier frequency shall be accurate to within 0,2 ppm compared to signals received from the SS.

2) At the start of the first reception gap the MS receive/transmit delay timing shall be 3 timeslots ± 1 bit.

NOTE: The SS determines the error from the first measurement of MS transmission frequency and timing.

3) During the second reception gap the MS shall maintain transmission for a period up to but not exceeding 3 SACCH blocks.

4) During the first, maximum, reception gap the MS transmission timing may have drifted resulting in an error of not greater than ±6,048 μs.

NOTE: The SS determines the error at the start of the reception gap from the first measurement of MS transmission frequency and timing.

18.2 Temporary reception gaps in HSCSD multislot configurations

18.2.1 Definition

A temporary reception gap is a limited period of time in which the RF reception is interrupted. During this gap the MS shall maintain the frequency and timing of its transmission within specifications.

18.2.2 Conformance requirement

1) During a temporary total loss of signal, of up to 64 SACCH block periods, the MS shall update its timebase with a clock which is accurate to within 0,2 ppm, or to within 0,2 ppm of the signals previously received from the BTS. The MS shall use the same frequency source for both RF frequency generation and clocking the timebase.

> 3GPP TS 05.10, subclauses 6.7 and 6.1.

2) The MS shall time its transmissions to the BTS according to signals received from the BTS. The MS transmissions to the BTS, measured at the MS antenna, shall be 3 timeslots - TA behind the transmissions received from the BTS, where TA is the last timing advance received from the current serving BTS.

> 3GPP TS 05.10, subclause 6.4.

3) During a temporary total loss of signal, of up to 64 SACCH block periods, the MS shall update its timebase with a clock which is accurate to within 0,2 ppm, or to within 0,2 ppm of the signals previously received from the BTS.

> 3GPP TS 05.10, subclause 6.7.

18.2.3 Test purpose

1) To verify that, during a temporary total loss of signal of up to 63 SACCH block periods on the main multislot channel, the MS carrier frequency is accurate to within 0,2 ppm of the signals previously received from the BTS.

2) To verify that, the MS transmissions to the BTS, measured at the MS antenna, is 3 timeslots behind the transmissions received from the BTS, with a tolerance of ±1 bit period.

3) To verify that, during a temporary total loss of signal, of up to 63 SACCH block periods on the main multislot channel, the MS transmission timing may have drifted resulting in an error not greater than ± 6,048 µs (0,2 ppm of 63 SACCH blocks).

4) To verify that, during a temporary loss of more than 64 SACCH block periods on other than the main channel in symmetric configuration, the MS meet the requirements 1, 2 and 3.

18.2.4 Method of test

18.2.4.1 Initial conditions

The SS signals RADIO_LINK_TIMEOUT = 64 and "DTX OFF" on the BCCH.

The MS is brought into MM state "idle, updated".

After 10 s, the SS continues to set up a call according to the generic call set up procedure for multislot HSCSD.

The SS commands the MS to operate in a highest possible asymmetric configuration, with a maximum number of downlink timeslots.

18.2.4.2 Procedure

a) The SS, in a TDMA frame immediately following the transmission of a complete SACCH block, removes the downlink signal for 63 SACCH blocks of the main channel.

NOTE: This gives the maximum temporary reception gap.

b) The SS measures the frequency and timing of the MS transmissions immediately before, and at least 5 times at approximately equally spaced intervals during the gap, one of these measurements being at the end of the gap.

c) The SS resumes transmission for a period sufficient to allow the MS reception of 1 SACCH block.

d) The SS again removes downlink transmission for a period equal to at least 3 SACCH blocks of the main channel. The SS measures the frequency and timing of the MS transmissions immediately before and during this second reception gap.

e) SS signals RADIO_LINK_TIMEOUT=64 and commands the MS to operate in a highest possible symmetric multislot configuration, with a maximum number of uplink timeslots.

f) For a symmetric multislot configuration steps a) and b) are repeated with the exception that a 69 SACCH blocks are removed from a channel other than the main channel.

18.2.5 Test requirement

1) The MS carrier frequency shall be accurate to within 0,2 ppm compared to signals received from the SS.

2) The receive/transmit delay timing shall be 3 timeslots ± 1 bit.

3) During the second reception gap the MS shall maintain transmission for a period up to but not exceeding 3 SACCH blocks.

4) During the first, maximum, reception gap the MS transmission timing may have drifted resulting in an error of not greater than ±6,048 µs.

5) During the last reception gap, the MS shall maintain transmission.

NOTE: The SS determines the error at the start of the reception gap from the first measurement of MS transmission frequency and timing.

19 Channel release after unrecoverable errors

NOTE: It is not possible to explicitly verify the correct functioning of all aspects of the radio link failure algorithm in the MS. Therefore 3 tests are used to implicitly verify correct implementation.

19.1 Channel release after unrecoverable errors - 1

19.1.1 Definition

Channel release after unrecoverable errors is a procedure to abort the call if the radio link has been severely corrupted for some time, according to a link failure criterion.

19.1.2 Conformance requirement

1) If the MS is unable to decode a SACCH message, the radio link counter S is decreased by 1. In the case of a successful reception of a SACCH message S is increased by 2. In any case S shall not exceed the value of RADIO_LINK_TIMEOUT. If S reaches 0 a radio link failure shall be declared.

   3GPP TS 05.08, subclause 5.2.

2) The MS shall continue transmitting as normal on the uplink until S reaches 0.

   3GPP TS 05.08, subclause 5.2.

3) The algorithm shall start after the assignment of a dedicated channel and S shall be initialized to RADIO_LINK_TIMEOUT.

   3GPP TS 05.08, subclause 5.2.

4) (Re-)initialization and start of the algorithm shall be done whenever the MS switches to a new channel (this includes the old channel in assignment and handover failure cases), at the latest when the main signalling link (see 3GPP TS 04.08 / 3GPP TS 44.018) has been established.

   3GPP TS 05.08, subclause 5.2.

19.1.3 Test purpose

1) To verify correct handling of the radio link counter S.

2) To verify that the MS that is transmitting continues to transmit as normal on the uplink until S reaches 0.

3) To verify that the algorithm starts after the assignment of a dedicated channel, with S initialized to RADIO_LINK_TIMEOUT.

4) To verify that the MS declares RADIO_LINK_FAILURE, and clears the RR connection when S = 0.

19.1.4 Method of test

19.1.4.1 Initial conditions

The SS sends a default value for the parameter RADIO_LINK_TIMEOUT on the BCCH. CALL RE-ESTABLISHMENT is not allowed.

19.1.4.2 Procedure

a) A MS terminated call is set up according to the generic call set up procedure. The SS sends a randomly choosen value N for the parameter RADIO_LINK_TIMEOUT on SACCH (System Information Type 6). This must be different than that sent on the BCCH.

b) The SS sends 32 error free SACCH messages, followed by N SACCH messages that contain unrecoverable errors, and then continuously sends error free SACCH messages.

NOTE: The SS shall continue sending error free SACCH messages for a time that allows the MS to release the RR connection.

c) The SS repeats steps a) to b).

19.1.5 Test requirement

After receiving the N SACCH messages with unrecoverable errors, the MS shall abort the RR-connection, i.e. there is no more MS activity on the SACCH channel.

19.2 Channel release after unrecoverable errors - 2

19.2.1 Definition

Channel release after unrecoverable errors is a procedure to abort the call if the radio link has been severely corrupted for some time, according to a link failure criterion.

19.2.2 Conformance requirement

1) If the MS is unable to decode a SACCH message, the radio link counter S is decreased by 1. In the case of a successful reception of a SACCH message S is increased by 2. In any case S shall not exceed the value of RADIO_LINK_TIMEOUT. If S reaches 0 a radio link failure shall be declared.

  3GPP TS 05.08, subclause 5.2.

2) The MS shall continue transmitting as normal on the uplink until S reaches 0.

  3GPP TS 05.08, subclause 5.2.

3) The algorithm shall start after the assignment of a dedicated channel and S shall be initialized to RADIO_LINK_TIMEOUT.

  3GPP TS 05.08, subclause 5.2.

4) (Re-)initialization and start of the algorithm shall be done whenever the MS switches to a new channel (this includes the old channel in assignment and handover failure cases), at the latest when the main signalling link (see 3GPP TS 04.08 / 3GPP TS 44.018) has been established.

  3GPP TS 05.08, subclause 5.2.

19.2.3 Test purpose

1) To verify correct handling of the radio link counter S.

2) To verify that the MS that is transmitting continues to transmit as normal on the uplink until S reaches 0.

3) To verify that the algorithm starts after the assignment of a dedicated channel, with S initialized to RADIO_LINK_TIMEOUT.

19.2.4 Method of test

19.2.4.1 Initial conditions

The SS sends a default value for the parameter RADIO_LINK_TIMEOUT on the BCCH. CALL RE-ESTABLISHMENT is not allowed.

19.2.4.2 Procedure

a) A MS terminated call is set up according to the generic call set up procedure. The SS sends a randomly choosen value N for the parameter RADIO_LINK_TIMEOUT on SACCH (System Information Type 6). This must be different than that sent on the BCCH.

b) The SS sends 2 SACCH messages with unrecoverable errors followed by one error free SACCH message. This step is repeated 64 times.

c) The SS sets N to a different but randomly chosen value, and broadcasts this on the BCCH. The SS repeats steps a) to b).

19.2.5 Test requirement

The MS shall not abort the RR-connection.

19.3 Channel release after unrecoverable errors - 3

19.3.1 Definition

Channel release after unrecoverable errors is a procedure to abort the call if the radio link has been severely corrupted for some time, according to a link failure criterion.

19.3.2 Conformance requirements

1) If the MS is unable to decode a SACCH message, the radio link counter S is decreased by 1. In the case of a successful reception of a SACCH message S is increased by 2. In any case S shall not exceed the value of RADIO_LINK_TIMEOUT. If S reaches 0 a radio link failure shall be declared.

   3GPP TS 05.08, subclause 5.2.

2) The MS shall continue transmitting as normal on the uplink until S reaches 0.

   3GPP TS 05.08, subclause 5.2.

3) The algorithm shall start after the assignment of a dedicated channel and S shall be initialized to RADIO_LINK_TIMEOUT.

   3GPP TS 05.08, subclause 5.2.

4) (Re-)initialization and start of the algorithm shall be done whenever the MS switches to a new channel (this includes the old channel in assignment and handover failure cases), at the latest when the main signalling link (see 3GPP TS 04.08 / 3GPP TS 44.018) has been established.

   3GPP TS 05.08, subclause 5.2.

19.3.3 Test purpose

1) To verify correct handling of the radio link counter S.

2) To verify that the MS that is transmitting continues to transmit as normal on the uplink until S reaches 0.

3) To verify that the algorithm starts after the assignment of a dedicated channel, with S initialized to RADIO_LINK_TIMEOUT.

4) To verify that the MS declares RADIO_LINK_FAILURE, and clears the RR connection when S = 0.

19.3.4 Method of test

19.3.4.1 Initial conditions

The SS sends a default value for the parameter RADIO_LINK_TIMEOUT on the BCCH. CALL RE_ESTABLISHMENT is not allowed.

19.3.4.2 Procedure

a) A MS terminated call is set up according to the generic call set up procedure. The SS sends a randomly choosen value N for the parameter RADIO_LINK_TIMEOUT on SACCH (System Information Type 6) . This must be different than that sent on the BCCH.

b) The SS sends 32 error free SACCH messages, followed by 3 SACCH messages with unrecoverable errors, and the sends 1 error free SACCH message. This step is repeated N - 2 times.

c) The SS shall continuously send error free SACCH messages.

NOTE: The SS shall continue sending error free SACCH messages for a time that allows the MS to release the RR connection.

d) The SS repeats steps a) to c).

19.3.5 Test requirement

After receiving the 3 × (N - 2) erroneous SACCH messages the MS shall abort the RR-connection, i.e. there is no more activity on the SACCH channel.

20 Cell selection and reselection

In the following paragraphs some explanatory text is given concerning the nature of the tests in this clause and the general behaviour of the SS is described.

Since the conformance requirements of most of the tests in this clause cannot be tested explicitly, testing is done implicitly by testing the MS behaviour from its responses to the SS.

The SS transmits one BCCH carrier per cell as indicated in the initial conditions for each test. These are referred to as carrier 1, carrier 2, etc. Each of these cell control channels are non-combined with SDCCHs. For tests in section 20.1 to 20.21, it is assumed that the SS can simultaneously transmit seven BCCH carriers and monitor three random access channels. For all other tests, unless explicitly stated otherwise, it is assumed that the SS can simultaneously transmit 7 BCCH or PBCCH carriers and monitor all RACH and PRACH channels for Cell Selection Testing and all adjacent RACH and PRACH channels for Cell Reselection. For multiband tests it is assumed that at least one of the BCCH carriers and one of the monitored random access channels is in a different frequency band from the others. In some cases, a test is performed in multiple stages in order that the requirements can be tested within the above constraints.

For any MS all the carriers are in its supported band(s) of operation. For an E-GSM mobile station at least one of the carriers is in the extension band and one of the carriers is in the primary band. Note: For an MS supporting Stored List Cell Selection it is necessary to ensure that the SIM does not contain any of the ARFCN's used by each individual Test, otherwise the Test Purpose will not be met as the MS will apply different rules compared to Normal Cell Selection. This can be achieved by either editing the SIM card or initially updating the MS in a cell with no BA in the list. This must apply to all tests in section 20.

Unless otherwise stated in the method of test, in all of the tests of this clause:

- The SS is continuously paging the MS on all carriers at the start of the test and does not respond to RACH requests from the MS. Where a test specifies that the MS is not paged on a particular carrier, only idle paging is transmitted according to 3GPP TS 04.08 / 3GPP TS 44.018, subclause 3.2.2.2.

- The default values of the system information data fields given in table 20.1 are used.

- The SIM is in the idle updated state in the default location area with a TMSI assigned at the beginning of each test.

- The ARFCNs used for the carriers in each test are chosen from those in table 20.1 with adjacent carriers separated by a minimum of three channels.

The absolute accuracy of the MS signal level measurements is assumed to be ±6 dB. A difference of at least 8 dB is allowed for cases of discrimination between C1 or C2 values and 0.

The relative accuracy of the MS signal level measurements is assumed to be ±3 dB for the signal levels used in the tests of this clause, except for subclause 20.20, where the relative accuracy is assumed to be ±5 dB if the measurements are on different frequency bands. A difference of at least 5 dB is allowed for cases of discrimination between C1 or C2 values on different carriers, except for subclause 20.20, where a difference of at least 10 dB is allowed if the measurements are on different frequency bands.

NOTE 1: The accuracy of MS signal level measurements is specified in 3GPP TS 05.08. For all of the tests in this clause, the signal levels used are greater than 1 dB above reference sensitivity level.

NOTE 2: The tolerance on timers specified in 3GPP TS 05.08 is ±10 % except for PENALTY_TIME where it is ±2 s. In the tests of this clause, the test requirements include these tolerances. Consequently, the times stated in the test requirement sometimes differ from the corresponding timer in the conformance requirement.

Where pulsed signals are specified, the SS tolerance on pulse width is ±2 % and the SS tolerance on power level ±1 dB.

Table 20.1: Default values of the system information fields

Parameter	3GPP TS 04.08 / 3GPP TS 44.018 reference	Abbr.	Normal Setting
Cell channel description	10.5.2.1	-	Any values
MAX retrans	10.5.2.29	-	1
TX-integer	10.5.2.29	-	Any value
CELL_BAR_QUALIFY	10.5.2.35	CBQ	0
CELL_BAR_ACCESS	10.5.2.29	CBA	0 (not barred)
AC CN	10.5.2.29	AC	All 0
RE	10.5.2.29	RE	0 (re-establishment allowed)
NCC	10.5.2.2	NCC	Any value
Cell Identity	10.5.1.1	-	Any value
MCC, MNC	10.5.1.3	PLMN	MS Home PLMN
LAC	10.5.1.3	LAC	1111 (Hex)
ATT	10.5.2.11	-	0 (Attach/Detach not allowed)
BS_AG_BLKS_RES	10.5.2.11	-	Any values
CCCH_CONF	10.5.2.11	-	1 basic physical channel used for CCCH, non-combined with SDCCHs.
T3212	10.5.2.11	-	Any values
BS_PA_MFRMS	10.5.2.11	BPM	5 frames
Cell Options	10.5.2.3	-	Any values
CELL_RESELECT_HYSTERESIS	10.5.2.4	CRH	4 dB
MS_TXPWR_MAX_CCH	10.5.2.4	MTMC	Max. output power of MS
RXLEV_ACCESS_MIN	10.5.2.4	RAM	-90 dBm
CELL_RESELECT_OFFSET	10.5.2.35	CRO	0
TEMPORARY_OFFSET	10.5.2.35	TO	0
PENALTY_TIME	10.5.2.35	PT	0
Power Offset	10.5.2.35	PO	0
BA ARFCN	10.5.2.22	BA	All 0 except values in Table 20.1a or 20.1b

Table 20.1a: ARFCNs for Single Band Tests

Band	ARFCNs	broadcast in SYSTEM INFORMATION type
GSM 450	259, 263, 269, 275, 279, 283, 287, 292	SI2
GSM 480	306, 310, 316, 322, 326, 330, 334, 339	SI2
GSM 710	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511	SI2
GSM 750	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511	SI2
T-GSM 810	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511	SI2
GSM 850	130, 136, 145, 152, 168, 170, 176, 177, 181, 185, 189, 193, 197, 207,219, 251	SI2
GSM 900	both P-GSM and E-GSM ARFCNs are broadcast:	
	GSM: 3, 9, 18, 25, 41, 43, 49, 50, 54, 58, 62, 66, 70, 80, 92, 124	SI2
	E-GSM: 985, 989, 995, 1010, 1014	SI2bis
DCS 1800	512, 543, 568, 589, 602, 641, 662, 683, 696, 711, 732, 754, 794, 851, 870, 871, 872, 884	SI2
PCS1900	512, 543, 568, 589, 602, 629, 641, 653, 662, 683, 696, 711, 727, 732, 754, 777, 794, 809	SI2

Table 20.1b: ARFCNs for Multiband Tests

Band	ARFCNs	broadcast in SYSTEM INFORMATION type
GSM 450	259, 263, 269, 275, 279, 283, 287, 292	SI2 (GSM 450 cell) & SI2ter (other band cell)
GSM 480	306, 310, 316, 322, 326, 330, 334, 339	SI2 (GSM 480 cell) & SI2ter (other band cell)
GSM 710	441, 452, 461, 477, 493, 511	SI2 (GSM 710 cell) & SI2ter (other band cell)
GSM 750	441, 452, 461, 477, 493, 511	SI2 (GSM 750 cell) & SI2ter (other band cell)
T-GSM 810	441, 452, 461, 477, 493, 511	SI2 (T-GSM 810 cell) & SI2ter (other band cell)
GSM 850	136, 152, 170, 177, 185, 193, 207, 251	SI2 (GSM 850 cell) & SI2ter (other band cell)
GSM 900	3, 18, 41, 49, 62, 70, 92, 124	SI2 (GSM 900 cell) & SI2ter (other band cell)
DCS 1800	512, 568, 602, 662, 696, 732, 794, 870	SI2 (DCS 1800 cell) & SI2ter (other band cell)
PCS 1900	512, 568, 602, 641, 662, 696, 727, 754	SI2 (PCS 1900 cell) & SI2ter (other band cell)

Table 20.1c: MNC values

Band	MNC value
GSM400, GSM900, DCS1800	01
Otherwise	011

For GSM 710and T-GSM 810 Bands ARFCNs are defined using Dynamic Mapping: 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. The required parameters are as defined in Table 20.1d.

Table 20.1d: ARFCNs for GSM710, T-GSM 810

Parameter	3GPP TS 04.08 / 3GPP TS 44.018 reference	Abbr.	Normal Setting
GSM_Band (4 bit field)	10.5.2.11b	-	0110 – GSM 710 Or 0111 – T-GSM 810
ARFCN_FIRST	10.5.2.11b	-	1
BAND_OFFSET	10.5.2.11b	-	438
ARFCN_RANGE	10.5.2.11b	-	90

Unless otherwise specified all tests in clauses 20.1 to 20.15 are applicable for all MSs supporting the bands identified in Table 20.1a

20.1 Cell selection

20.1.1 Definition

Cell selection is a process in which a MS, whenever a new PLMN is selected, attempts to find a suitable cell of that PLMN to camp on. Two methods of searching for a suitable cell are possible, normal cell selection and stored list cell selection. The process ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink. Once the MS is camped on a cell, access to the network is allowed.

20.1.2 Conformance requirement

1. The MS shall be able to select the correct (fourth strongest) cell and be able to respond to paging on that cell within 30 s of switch on, when the three strongest cells are not suitable. This assumes a valid SIM, with PIN disabled and ideal radio conditions; 3GPP TS 05.08, subclause 6.1.

2. There are various requirements that a cell must satisfy before an MS can perform normal camping on it:

    2.1 (i) It should be a cell of the selected PLMN

    2.2 (ii) It should not be "barred" (see subclause 3.5.1)

    2.3 (iv) The radio path loss between MS and BTS must be below a threshold set by the PLMN operator. This is estimated as shown in subclause 3.6.

    3GPP TS 03.22, subclause 3.2.1.

    NOTE: Criteria (iii) is not applicable for Cell Selection.

3. Initially the MS looks for a cell which satisfies these 4 constraints ("suitable cell") by checking cells in descending order of received signal strength. If a suitable cell is found, the MS camps on it; 3GPP TS 03.22, subclause 3.2.1.

4. The MS shall be able to calculate correctly the path loss criterion parameter C1, used for cell selection and reselection; 3GPP TS 05.08, subclause 6.4.

20.1.3 Test purpose

1. To verify that the MS meets conformance requirement 1.

2. To verify that:

   2.1 The MS does not select a cell of a PLMN which is not the selected PLMN.

   2.2 The MS does not select a cell which is "barred".

   2.3 The MS does not select a cell with C1 < 0.

3. To verify that the MS selects suitable cells in descending order of received signal strength.

4. To verify that the MS does not select a cell with C1 < 0.

20.1.4 Method of test

20.1.4.1 Initial conditions

Parameters changed from the default values in table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	48 / -65	38 / -75	43 / -70	33 / -80	28 / -85	OFF
CBA	1	0	0	0	0	
RXLEV_ACCESS_MIN (dBm)	-90	-67	-90	-88	-98	
MNC			See Table 20.1c			
MCC			002			
C1	25	-8	20	8	13	
C2	25	-8	20	8	13	

For an E-GSM MS carrier 2 and carrier 4 ARFCNs are chosen in the E-GSM band, carrier 1 and carrier 3 ARFCNs in the P-GSM band.

20.1.4.2 Procedure

a) The SS activates the carriers and monitors carriers 2, 4 and 5 for RA requests from the MS.

b) The MS is switched on.

c) The MS is switched off.

d) The SS monitors carriers 1 and 3 for RA requests from the MS.

e) The MS is switched on.

20.1.5 Test requirements

1) After step b), the first response from the MS shall be on carrier 4 within 33 s. There shall be no response from the MS on carrier 2.

2) After step e), there shall be no response from the MS on either carrier 1 or carrier 3 within 33 s.

20.2 Cell selection with varying signal strength values

20.2.1 Definition

For definition see conformance requirement.

20.2.2 Conformance requirement

1. The MS shall:

The MS shall search all RF channels within its bands of operation, take readings of received RF signal level on each RF channel, and calculate the RLA_C for each. The averaging is based on at least five measurement samples per RF carrier spread over 3 to 5 s, the measurement samples from the different RF carriers being spread evenly during this period.

3GPP TS 05.08 / 3GPP TS 45.008, subclause 6.2.

1.1 The MS shall search all RF channels within its bands of operation, take readings of received RF signal level on each RF channel, and calculate the RLA_C for each.

1.2 The averaging is based on at least five measurement samples per RF carrier spread over 3 to 5 s, …

1.3 …. the measurement samples from the different RF carriers being spread evenly during this period.

2. These quantities termed the "received level averages" (RLA_C), shall be unweighted averages of the received signal levels measured in dBm..

GSM 05.08 / 3GPP TS 45.008, subclause 6.1.

20.2.3 Test purpose

1. To verify that:

1.1 The MS meets conformance requirement 1.1.

1.2 The MS meets conformance requirement 1.2.

1.3 The MS meets conformance requirement 1.3.

2. To verify that the MS meets conformance requirement 2.

20.2.4 Method of test

20.2.4.1 Initial conditions

Parameters changed from the default values in table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	23 / -90	58 / -55	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	13 / -100	13 / -100				
C1	10	53				

For an E-GSM MS carrier 1 ARFCN is chosen in the E-GSM band.

Specific PICS Statements:

-

PIXIT statements:

- averaging time Tav

20.2.4.2 Procedure

a) The SS transmits on carriers 1 and 2. After a period of b × Tav carrier 2 reduces its transmit level to -85 dBm (28 dBμV emf( )). After a further period of a × Tav, carrier 2 increases its transmit level again to -55 dBm (58 dBμV emf( )). Switching of carrier 2 continues with these levels and duty cycle until the end of the test.

Tav is the averaging time declared by the manufacturer.

The parameters a and b are chosen according to the following rules:

$(a + b) \times Tav > Tav$

$0 < a \times Tav < 2/3 \times Tav$

$0,5 \times Tav < b \times Tav < Tav$

In the equations < and > means at least one TDMA frame less or greater than the given value.

While satisfying the conditions given above:

a is chosen to be as close as possible to 2/3.

b is chosen to be as close as possible to 0,5.

b) The MS is switched on.

c) The SS monitors all RA requests from MS on carriers 1 and 2.

20.2.5 Test requirements

In step c), the first response from the MS shall be on carrier 2 within 33 s.

NOTE 1: With the selected duty cycle it can be guaranteed that a "good" MS passes the test even at the worst case situations. The minimum averaged value of carrier 2 is in any case higher or equal to -75 dBm which is still 6 dB above carrier 1's level (for a "good" MS).

NOTE 2: With the selected levels and duty cycle the probability that a "bad" MS (i.e. MS that averages over shorter period than 3 s) fails the test is maximized. However, it can not be guaranteed that all the MSs not fulfilling the conformance requirement of averaging or uniform sampling will fail this test.

20.3 Basic cell reselection

20.3.1 Definition

While camped on a cell of the selected PLMN the MS may need to select a different cell in order to fulfil the normal service state. This ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

20.3.2 Conformance requirement

1. While camped on a cell of the selected PLMN ("camped normally"), the MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

   1.1 (iii) The cell camped on (current serving cell) has become barred.

   1.2 (iv) There is a better cell (in terms of the path loss criterion C2) in the same LA, or a much better cell in another LA of the selected PLMN (using the CRH parameter).

   The MS will then reselect a new cell in order to fulfil the process goal.; 3GPP TS 03.22, subclause 4.5.

   NOTE 1: Criterion (i) is tested in subclause 20.8 (Cell reselection when C1(serving cell) < 0 for 5 s).

   NOTE 2: Criterion (ii) is tested subclause 20.16 (Downlink signalling failure).

   NOTE 3: Criterion (v) is tested in subclause 20.6 (Cell reselection timings).

2. There are various requirements that a cell must satisfy before an MS can perform normal camping on it:

   2.1 (ii) It should not be "barred".

   2.2 (iv) The radio path loss between MS and BTS must be below a threshold set by the PLMN operator. 3GPP TS 03.22, subclause 3.2.1.

   NOTE 4: Criterion (i) is not relevant for cell reselection and for cell selection it is tested in subclause 20.1.

NOTE 5: Criterion (iv) refers to the C1 parameter.

3. The MS shall be able to calculate correctly the path loss criterion parameter C2 used for cell reselection; 3GPP TS 05.08, subclause 6.4.

4. At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and recalculate C1 and C2 values for non serving cells (if necessary). The MS shall then check whether:

    i) The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high.

    ii) The calculated value of C2 for a non-serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 seconds, except;

        a) in the case of the new cell being in a different location area or, for a GPRS MS, in a different routing area or always for a GPRS MS in ready state in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least CELL_RESELECT_HYSTERESIS dB as defined by the BCCH data from the current serving cell, for a period of 5 seconds; or

        b) in case of a cell reselection occurring within the previous 15 seconds in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least 5 dB for a period of 5 seconds.

    This indicates that it is a better cell.

    3GPP TS 05.08 / 3GPP TS 45.008, subclause 6.6.2.

5. The MS shall attempt to decode the full BCCH data of the serving cell at least every 30 s; 3GPP TS 05.08, subclause 6.6.1.

20.3.3   Test purpose

1. To verify that:

    1.1 The MS meets conformance requirement 1.1.

    1.2 The MS meets conformance requirement 1.2.

2. To verify that:

    2.1 The MS does not reselect a cell which is barred.

    2.2 The MS does not reselect a cell which has a C1 < 0.

3. To verify that the MS calculates the C2 parameter correctly when the CELL_RESELECT_OFFSET, TEMPORARY_OFFSET and PENALTY_TIME parameters are not used.

4. To verify that the MS takes into account the CELL_RESELECT_HYSTERESIS parameter when reselecting a cell in a different location area.

5. To verify that the MS decodes the CELL_BAR_ACCESS and CELL_BAR_QUALIFY parameters from the BCCH every 30 s.

20.3.4   Method of test

20.3.4.1   Initial conditions

Parameters changed from the default values in table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμVemf() / dBm)	43 / -70	33 / -80	43 / -70	35 / -78	38 / -75	
RXLEV_ACCESS_MIN (dBm)	-85	-90	-90	-85	-67	
CRH	10 dB					
LAC			different from other carriers			
CBA				1		
CBQ				0		
C1	15	10	20	7	-8	
C2	15	10	20	7	-8	

The BA(BCCH) list only contains the ARFCNs of the carriers used during the test.

20.3.4.2 Procedure

a) The SS activates carriers 1, 2, 4 and 5. The MS is not paged on carrier 1. The SS monitors carriers 2, 4 and 5 for RA requests from the MS.

b) The MS is switched on.

c) The SS stops paging on all carriers except carrier 2. The level of carrier 2 is increased to 43 dBμVemf (C2 becomes 20 dB), and the SS monitors carrier 2 for RA requests from the MS.

d) When the SS receives a response from the MS on carrier 2, it stops paging the MS on this carrier.

e) The MS is switched off.

f) The SS is reconfigured and sets CBA = 1 on carriers 1 and 5.

g) The MS is switched on.

h) After 33 s, the SS starts paging continuously on carrier 1 and sets CBA=1 on carrier 2 and CBA=0 on carriers 1, 4 and 5.

i) When the SS receives a response on carrier 1, it stops paging the MS and waits for 25 s. (The MS should reselect and camp onto carrier 1).

j) The SS activates carrier 3, pages the MS continuously on this carrier and monitors carrier 3 for RA requests from the MS.

k) The SS increases the level of carrier 3 to 53 dBμVemf (C2 increases to 30 dB.).

20.3.5 Test requirements

1) After step b), there shall be no response from the MS on carriers 2, 4, or 5 within 50 s.

2) In step c), the MS shall respond on carrier 2 within 20 s of increasing the level of carrier 2.

NOTE 1: 5 s to perform running average, 10 s to detect C2 differences, 2,4 s to read BCCH of carrier 2, 1 s to perform RA. Total 18,4 s, allow 20 s.

3) In step h), the MS shall respond on carrier 1 within 50 s of setting CBA=1 on carrier 2.

NOTE 2: 33 s for the MS to read the BCCH of carrier 2 (30 s + 10 %), 15 s for the MS to reselect cell 1, since the MS already has a running average on carrier 1, allow 50 s.

4) After step j), there shall be no response from the MS within 50 s.

5) After step k), the MS shall respond on carrier 3 within 20 s.

20.4 Cell reselection using TEMPORARY_OFFSET, CELL_RESELECT_OFFSET, POWER_OFFSET and PENALTY_TIME parameters

20.4.1 Definition

void

20.4.2 Conformance requirement

1. The MS shall be able to calculate correctly the path loss criterion parameter C2 used for cell reselection; 3GPP TS 05.08, subclause 6.4.

20.4.3 Test purpose

1. To verify that the MS calculates the C2 parameter correctly when the CELL_RESELECT_OFFSET, TEMPORARY_OFFSET and PENALTY_TIME parameters are used.

2. To verify DCS 1 800 MS correctly calculate the C2 parameter when the POWER_OFFSET parameter is present.

20.4.4 Method of test

20.4.4.1 Initial conditions

Parameters changed from the default values in table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	53 / -60	43 / -70	48 / -65	48 / -65		
RXLEV_ACCESS_MIN (dBm)	-80	-100	-85	-85		
PT		11111	40 s	60 s		
CRO		16 dB	20 dB	20 dB		
TO			20 dB	20 dB		
K = 1						
C1	20	30	20	20		
C2	20	14	20 - > 40	20 - > 40		
K = 2 (DCS1800 Class 3 MS only)						
POWER_OFFSET	0	2	6	6		

The BA(BCCH) list only contains the ARFCNs of the carriers used during the test.

Specific PICS statements:

- Support of DCS Power Class 3 (TSPC_Type_DCS_Class3)

PIXIT Statements:

-

20.4.4.2 Procedure

For testing of all types of MS, the test procedure is performed for execution counter K = 1. For testing of DCS 1 800 Class 3 MS, the test procedure is performed for execution counter K = 1 and 2:

On execution counter K = 1, the POWER_OFFSET Parameter is not present.

On execution counter K = 2, the POWER_OFFSET parameter is present.

a) The SS activates carriers 1 and 2. The MS is not paged on carrier 1. The SS monitors carrier 2 for RA requests from the MS.

b) The MS is switched on.

c) The SS increases the level of carrier 2 to 54 dBµVemf (C2 becomes 25 dB).

d) When the SS receives a response on carrier 2, the SS stops paging on that carrier and waits for 20 s (The MS should reselect and camp onto carrier 2).

e) The SS activates carriers 3 and 4 and continuously pages the MS on these carriers. The SS monitors carriers 3 and 4 for RA requests from the MS.

20.4.4.3 Requirements

For execution counter K = 1 and K = 2.

1) After step b), there shall be no response from the MS on carrier 2 within 50 s.

2) After step c), the MS shall respond on carrier 2 within 20 s of increasing the level of carrier 2.

3) After step e), there shall be no response from the MS on carrier 3 within 38 s of activating the carriers but, the MS shall respond on carrier 3 within 90 s. The response on carrier 3 shall be before any response on carrier 4.

NOTE: Minimum time of 38 s set by penalty timer on carrier 3 less 2 s tolerance. Maximum time, total of 33 s to read BCCH of carrier 3, 42 s for expiry of penalty timer on carrier 3, 15 s for reselection, since the MS will already have running averages on carriers 3 and 4, when the penalty timers expire, allow 90 s.

20.5 Cell reselection using parameters transmitted in the System Information type 2bis, type 2ter, type 7 and type 8 messages

20.5.1 Definition

System information (SI) type 7 and 8 are transmitted on the BCCH Ext when the system information type 4 message does not contain all information needed for cell selection.

The system information type 2 bis message is used when the system information type 2 message does not contain all neighbour cell ARFCNs.

The system information type 2 ter message is used when system information type 2 messages broadcast by one cell which are system information 2 or both system information 2 and 2bis do not contain all neighbour cell ARFCNs.

Test purpose 2 is not applicable for P-GSM MS. This is reflected in initial conditions step d).

Test purpose 4 is only applicable to an E-GSM MS. This is reflected in initial conditions step f), test procedures d) and e) and test requirements clause 3).

20.5.2 Conformance requirement

1. The MS shall be able to calculate correctly the path loss criterion parameter C2 used for cell reselection. 3GPP TS 05.08, subclause 6.4.

2   Whilst in idle mode, an MS shall continue to monitor all BCCH carriers as indicated by the BCCH allocation. 3GPP TS 05.08, subclause 6.6.1.

3   Mobile stations shall treat all ARFCNs in the set {0, 1, 2 ... 1023} as valid ARFCN values even if the mobile station is unable to transmit or receive on that ARFCN. 3GPP TS 04.08 / 3GPP TS 44.018, subclause 10.5.2.1b.

4   An E-GSM MS shall correctly decodes parameters transmitted in the system information type 2 ter message. 3GPP TS 04.08 / 3GPP TS 44.018, subclause 9.1.34.

20.5.3 Test purpose

1. To verify that the MS correctly calculates the C2 criterion when the parameters affecting cell reselection are transmitted in the system information type 7 and 8 messages.

2. To verify that E-GSM, DCS 1 800 and PCS 1 900 MS decode parameters transmitted in the system information type 2 bis message.

3. To verify that the MS treats ARFCNs as valid ARFCNs even if the MS is unable to transmit or receive on that ARFCN.

4. To verify that an E-GSM mobile correctly decode parameters transmitted in the system information type 2 ter message.

20.5.4 Method of test

20.5.4.1 Initial conditions

a) Parameters changed from the default values in table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3 (note)	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	53 / -60	32 / -81	40 / -73	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	23 / -90	23 / -90	30 / -83			
BS_AG_BLKS_RES	1	1	1			
PT		0	0			
CRO		16 dB	10 dB			
TO		0 dB	0 dB			
C1	30	9	10			
C2	30	25	20			
NOTE: Carrier 3 is off for P-GSM, DCS 1800 and PCS 1 900 MS. Carrier 3 is only required for E-GSM MS.						

The BA(BCCH) list only contains the ARFCNs of the carriers used during the test and the ARFCNs specified in d) below.

b) The ARFCNs of carriers 1, 2 and 3 are chosen from those in table 20.1a.

c) The cell reselection parameters PENALTY_TIME, CELL_RESELECT_OFFSET and TEMPORARY_OFFSET are transmitted in the SI3, SI7 and SI8 messages on carrier 2. They are not transmitted in SI4 and the ADDITIONAL RESELECT PARAM IND parameter is set to 1.

d) The SI2bis message is transmitted on carrier 1 and contains the ARFCN of carrier 2 and ARFCNs 43, 70, 500, 550, 990 and 995. The ARFCN of carrier 2 is transmitted in the SI2 message only for an MS supporting only P-GSM..

e) Carriers 1 and 2 are synchronized, but staggered in frame number so that the transmission of the SI3 message on carrier 2, coincides with the paging block which the MS is listening to on carrier 1.

NOTE: Under these conditions, the MS can only decode the parameters affecting cell reselection from the SI7 or SI8 messages.

To achieve this, the following conditions are used:

- BS_PA_MFRMS = 4;

- IMSI mod 1000 = 12;

- FN carrier 1 = FN carrier 2-21, for simultaneously transmitted frames.

f) For an E-GSM MS, the SI3 message on carrier 2 indicates that SI2ter is used on carrier 2. SI2ter message contains the ARFCN of carrier 3 and ARFCNs 45, 76, 891, 905. The ARFCN of carrier 3 is transmitted neither in the SI2 nor in the SI2bis messages on carriers 1 and 2.

20.5.4.2 Test Procedure

a) The SS activates the channels. The MS is not paged on carrier 1.

b) The MS is switched on.

c) After 50 s, the SS increases the level of carrier 2 to 42 dBμVemf( ).

d) For an E-GSM MS only, when the SS receives a response on carrier 2, the SS stops paging on that carrier and after 30 s, the SS increases the level of carrier 3 to 60 dBμVemf( ).

20.5.5 Test Requirements

1) After step b), there shall be no response from the MS on carrier 2. For an E-GSM MS there shall also be no response on carrier 3.

2) After increasing the level of carrier 2 in step c), the MS shall respond on carrier 2 within 20 s.

3) After increasing the level of carrier 3 in step d), an E-GSM mobile shall respond on carrier 3 within 20 s.

20.6 Cell reselection timings

20.6.1 Definition

void

20.6.2 Conformance requirement

1. At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and recalculate C1 and C2 values for non serving cells (if necessary). The MS shall then check whether:

1.1 ii) The calculated value of C2 for a non-serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s.

1.2 Cell reselection for any other reason (see 3GPP TS 03.22) shall take place immediately, but the cell that the MS was camped on shall not be returned to within 5 s if another suitable cell can be found.

3GPP TS 05.08, subclause 6.6.2.

20.6.3 Test purpose

1. To verify that:

1.1 The MS does not perform a cell reselection when the C2 value for a non serving cell does not exceed the C2 value of the serving cell for a period of at least 5 s.

1.2 When the MS performs an immediate cell reselection due to an unsuccessful random access attempt, the cell that the MS was camped onto is not returned to within 5 s when another suitable cell exists.

20.6.4 Method of test

20.6.4.1 Initial conditions

Parameters changed from the default values in table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier
RF Signal Level (dBμV emf() / dBm)	56 / -57	46 / -67	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	29 / -84	33 / -80				
Max. Retrans	00	00				
C1	27	13				
C2	27	13				

Below is an alternative table of parameters for use with test equipment that cannot reach the upper RF levels as specified in the table above. These carrier levels are reduced by 5 dB and will not effect the purpose of the test case.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier
RF Signal Level (dBμV emf() / dBm)	51 / -62	41 / -72	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	24 / -89	28 / -85				
Max. Retrans	00	00				
C1	27	13				
C2	27	13				

The BA(BCCH) list only contains 5 ARFCNs including the ARFCNs of the carriers used during the test.

NOTE: With 5 ARFCNs in the BA(BCCH) list and BS_PA_MFRMS=5 (default value) the MS will maintain a running average on surrounding cells over a period of 5 s.

20.6.4.2   Procedure

a) The SS activates the channels. The MS is not paged on any of the carriers.

b) The MS is switched on.

c) After 50 s, the SS starts paging continuously on carriers 1 and 2 for 20 s. The SS monitors carriers 1 and 2 for RA requests from the MS.

d) The SS stops paging on carriers 1 and 2 and waits for 20 s. (The MS should revert to carrier 1 due to cell reselection.)

e) The SS starts paging continuously on carrier 2.

f) The SS increases the transmit level of carrier 2 by 20 dB for a period of 4 s and then reduces the level back to the original value.

g) The SS increases the transmit level of carrier 2 by 20 dB and waits for the MS to access on carrier 2.

20.6.5   Test requirements

1) In step c), the MS shall transmit 2 RA requests on carrier 1 followed by 2 RA requests on carrier 2. Subsequent RA requests on either carrier shall not occur within 4,5 s of the second RA request on that carrier.

2) In step f), there shall be no access on carrier 2 within 34 seconds of increasing the level of carrier 2.

3) After step g), the MS shall respond on carrier 2.

20.7   Priority of cells

20.7.1   Definition

In general, cell prioritization is a means of encouraging MSs to select some suitable cells in preference to others.

20.7.2   Conformance requirement

1. During cell selection a cell with low priority indication will only be selected if a suitable cell of normal priority cannot be found; 3GPP TS 03.22, subclause 3.5.2.1.

2.

Table 1a: Parameters affecting cell priority for cell selection

CELL_BAR_QUALIFY	CELL_BAR_ACCESS	Cell selection priority	Status for cell reselection
0	0	normal	normal
0	1	barred	barred
1	0	low	normal (see note 2)
1	1	low	normal (see note 2)

3GPP TS 05.08, table 1.a.

3. If all the following conditions are met then the "Cell selection priority" and the "Status for cell reselection" shall be set to normal:

- the cell belongs to the MS HPLMN;

- the MS is in cell test operation mode;

- the CELL_BAR_ACCESS is set to "1";

- the CELL_BAR_QUALIFY is set to "0";

- the Access Control class 15 is barred.

    3GPP TS 05.08, table 1.a.

20.7.3 Test purpose

1. To verify that the MS does not select a cell of low priority when a suitable cell of normal priority exists with a lower received signal strength.

2. To verify that the MS takes into account CELL_BAR_ACCESS and CELL BAR _QUALIFY when performing cell selection and reselection.

3. To verify that the MS meets conformance requirement 3.

20.7.4 Method of test

20.7.4.1 Initial conditions

Parameters changed from Default values table 20.1

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	33 / -80	43 / -70	33 / -80	23 / -90	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	3 / -110	23 / -90	13 / -100	13 / -100		
CBA	0	1	1	0		
CBQ	1	1	0	0		
Access class 15	barred	barred	barred	barred		
C1	30	20	20	10		

20.7.4.2 Procedure

a) The SS activates the carriers and monitors for RA requests from the MS on carriers 1, 2, and 4.

b) The MS is switched on.

c) The MS is switched off. The SS deactivates the carriers.

d) The MS is placed in cell test operation mode.

NOTE: Cell test mode is a mode of operation defined in SIM administrative data field.

e) The SS activates the carriers and monitors for RA requests from the MS on carriers 1, 2, and 3.

f) The MS is switched on.

20.7.5 Test requirements

1) After step b), the first response from the MS shall be on carrier 4 within 33 s, followed by a response on carrier 1 before a response (if any) on carrier 2 within 50 s.

2) After step f), the first response from the MS shall be on carrier 3 within 33 s, followed by a response on carrier 1 before a response (if any) on carrier 2 within 50 s.

20.8 Cell reselection when C1 (serving cell) < 0 for 5 s

20.8.1 Definition

void

20.8.2 Conformance requirement

1. At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and recalculate C1 and C2 values for non serving cells (if necessary). The MS shall then check whether:

   i) The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high. 3GPP TS 05.08, subclause 6.6.2.

2. While camped on a cell of the selected PLMN ("camped normally"), the MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

   (i) The path loss criterion parameter C1 (see subclause 3.6) indicates that the path loss to the cell has become too high. 3GPP TS 03.22, subclause 4.5.

20.8.3 Test purpose

1. To verify that the MS meets conformance requirement 1.

2. To verify that the MS meets conformance requirement 2.

20.8.4 Method of test

20.8.4.1 Initial conditions

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBµV emf() / dBm)	63 / -50	33 / -80	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBµV emf() / dBm)	43 / -70	23 / -90				
CRO	30 dB					
TO	0					
PT	0					
C1	20	10				
C2	50	10				

NOTE: With BS_PA_MFRMS = 5 (default value), the averaging time of the MS on the serving cell BCCH is 5,9 s.

20.8.4.2 Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2 for RA requests from the MS.

b) The MS is switched on.

c) The SS reduces signal level on carrier 1 to -80 dBm / 33 dBµV emf() for 4 s. Then, the SS raises the level back to -50 dBm / 63 dBµV emf(). (C1 becomes -10 dB and C2, 20 dB during this period).

d) The SS reduces signal level on carrier 1 to -80 dBm / 33 dBµV emf()

20.8.5 Test requirements

1) After step b), there shall be no access on carrier 1 or carrier 2, within 50 s.

2) After step c), there shall be no access on carrier 2 within 30 s.

3) After step d), the MS shall access on carrier 2 within 20 s.

20.9 Running average of the surrounding cell BCCH carrier signal levels

20.9.1 Definition

void

20.9.2 Conformance requirement

1. Whilst in idle mode an MS shall continue to monitor all BCCH carriers as indicated by the BCCH allocation (BA - See table 1). A running average of received signal level (RLA_C) in the preceding 5 to:

   - Max. {5, ((5 × N + 6) DIV 7) * BS_PA_MFRMS / 4};

     seconds shall be maintained for each carrier in the BCCH allocation. N is the number of non-serving cell BCCH carriers in BA and the parameter BS_PA_MFRMS is defined in 3GPP TS 45.002; 3GPP TS 45.008, subclause 6.6.1.

2. The same number of measurement samples shall be taken for all non-serving cell BCCH carriers of the BA list, and the samples allocated to each carrier shall as far as possible be uniformly distributed over each evaluation period. 3GPP TS 05.08 / 3GPP TS 45.008, subclause 6.6.1

20.9.3 Test purpose

1. To verify that if the MS calculates a received level average (over 5 s) for a non-serving suitable cell which results in the value of C2 exceeding the value of C2 for the serving cell, then cell reselection takes place to the non-serving cell.

2. To verify that by using suitable varying levels of signal strength for non serving cells, the MS samples on non serving cell BCCH carriers are as far as possible distributed uniformly over each evaluation period.

20.9.4 Method of test

20.9.4.1 Initial conditions

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBµV emf() / dBm)	53 / -60	33 / -80	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBµV emf() / dBm)	23 / -90	23 / -90				
C1	30	10				
C2	30	10				

BS_PA_MFRMS is set to 4 for this test.

The BA(BCCH) list only contains 7 ARFCNs including the ARFCNs of the carriers used during the test.

NOTE: With 7 ARFCNs in the BA(BCCH) list and BS_PA_MFRMS=4 the MS will maintain a running average on surrounding cells over a period of 5 s.

20.9.4.2 Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2.

b) The MS is switched on.

c) The SS starts switching the level of carrier 2 between -80 dBm and -57 dBm every 2,7 s and continues to do so until the end of the test.

d) The SS decreases the level of carrier 1 to -76 dBm.

NOTE: As a result of the switching in levels, the running average on carrier 2 will be between -66 dBm and -71dBm, assuming that samples are distributed over five consecutive paging blocks.

20.9.5 Test requirements

1) After step b), there shall be no access from the MS on carrier 1 or carrier 2, within 50 s.

2) After step c), there shall be no access from the MS on carrier 1 or 2 within 25 s.

NOTE: Any potential access on is likely to occur within 20 s.

3) After step d), the MS shall access on carrier 2 within 20 s.

20.10 Running average of the serving cell BCCH carrier signal level

20.10.1 Definition

The MS is required to monitor continuously the BCCH carrier signal level of the serving cell (and to compare it to the BCCH carrier signal levels of the non-serving cells) to guarantee that it is camped on the most suitable cell.

20.10.2 Conformance requirement

1. For the serving cell, receive level measurement samples shall be taken at least for each paging block of the MS. The RLA_C shall be a running average determined using samples collected over a period of 5 s to Max {5s, five consecutive paging blocks of that MS}. New sets of RLA_C values shall be calculated as often as possible.; 3GPP TS 45.008, subclause 6.6.1.

20.10.3 Test purpose

1. To verify that by using suitable varying levels of signal strength for the serving cell, the MS performs a running average over 5 consecutive paging blocks.

20.10.4 Method of test

20.10.4.1 Initial conditions

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBμV emf() / dBm)	63 / -50	39 / -74	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	23 / -90	23 / -90				
C1	40	16				
C2	40	16				

NOTE: With BS_PA_MFRMS = 5 (default value), the averaging time of the MS on the serving cell BCCH is 5,9 s.

20.10.4.2 Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2 for RA requests from the MS.

b) The MS is switched on.

c) After 50 s the SS starts switching the level of carrier 1 between -80 dBm and -50 dBm every 3 s.

NOTE: As a result of the switching in levels, the running average on carrier 1 will be between -62 dBm and -68 dBm over five consecutive paging blocks.

d) The SS increases the level of carrier 2 to -56 dBm.

20.10.5 Test requirement

1) After step c), the MS shall not access on carrier 2, within 25 s.

2) After step d), the MS shall access on carrier 2, within 30 s.

NOTE: 13,75 s to perform running average, 10 s to detect C2 differences, 2,4 s to read BCCH of carrier 2, 1 s to perform RA. Total 27,15 s, allow 30 s.

20.11 Updating the list of six strongest neighbour carriers and decoding the BCCH information of a new carrier on the list

20.11.1 Definition

void

20.11.2 Conformance requirement

1. The list of the 6 strongest non-serving carriers shall be updated at least as often as the duration of the running average defined for measurements on the BCCH allocation and may be updated more frequently; 3GPP TS 05.08, subclause 6.6.1.

2. When the MS recognizes that a new BCCH carrier has become one of the 6 strongest, the BCCH data shall be decoded for the new carrier within 30 s; 3GPP TS 05.08, subclause 6.6.1.

20.11.3 Test purpose

1. To verify that MS meets conformance requirement 1.

2. To verify that MS meets conformance requirement 2.

20.11.4 Method of test

20.11.4.1 Initial conditions

Six BCCH carriers are established with the system information contents of table 20.1.

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6	Carrier 7
RF signal level (dBμV emf ( )/dBm)	53 / -60	48 / -65	43 / -70	38 / -75	33 / -80	33 / -80	38 / -75
RXLEV_ACCESS_MIN	-90	-90	-90	-90	-90	-90	-110
C1	30	25	20	15	10	10	35
C2	30	25	20	15	10	10	35

The BA(BCCH) list contains only eight ARFCNs and includes those of carriers 1 to 7.

BS_PA_MFRMS is set to 3 during this test.

NOTE: The combination of 8 carriers on the BA list and BS_PA_MFRMS = 3 leads to averaging time of 5 s. Hence 5 s is also the updating time of the list of six strongest neighbour carriers.

20.11.4.2 Procedure

a) The SS activates carriers 1 to 6. The MS is not paged on any of the carriers.

b) The MS is switched on.

c) After 60 s, the SS activates carrier 7 and pages the MS continuously on this carrier. The SS monitors carrier 7 for RA requests from the MS.

20.11.5 Test requirements

1) The MS shall access on carrier 7 within 55 s of activating carrier 7.

NOTE: 5,5 s to notice new strongest carrier in top 6 (because the updating time for six strongest is 5 s (+10 %)), 33 s to read BCCH, 15 s for reselection, since the MS has already performed the running average on the new strongest carrier, allow 55 s.

20.12 Decoding the BCCH information of the neighbour carriers on the list of six strongest neighbour carriers

20.12.1 Definition

void

20.12.2 Conformance requirement

1. The MS shall attempt to decode the BCCH data block that contains the parameters affecting cell reselection for each of the 6 strongest non-serving cell BCCH carriers at least every 5 minutes; 3GPP TS 05.08, subclause 6.6.1.

NOTE: Verification of cell reselection as implicitly tested here is performed in subclause 20.3.

20.12.3 Test purpose

1. To verify that the MS decodes the BCCH data block that contains the parameters affecting cell reselection for a non-serving cell BCCH carrier, (which is in the list of six strongest neighbour cells), at least every 5 minutes. This is achieved by changing the BCCH data such that the value of C2 for the non serving cell exceeds the value of C2 for the serving cell, and observing that the MS performs cell reselection within 5 minutes plus the time allowed for cell reselection after the change of the BCCH data.

20.12.4 Method of test

20.12.4.1 Initial conditions

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBµV emf() / dBm)	38 / -75	33 / -80	OFF	OFF	OFF	OFF
C1	15	10				
C2	15	10				

20.12.4.2 Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2.

b) The MS is switched on.

c) The SS changes the RXLEV_ACCESS_MIN in the BCCH data of carrier 2 to be -100 dBm.

NOTE: With the above change the C2 of carrier 2 becomes 20 whereas the C2 of carrier 1 stays at 15.

20.12.5   Test requirements

1) After step b), there shall be no access from the MS on carrier 1 or carrier 2 within 50 s.

2) After step c), the MS shall access on carrier 2 within 345 s of the change in the BCCH data of carrier 2.

NOTE: 330 s for decode of BCCH of carrier 2 (300 s +10 %), 15 s for reselection of carrier 2, since the MS already has a running average on carrier 2.

20.13 Decoding the BSIC of the neighbour carriers on the list of six strongest neighbour carriers

20.13.1   Definition

-20.13.2   Conformance requirement

1. The MS shall attempt to check the BSIC for each of the 6 strongest non-serving cell BCCH carriers at least every 30 s, to confirm that it is monitoring the same cell. If a change of BSIC is detected then the carrier shall be treated as a new carrier and the BCCH data redetermined; 3GPP TS 05.08, subclause 6.6.1.

NOTE: Verification of cell reselection as implicitly tested here is performed in subclause 20.3.

20.13.3   Test purpose

1. To verify that the MS will check the BSIC of the non-serving cell, which is in the list of six strongest neighbour cells, by changing the BSIC and the BCCH data of the non-serving cell such that the value of C2 for that cell exceeds the value of C2 of the serving cell, and observing that the MS performs cell reselection within the time allowed to check the BSIC, redetermine the BCCH data and perform cell reselection.

20.13.4   Method of test

20.13.4.1   Initial conditions

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBμV emf() / dBm)	38 / -75	33 / -80	OFF	OFF	OFF	OFF
C1	15	10				
C2	15	10				

20.13.4.2   Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2.

b) The MS is switched on.

c) The SS changes the BSIC of carrier 2 by changing the Base Station Colour Code (BCC) part of the BSIC. The SS also changes the RXLEV_ACCESS_MIN in the BCCH data of carrier 2 to be -100 dBm.

NOTE: With the above change to the BCCH data the C2 of carrier 2 becomes 20 whereas the C2 of carrier 1 stays at 15.

20.13.5   Test requirements

1) In step b), there shall be no access from the MS on carrier 1 or carrier 2 within 50 s.

2) After step c), the MS shall access on carrier 2 within 85 s of the change in the BSIC value (and BCCH data) of carrier 2.

NOTE: 33 s for check of BSIC on carrier 2, 33 s for decode of BCCH of carrier 2, 15 s for reselection of carrier 2, since the MS already has a running average on carrier 2, allow 85 s.

20.14 Emergency calls

20.14.1 Definition

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20.14.2 Conformance requirement

1. In this mode, only emergency calls may be made

3GPP TS 45.008, subclause 6.8.

2. When in the limited service state (see 3GPP TS 43.022) the aim is to gain normal service rapidly and the following tasks shall be performed, depending on the conditions, as given in the table below:

   a) The MS shall monitor the received signal level of all RF channels within its bands of operation, and search for a BCCH carrier which has C1 > 0 and which is not barred. When such a carrier is found, the MS shall camp on that cell, irrespective of the PLMN identity.

3GPP TS 45.008, subclause 6.8.

3. c) The MS shall perform cell reselection at least among the cells of the PLMN of the cell on which the MS has camped, according to the algorithm of 3GPP TS 43.022, except that a zero value of CELL_RESELECT_HYSTERESIS shall be used.

3GPP TS 45.008, subclause 6.8.

20.14.3 Test purpose

1. To verify that the MS shall be able to initiate emergency calls when no suitable cells of the selected PLMN are available, but at least one acceptable cell is available.

2. To verify that the MS selects a cell with C1 > 0 and CBA = 0 when no suitable cells of the selected PLMN are available.

3. To verify that the MS, when performing cell reselection in the limited service state, uses CELL_RESELECT_HYSTERESIS = 0.

20.14.4 Method of test

20.14.4.1 Initial conditions

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBµV emf() / dBm)	38 / -75	33 / -80	33 / -80	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBµV emf() / dBm)	23 / -90	43 / -70	23 / -90			
CELL_BAR_ACCESS	1 (barred)	0	0			
MCC,MNC	forbidden	forbidden	forbidden			
CELL_RESELECT_HYST	0	0	14 dB			
C1	15	-10	10			

NOTE: All the BCCH carriers belong to the same PLMN, which is not the MS's home PLMN and is in the SIM's forbidden PLMN's list.

20.14.4.2 Procedure

a) The SS activates the carriers. The SS monitors for RA attempts from the MS on carriers 1, 2 and 3 for the duration of the test. In order to prevent the MS from answering to paging only idle -paging is sent on all channels.

b) The MS is switched on.

c) 50 s after switch on, an emergency call is initiated on the MS.

d) The SS changes the CBA of carrier 1 to 0.

NOTE 1: The MS should reselect to carrier 1 because it should not take into account the CELL_RESELECT_HYST value of 14 but use 0 instead.

e) After 345 s an emergency call is initiated on the MS.

NOTE 2: 330 s to detect change of BCCH data, 15 s to perform reselection of carrier 1, since the MS already has a running average on carrier 1.

20.14.5 Test requirements

1) In step c), the first access by the MS shall be on carrier 3.

2) In step e), the first access from the MS shall be on carrier 1.

20.15 Cell reselection due to MS rejection "LA not allowed"

20.15.1 Definition

While camped on a cell of the selected PLMN the MS may need to select a different cell in order to fulfil the normal service state. This ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

This process goes on while camping on a cell which pertains to an LA which is placed in the list of "forbidden LAIs for regional provision of service".

20.15.2 Conformance requirement

1. In response to a registration attempt, when receiving an LU reject with cause value "LA not allowed", the MS stores this LAI in a list of "forbidden LAIs for regional provision of service", to prevent repeated attempts to access a cell of the forbidden LA, 3GPP TS 03.22, subclause 3.3.

2. If the MS has received the cause 'LA not allowed', it shall ignore this fact when selecting a cell to camp on, i.e. it shall not reject a cell for camping on because that cell is part of a LA where this cause has been received, 3GPP TS 03.22, subclause 3.5.4.

3. In response to a registration attempt, when receiving an LU reject with cause value "LA not allowed", the MS continues to perform normal cell-reselection, 3GPP TS 03.22, subclause 4.4.2

4. A new LU attempt shall only be performed when a new LA (or new PLMN) is entered according to the cell reselection procedure, 3GPP TS 03.22, subclause 3.3 and figure 4.

NOTE: LA stands for "Location Area" and LU stands for "Location Update".

20.15.3 Test purpose

1. To verify that if an LU is rejected with cause "LA not allowed" that the LAI of that cell is written into a forbidden list which prevents the MS from performing LU onto another cell in that LA. This is verified indirectly in test purposes 2,3 and 4.

2. To verify that the MS will not reject a cell for camping on because that cell is part of a LA in the list of "forbidden LAIs for regional provision of service". This is verified indirectly by making the MS attempt an emergency call and checking that the channel request message is transmitted on the correct cell.

3. To verify that the MS when receiving an LU reject with cause value "LA not allowed", the MS continues to perform normal cell-reselection:

   Cell reselection is triggered if there is a better cell (in terms of the path loss criterion C2) in the same LA, or a much better cell in another LA of the selected PLMN (using the CRH parameter). 3GPP TS 03.22, subclauses 3.4 and 4.5.

4. To verify that a new LU attempt will be performed when a new LA (or new PLMN) is entered, 3GPP TS 03.22, subclause 3.3 and figure 4.

20.15.4   Method of test

20.15.4.1   Initial conditions

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBµV emf() / dBm)	63 / -50	54 / -59	44 / -69	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBµV emf() / dBm)	53 / -60	35 / -78	29 / -84			
CRH	14	0	10			
LAC	H1111	H2222	H1111			
ATT	1	1	1			
C1	10	19	15			
C2	10	19	15			

20.15.4.2   Procedure

a) The SS activates the carriers. The SS monitors all RA requests from MS on carriers 1, 2 and 3 until step e) has been completed. Only idle-paging is sent on all channels.

b) The MS is switched on.

c) When the MS performs an IMSI attach onto carrier 1, the SS shall reject it with cause "LA not allowed".

d) 30 s after the MS has returned to idle mode (channel release after LU reject), the MS is manually commanded to set up an emergency call.

NOTE 1: C2 of carrier 3 > C2 of carrier 1. Carriers 1 and 3 belong to the same LA.

e) The SS rejects the CM service request from the MS, with a CM service reject message with cause value #17 (Network Failure).

NOTE 2: Cause values #4 (IMSI unknown in VLR) or #6 (Illegal ME) lead to unwanted behaviour of the mobile.

f) 10 s after the MS has returned to idle mode (channel release after CM service reject), the SS increases the level of carrier 2 to 65 dBµV emf().

NOTE 3: C2 of carrier 2 = 30, now larger than C2 of carrier 3 + CRH.

g) The SS shall accept any LU on carrier 2.

20.15.5   Test requirements

1) After step b), the MS shall respond on carrier 1 within 33 s.

2) In step d), the MS shall access on carrier 3 with a channel request message, within 15 s of being commanded to set up the emergency call.

3) After increasing the level of carrier 2 in step f), the MS shall reselect and access onto carrier 2 requesting an LU within 30 s.

NOTE: 13,75 s to perform running average, 10 s to detect C2 differences, 2,4 s to read BCCH of carrier 2, 1 s to perform RA. Total 27,15 s, allow 30 s.

20.16   Downlink signalling failure

20.16.1   Definition

See conformance requirement.

20.16.2   Conformance requirement

The downlink signalling failure criterion is based on the downlink signalling failure counter DSC.

1. When the MS camps on a cell, DSC shall be initialized to a value equal to the nearest integer to 90/N where N is the BS_PA_MFRMS parameter for that cell (see 3GPP TS 05.02).

2. Thereafter, whenever the MS attempts to decode a message in its paging subchannel; if a message is successfully decoded DSC is increased by 1,(however never beyond the nearest integer to 90/N).

3. Whenever the MS can not successfully decode a message in its paging subchannel the DSC is decreased by 4.

4. When DSC reaches 0, a downlink signalling failure shall be declared. A downlink signalling failure shall result in cell reselection, 3GPP TS 03.22, subclause 4.5 (ii) and 3GPP TS 05.08, subclause 6.5.

NOTE: The network sends the paging subchannel for a given MS every BS_PA_MFRMS multiframes. The requirement for network transmission on the paging subchannel is specified in 3GPP TS 04.08 / 3GPP TS 44.018. The MS is required to attempt to decode a message every time its paging subchannel is sent.

20.16.3 Test purpose

1. To verify that the MS initializes the DSC counter in accordance with the conformance requirement. This is verified indirectly.

2. To verify that whenever the MS successfully decodes a message on paging subchannel, the DSC is increased by 1, (however never beyond the nearest integer to 90/N). This is verified indirectly.

3 To verify that whenever the MS can not successfully decode a message on paging subchannel, the DSC decreased by 4. This is verified indirectly.

4. To verify that when the DSC reaches 0, a downlink signalling failure shall be declared and the MS will perform cell reselection.

20.16.4 Method of test

20.16.4.1 Initial conditions

Two BCCH carriers are established with the system information contents of table 20.1.

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBμV emf() / dBm)	43 / -70	33 / -80	OFF	OFF	OFF	OFF
C1 = C2	20	10				

NOTE: The DSC counter will have a value 18 (90/5).

20.16.4.2 Procedure

a) The MS is switched on. On carrier 1 valid layer 3 messages shall be sent in the paging blocks, but not paging the MS (idle paging). On carrier 2 the MS is paged continuously in all paging blocks.

b) After 40 s the SS sends corrupted data (using random data, wrong parity bits see 3GPP TS 05.03, subclauses 4.3 and 4.1.2 or other lower layer error) in four successive paging blocks to carrier 1 and then reverts to sending normal data.

NOTE 1: Sending corrupted, i.e. non-decodable data on four successive paging blocks should decrease the DSC to 2.

c) The SS monitors all accesses on both carriers for 30 s.

d) The SS sends corrupted data in five successive paging blocks to carrier 1 and then reverts to sending normal data.

NOTE 2: Sending random, data on five successive paging blocks should decrease the DSC to < 0 and cause a cell reselection.

e) The SS monitors all accesses on both carriers for 30 s.

20.16.5 Test requirements

1) There shall be no access to carrier 2 in test steps a) and c).

2) The MS shall access on carrier 2 at test step e) within 15 s.

20.17 Cell selection if no suitable cell found in 10 s

20.17.1 Definition

See conformance requirement.

20.17.2 Conformance requirement

If no suitable cell is found in cell reselection process within 10 s, the cell selection algorithm of 3GPP TS 03.22 shall be performed, 3GPP TS 05.08, subclause 6.6.2.

20.17.3 Test purpose

To verify that the MS fulfils the conformance requirement.

20.17.4 Method of test

20.17.4.1 Initial conditions

One BCCH carrier is established with the system information contents of table 20.1.

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBμV emf() / dBm)	43 / -70	OFF	OFF	OFF	OFF	OFF
C1 = C2	20					

20.17.4.2 Procedure

a) The MS is switched on. Idle paging is sent on carrier 1.

b) After the MS indicates service the SS reduces the transmit level of carrier 1 to 13 dBμV emf() (so that C1 of carrier 1 becomes -10) and turns on a new carrier (carrier 2) at a level of 33 dBμV emf(). Carrier 2 shall not be in the MS BA list (i.e. it shall not be one of the carriers that MS has been monitoring after camped on carrier 1).

c) The SS shall monitor all accesses on carriers 1 and 2 for 60 s.

NOTE: The access on carrier 2 should not take longer than 50 s. (5 s to rxlev averages, 5 s for C1 < 0 duration, 10 s for searching another suitable cell, 30 s for cell selection), 60 s is a safe time to wait.

20.17.5 Test requirements

The MS shall access on carrier 2 at test step c) within 60 s.

20.18 Cell reselection due to MS rejection "Roaming not allowed in this LA"

20.18.1 Definition

While camped on a cell of the selected PLMN the MS may need to select a different cell in order to fulfil the normal service state. This ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

The MS looks for suitable neighbour cells which satisfies 4 constraints including that It should not be in an LA which is in the list of "forbidden LAs for roaming".

20.18.2 Conformance requirement

1. To prevent repeated attempts to have roaming service on a not allowed LA, when the MS is informed that an LA is forbidden, the LA is added to a list of "forbidden LAs for roaming" which is stored in the MS, 3GPP TS 03.22; subclause 3.1.

2. If the MS has received the cause "Roaming not allowed in this LA", in response to a LU attempt, the Network Selection Procedure shall be started, 3GPP TS 03.22; subclause 4.3.3 L3, 3GPP TS 04.08 / 3GPP TS 24.008, subclause 4.4.4.7.

3. The MS can only perform camping on a suitable cell, which:

   - should not be in an LA which is in the list of "forbidden LAs for roaming" 3GPP TS 03.22, subclause 3.2.1.

   NOTE: LA stands for "Location Area" and LU stands for "Location Update".

20.18.3 Test purpose

1. To verify that if an LU is rejected with cause "Roaming not allowed in this LA", that the LAI of that cell is written into a forbidden list which prevents the MS from camping onto any cell in that LA.

2. To verify that if the MS has received the cause "Roaming not allowed in this LA", in response to a LU attempt, the Network Selection Procedure is initiated. This is verified indirectly by test purpose 3, in that the new LA is accessed as part of cell selection, hence CRH is disregarded.

3. To verify that if an LU is rejected, when attempting LU in a LA with LAI = LAI1, with cause "Roaming not allowed in this LA" and only cells of the selected PLMN are available, the MS will only camp and attempt LU in any LA with LAI $\Leftrightarrow$ LAI1.

20.18.4 Method of test

20.18.4.1 Initial conditions

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBµV emf() / dBm)	63 / -50	53 / -60	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBµV emf() / dBm)	23 / -90	23 / -90				
MNC	MNC <> HPLMN	MNC <> HPLMN				
MCC	MCC of HPLMN	MCC of HPLMN				
CRH	0	0				
LAC	H1111	H2222				
ATT	1	1				
C1	40	30				
C2	40	30				

20.18.4.2 Procedure

a) The MS is switched on. Idle paging is sent on all carriers.

b) The SS monitors all RA requests from MS on carriers 1 and 2.

c) When the MS performs an IMSI attach onto carrier 1, the SS shall reject it with cause "Roaming not allowed in this LA".

d) The SS shall accept any LU on carrier 2.

e) The SS monitors all RA requests from MS on carriers 1 to 2.

20.18.5 Test requirements

1) The MS should respond on carrier 1 within 33 s of switch on.

2) After LU reject, the MS shall initiate the Network Selection Procedure and access onto Carrier 2 as part of cell selection within 33 s from returning to idle mode after the LU reject.

NOTE: The timing requirement in b) is given only for testing purposes only. No timing requirements are defined for the Network Selection Procedure, but the time allowed for cell selection (see 20.1) should be adequate.

3) After the LU reject on carrier 1, there shall be no more access attempts on this carrier.

20.19 Cell selection on release of SDCCH and TCH

20.19.1 Definition

Void.

20.19.2 Conformance requirement

1. When the SS releases a TCH or SDCCH and returns to idle mode, it shall, as quickly as possible camp on the BCCH carrier of the cell whose channel has just been released. If the full BCCH data for that cell was not decoded in the preceding 30 s, the MS shall then attempt to decode the full BCCH data. Until the MS has decoded the BCCH data required for determining the paging group, it shall also monitor all paging blocks on timeslot 0 of the BCCH carrier for possible paging messages that might address it. If the MS receives a page before having decoded the full BCCH data for the cell, the MS shall store the page and respond once the full BCCH data has been decoded, provided that the cell is not barred and the MSs access class is allowed. 3GPP TS 05.08, subclause 6.7.

20.19.3 Test purpose

1. To verify that on release of a TCH or an SDCCH, the MS camps as quickly as possible on the BCCH carrier of the cell whose channel has just been released.

NOTE: This is implicitly tested by the MS responding to a paging request. The decoding of BCCH data cannot be explicitly tested. However, the MS shall monitor for paging messages which may address it if it decodes the BCCH.

20.19.4 Method of test

20.19.4.1 Initial conditions

a) Parameters changed from default values in table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBmV emf() / dBm)	53 / -60	33 / -80	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBmV emf() / dBm)	23 / -90	23 / -90				
BS_PA_MFRMS	2	2				
ATT	1					
C1	30	10				
C2	30	10				

b) Carrier 1 is configured to have a combined control channel.

c) Carrier 2 is configured to have a non combined control channel.

20.19.4.2 Test procedure

a) The SS activates the carriers. No paging messages are transmitted on carrier 1 or carrier 2.

b) The MS is switched on.

c) In response to the MS access for IMSI attach, the SS allocates a combined SDDCH/4, accepts the IMSI attach procedure and then releases the link. After 0,5 s but within 1 second of transmitting the UA frame on completion of the IMSI attach procedure, the SS transmits a single PAGING REQUEST in the appropriate paging block of the MS on carrier 1.

d) When the MS responds to paging, the SS establishes a call on a traffic channel.

e) The SS increases the level of carrier 2 to 63 dBmV emf().

f) After 10 s the SS performs a handover to another TCH, with the parameters of carrier 2 indicated in the CELL DESCRIPTION information element of the HANDOVER COMMAND message.

g) After a further 10 s, the SS clears down the call. After 0,5 s but within 1 second of transmitting the UA frame, the SS transmits a single PAGING REQUEST on carrier 2 in the appropriate paging block of the MS.

20.19.5 Test requirements

1) After step b) the MS shall access in order to commence an IMSI attach procedure on carrier 1 within 33 s.

2) In step c), the MS shall respond to paging within 3 seconds of transmitting the PAGING REQUEST.

3) In step g), the MS shall respond to paging within 3 seconds of transmitting the PAGING REQUEST.

20.20 Multiband cell selection and reselection

20.20.1 Multiband cell selection and reselection / Cell Selection

20.20.1.1 Definition

Multiband cell selection is a process in which a multiband MS, whenever a new PLMN is selected, attempts to find a suitable cell of that PLMN to camp on, irrespective of frequency band. Two methods of searching for a suitable cell are possible, normal cell selection and stored list cell selection. The process ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink. Once the MS is camped on a cell, access to the network is allowed.

20.20.1.2 Conformance requirement

1. The MS shall search all RF channels within its bands of operation, take readings of received RF signal level on each RF channel, and calculate the RLA_C for each. The averaging is based on at least five measurement samples per RF carrier spread over 3 to 5 s, the measurement samples from the different RF carriers being spread evenly during this period.

   A multi band MS shall search all channels within its bands of operation as specified above. The number of channels searched will be the sum of channels on each band of operation.

   3GPP TS 45.008, subclause 6.2.

2. … the MS shall be able to select the correct (fourth strongest) cell and be able to respond to paging on that cell within 30 s of switch on, when the three strongest cells are not suitable. This assumes a valid SIM, with PIN disabled and ideal radio conditions; 3GPP TS 05.08, subclause 6.1.

3. There are various requirements that a cell must satisfy before an MS can perform normal camping on it:

   3.1(i) It should be a cell of the selected PLMN

   3.2(ii) It should not be "barred" (see subclause 3.5.1)

3.3(iv) The radio path loss between MS and BTS must be below a threshold set by the PLMN operator. This is estimated as shown in subclause 3.6.

3GPP TS 03.22, subclause 3.2.1.

NOTE: Criteria (iii) is not applicable for Cell Selection

4. Initially the MS looks for a cell which satisfies these 4 constraints ("suitable cell") by checking cells in descending order of received signal strength. If a suitable cell is found, the MS camps on it; 3GPP TS 03.22, subclause 3.2.1.

5. The MS shall be able to calculate correctly the path loss criterion parameter C1, used for cell selection and reselection; 3GPP TS 05.08, subclause 6.4.

20.20.1.3 Test purpose

1. To verify that the MS meets conformance requirement 1.

2. To verify that the MS meets conformance requirement 2 in a multiband environment.

3. To verify that:

3.1 The MS does not select a cell of a PLMN which is not the selected PLMN.

3.2 The MS does not select a cell which is "barred".

3.3 The MS does not select a cell with C1 < 0.

4. To verify that the MS selects suitable cells in descending order of received signal strength, irrespective of frequency band.

5. To verify that the MS does not select a cell with C1 < 0.

20.20.1.4 Method of test

20.20.1.4.1 Initial conditions

Parameters changed from the default values in table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBmV emf() / dBm)	48 / -65	36 / -77	43 / -70	33 / -80	23 / -90	OFF
CBA	1	0	0	0	0	
RXLEV_ACCESS_MIN (dBm)	-90	-69	-90	-88	-98	
MNC			See Table 20.1c		See Table 20.1c	
MCC			002			
MS_TXPWR_MAX_CCH	7	7		7		
C1	25	-8	20	8	8	
C2	25	-8	20	8	8	

Carrier 1, carrier 2 and carrier 4 ARFCNs are chosen in the lower band, carrier 3 and carrier 5 ARFCNs in the higher band.

20.20.1.4.2 Procedure

a) The SS activates the carriers and monitors carriers 2, 4 and 5 for RA requests from the MS.

b) The MS is switched on.

c) The MS is switched off.

d) The SS monitors carriers 1 and 3 for RA requests from the MS.

e) The MS is switched on.

f) The MS is switched off.

g) The SS is reconfigured and sets MCC of carrier 3 to 001 (same as the other carriers).

h) The SS activates the carriers and monitors carriers 3, 4 and 5 for RA requests from the MS.

i) The MS is switched on.

j) The MS is switched off.

k) For multiband MS supporting three or more bands all valid combinations of two bands shall be tested using the steps from a) to j). The valid combinations are indicated in sub-clause 26.11.6 Multiband signalling / Default messages contents.

20.20.1.4.3 Specific PICS statement(s)

- Support for stored list cell selection Yes/No (TSPC_AddInfo_StoredListCellSel)

20.20.1.4.4 PIXIT Statements

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20.20.1.5 Test requirements

1) After step b), the first response from the MS shall be on carrier 4 within 33 s. If the MS supports stored list cell selection MS may be also on carrier 5. There shall be no response from the MS on carrier 2.

2) After step e), there shall be no response from the MS on either carrier 1 or carrier 3 within 33 s.

3) After step i), the first response from the MS shall be on carrier 3 within 33 s. If the MS supports stored list cell selection the first response may be also on carrier 4 or carrier 5.

20.20.2 Multiband cell selection and reselection / Cell reselection

20.20.2.1 Definition

While camped on a cell of the selected PLMN the multiband MS may need to select a different cell (irrespective of frequency band used) in order to fulfil the normal service state. This ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

20.20.2.2 Conformance requirement

1. The list of the 6 strongest non-serving carriers shall be updated at least as often as the duration of the running average defined for measurements on the BCCH allocation and may be updated more frequently;
3GPP TS 05.08, subclause 6.6.1.

2. When the MS recognizes that a new BCCH carrier has become one of the 6 strongest, the BCCH data shall be decoded for the new carrier within 30 s; 3GPP TS 05.08, subclause 6.6.1.

3. The MS shall be able to calculate correctly the path loss criterion parameter C2 used for cell reselection;
3GPP TS 05.08, subclause 6.4.

20.20.2.3 Test purpose

1. To verify that MS meets conformance requirement 1.

2. To verify that MS meets conformance requirement 2.

3. To verify that the MS calculates the C2 parameter correctly when the CELL_RESELECT_OFFSET, and PENALTY_TIME parameters are used to give different priorities to different frequency bands.

20.20.2.4   Method of test

20.20.2.4.1   Initial conditions

Six BCCH carriers are established with the system information contents of table 20.1.

Parameters changed from Default values table 20.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6	Carrier 7
RF signal level (dBmV emf ( )/dBm)	53 / -60	48 / -65	43 / -70	38 / -75	33 / -80	33 / -80	43 / -70
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90	-90	-90	-110
PT							11111
CRO							20 dB
MS_TXPWR_MAX_CCH	7	7	7				
C1	30	25	20	15	10	10	40
C2	30	25	20	15	10	10	20

Carrier 1, 2 and 3 ARFCNs are chosen in the lower band, carrier 4, 5, 6 and 7 ARFCNs in the higher band.

The BA(BCCH) list contains only eight ARFCNs and includes those of carriers 1 to 7.

BS_PA_MFRMS is set to 3 during this test.

NOTE: The combination of 8 carriers on the BA list and BS_PA_MFRMS = 3 leads to averaging time of 5 s. Hence 5 s is also the updating time of the list of six strongest neighbour carriers.

20.20.2.4.2   Procedure

a) The SS activates carriers 1 to 6. The MS is not paged on any of the carriers.

b) The MS is switched on.

c) After 60 s, the SS deactivates carrier 4 and activates carrier 7 and pages the MS continuously on carrier 7. The SS monitors carrier 7 for RA requests from the MS.

d) The MS is switched off.

e) The SS is reconfigured and sets PT = 0 and CRO = 0 on carrier 7 (thus increasing C2 to 40 dB).

f) The SS activates carriers 1 to 6. The MS is not paged on any of the carriers.

g) The MS is switched on.

h) After 60 s, the SS deactivates carrier 4 and activates carrier 7 and pages the MS continuously on carrier 7. The SS monitors carrier 7 for RA requests from the MS.

i) 20 s after receiving an RA request on carrier 7 the SS sets PT = 11111 and CRO = 20 dB on carrier 7 (thus decreasing C2 to 20 dB), stops paging on carrier 7, and pages the MS continuously on carrier 1. The SS monitors carrier 1 for RA requests from the MS.

j) The MS is switched off.

k) For multiband MS supporting three or more bands all valid combinations of two bands shall be tested using the steps from a) to j). The valid combinations are indicated in sub-clause 26.11.6 Multiband signalling / Default messages contents.

20.20.2.5 Test requirements

1) After step c) there shall be no response from the MS on carrier 7 within 55 s of activating carrier 7.

2) After step h) the MS shall access on carrier 7 within 55 s of activating carrier 7.

NOTE: 5,5 s to notice new strongest carrier in top 6 (because the updating time for six strongest is 5 s (+10 %)), 33 s to read BCCH, 15 s for reselection, since the MS has already performed the running average on the new strongest carrier, allow 55 s.

3) After step i) the MS shall access on carrier 1 within 55 s of setting PT and CRO on carrier 7.

20.21 R-GSM cell selection and reselection

In the following paragraphs some explanatory text is given concerning the nature of the tests in this subclause and the general behaviour of the SS is described.

Since the conformance requirements of most of the tests in this subclause cannot be tested explicitly, testing is done implicitly by testing the MS behaviour from its responses to the SS.

The SS transmits one BCCH carrier per cell as indicated in the initial conditions for each test. These are referred to as carrier 1, carrier 2, etc. It is assumed that the SS can simultaneously transmit seven BCCH carriers and monitor three random access channels. For multiband tests it is assumed that at least one of the BCCH carriers and one of the monitored random access channels is in a different frequency band from the others. In some cases, a test is performed in multiple stages in order that the requirements can be tested within the above constraints.

For any MS all the carriers are in its supported band(s) of operation. For an R-GSM mobile station at least one of the carriers is chosen between ARFCN 955-974 and one of the carriers is in the primary band.

Unless otherwise stated in the method of test, in all of the tests of this subclause:

- The SS is continuously paging the MS on all carriers at the start of the test and does not respond to RACH requests from the MS. Where a test specifies that the MS is not paged on a particular carrier, only idle paging is transmitted according to 3GPP TS 04.08 / 3GPP TS 44.018, subclause 3.2.2.2.

- The default values of the system information data fields given in table 20.21.1 are used.

- The SIM is in the idle updated state in the default location area with a TMSI assigned at the beginning of each test.

- The ARFCNs used for the carriers in each test are chosen from those in table 20.21.1 with adjacent carriers separated by a minimum of three channels.

The absolute accuracy of the MS signal level measurements is assumed to be ±6 dB. A difference of at least 8 dB is allowed for cases of discrimination between C1 or C2 values and 0.

The relative accuracy of the MS signal level measurements is assumed to be ±3 dB for the signal levels used in the tests of this subclause, except for subclause 20.20, where the relative accuracy is assumed to be ±5 dB if the measurements are on different frequency bands. A difference of at least 5 dB is allowed for cases of discrimination between C1 or C2 values on different carriers, except for subclause 20.20, where a difference of at least 10 dB is allowed if the measurements are on different frequency bands.

NOTE 1: The accuracy of MS signal level measurements is specified in 3GPP TS 05.08. For all of the tests in this subclause, the signal levels used are greater than 1 dB above reference sensitivity level.

NOTE 2: The tolerance on timers specified in 3GPP TS 05.08 is ±10 % except for PENALTY_TIME where it is ±2 s. In the tests of this subclause, the test requirements include these tolerances. Consequently, the times stated in the test requirement sometimes differ from the corresponding timer in the conformance requirement.

Where pulsed signals are specified, the SS tolerance on pulse width is ±2 % and the SS tolerance on power level ±1 dB.

Table 20.21.1: Default values of the system information fields

Parameter	3GPP TS 04.08 / 3GPP TS 44.018 reference	Abbr.	Normal Setting
Cell channel description	10.5.2.1	-	Any values
MAX retrans	10.5.2.29	-	1
TX-integer	10.5.2.29	-	Any value
CELL_BAR_QUALIFY	10.5.2.35	CBQ	0
CELL_BAR_ACCESS	10.5.2.29	CBA	0 (not barred)
AC CN	10.5.2.29	AC	All 0
RE	10.5.2.29	RE	0 (re-establishment allowed)
NCC	10.5.2.2	NCC	Any value
Cell Identity	10.5.1.1	-	Any value
MCC, MNC	10.5.1.3	PLMN	MS Home PLMN
LAC	10.5.1.3	LAC	1111 (Hex)
ATT	10.5.2.11	-	0 (Attach/Detach not allowed)
BS_AG_BLKS_RES	10.5.2.11	-	Any values
T3212	10.5.2.11	-	Any values
BS_PA_MFRMS	10.5.2.11	BPM	5 frames
Cell Options	10.5.2.3	-	Any values
CELL_RESELECT_HYSTERESIS	10.5.2.4	CRH	4 dB
MS_TXPWR_MAX_CCH	10.5.2.4	MTMC	Max. output power of MS
RXLEV_ACCESS_MIN	10.5.2.4	RAM	-90 dBm
CELL_RESELECT_OFFSET	10.5.2.35	CRO	0
TEMPORARY_OFFSET	10.5.2.35	TO	0
PENALTY_TIME	10.5.2.35	PT	0
Power Offset	10.5.2.35	PO	0
BA ARFCN	10.5.2.22	BA	All 0 except values in Table 20.21.1a or 20.21.1b

Table 20.21.1a: ARFCNs for Single Band Tests

Band	ARFCNs	broadcast in SYSTEM INFORMATION type
GSM 450	259, 263, 269, 275, 279, 283, 287, 292	SI2
GSM 480	306, 310, 316, 322, 326, 330, 334, 339	SI2
GSM 710	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511	SI2
GSM 750	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511	SI2
T-GSM 810	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511	SI2
GSM 850	130, 136, 145, 152, 168, 170, 176, 177, 181, 185, 189, 193, 197, 207,219, 251	SI2
GSM 900	both P-GSM and R-GSM ARFCNs are broadcast:	
	GSM: 3, 9, 18, 25, 41, 43, 49, 50, 54, 58, 62, 66, 70, 80, 92, 124	SI2
	R-GSM: 956, 960, 969, 985, 989, 995, 1010, 1014	SI2bis
DCS 1800	512, 543, 568, 589, 602, 641, 662, 683, 696, 711, 732, 754, 794, 851, 870, 871, 872, 884	SI2
PCS 1900	512, 543, 568, 589, 602, 629, 641, 653, 662, 683, 696, 711, 727, 732, 754, 777, 794, 809	SI2

Table 20.21.1b: ARFCNs for Multiband Tests

Band	ARFCNs	broadcast in SYSTEM INFORMATION type
GSM 900	3, 18, 41, 49, 62, 70, 92, 124	SI2 (GSM 900 cell) & SI2ter (DCS 1800 cell)
DCS 1800	512, 568, 602, 662, 696, 732, 794, 870	SI2 (DCS 1800 cell) & SI2ter (GSM 900 cell)

20.21.1 R-GSM cell selection

20.21.1.1   Definition

Cell selection is a process in which a MS, whenever a new PLMN is selected, attempts to find a suitable cell of that PLMN to camp on. Two methods of searching for a suitable cell are possible, normal cell selection and stored list cell selection. The process ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink. Once the MS is camped on a cell, access to the network is allowed.

20.21.1.2 Conformance requirement

1. … the MS shall be able to select the correct (fourth strongest) cell and be able to respond to paging on that cell within 30 s of switch on, when the three strongest cells are not suitable. This assumes a valid SIM, with PIN disabled and ideal radio conditions; 3GPP TS 05.08, subclause 6.1.

2. There are various requirements that a cell must satisfy before an MS can perform normal camping on it:

   2.1 (i) It should be a cell of the selected PLMN.

   2.2 (ii) It should not be "barred" (see subclause 3.5.1).

   2.3 (iv) The radio path loss between MS and BTS must be below a threshold set by the PLMN operator. This is estimated as shown in subclause 3.6.

   3GPP TS 03.22, subclause 3.2.1.

   NOTE: Criteria (iii) is not applicable for Cell Selection.

3. Initially the MS looks for a cell which satisfies these 4 constraints ("suitable cell") by checking cells in descending order of received signal strength. If a suitable cell is found, the MS camps on it; 3GPP TS 03.22, subclause 3.2.1.

4. The MS shall be able to calculate correctly the path loss criterion parameter C1, used for cell selection and reselection; 3GPP TS 05.08, subclause 6.4.

20.21.1.3 Test purpose

1. To verify that the MS meets conformance requirement 1.

2. To verify that:

   2.1 The MS does not select a cell of a PLMN which is not the selected PLMN.

   2.2 The MS does not select a cell which is "barred".

   2.3 The MS does not select a cell with C1 < 0.

3. To verify that the MS selects suitable cells in descending order of received signal strength.

4. To verify that the MS does not select a cell with C1 < 0.

20.21.1.4 Method of test

20.21.1.4.1 Initial conditions

Parameters changed from the default values in table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	48 / -65	38 / -75	43 / -70	33 / -80	28 / -85	OFF
CBA	1	0	0	0	0	
RXLEV_ACCESS_MIN (dBm)	-90	-67	-90	-88	-98	
MNC			See Table 20.1c			
MCC			002			
C1	25	-8	20	8	13	
C2	25	-8	20	8	13	

Carrier 2 and carrier 4 are chosen between ARFCN 955 - 974. Carrier 1 is chosen between 975 - 1 023, 0; and carrier 3 remains in the P-GSM band.

20.21.1.4.2 Procedure

a) The SS activates the carriers and monitors carriers 2, 4 and 5 for RA requests from the MS.

b) The MS is switched on.

c) The MS is switched off.

d) The SS monitors carriers 1 and 3 for RA requests from the MS.

e) The MS is switched on.

20.21.1.5 Test requirements

1) After step b), the first response from the MS shall be on carrier 4 within 33 s. There shall be no response from the MS on carrier 2.

2) After step e), there shall be no response from the MS on either carrier 1 or carrier 3 within 33 s.

20.21.2 R-GSM cell selection with varying signal strength values

20.21.2.1 Definition

For definition see conformance requirement.

20.21.2.2 Conformance requirement

1. The MS shall:

   The MS shall search all RF channels within its bands of operation, take readings of received RF signal level on each RF channel, and calculate the RLA_C for each. The averaging is based on at least five measurement samples per RF carrier spread over 3 to 5 s, the measurement samples from the different RF carriers being spread evenly during this period.

   3GPP TS 05.08 / 3GPP TS 45.008, subclause 6.2.

   1.1 The MS shall search all RF channels in the system (194 ARFCNs for R-GSM), take readings of received RF signal strength on each RF channel, and calculate the received level average for each.

   1.2 The averaging is based on at least five measurement samples per RF carrier spread over Tav (3 s to 5 s).

   1.3 The measurement samples from the different RF carriers being spread evenly during this period.

2. These quantities termed the "received level averages" (RLA_C), shall be unweighted averages of the received signal levels measured in dBm.

   3GPP TS 05.08 / 3GPP TS 45.008, subclause 6.1.

20.21.2.3 Test purpose

1. To verify that:

   1.1 The MS meets conformance requirement 1.1.

   1.2 The MS meets conformance requirement 1.2.

   1.3 The MS meets conformance requirement 1.3.

2 To verify that the MS meets conformance requirement 2.

20.21.2.4 Method of test

20.21.2.4.1 Initial conditions

Parameters changed from the default values in table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	23 / -90	58 / -55	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	13 / -100	13 / -100				
C1	10	53				

Carrier 1 is chosen between ARFCN 955 - 974.

Specific PICS Statements:

-

PIXIT statements:

- averaging time Tav

20.21.2.4.2 Procedure

a) The SS transmits on carriers 1 and 2. After a period of b × Tav carrier 2 reduces its transmit level to -85 dBm (28 dBμV emf( )). After a further period of a × Tav, carrier 2 increases its transmit level again to -55 dBm (58 dBμV emf( )). Switching of carrier 2 continues with these levels and duty cycle until the end of the test.

Tav is the averaging time declared by the manufacturer.

The parameters a and b are chosen according to the following rules:

$(a + b) \times Tav > Tav$

$0 < a \times Tav < 2/3 \times Tav$

$0,5 \times Tav < b \times Tav < Tav$

In the equations < and > means at least one TDMA frame less or greater than the given value.

While satisfying the conditions given above:

a is chosen to be as close as possible to 2/3.

b is chosen to be as close as possible to 0,5.

b) The MS is switched on.

c) The SS monitors all RA requests from MS on carriers 1 and 2.

20.21.2.5 Test requirements

In step c), the first response from the MS shall be on carrier 2 within 33 s.

NOTE 1: With the selected duty cycle it can be guaranteed that a "good" MS passes the test even at the worst case situations. The minimum averaged value of carrier 2 is in any case higher or equal to -75 dBm which is still 6 dB above carrier 1's level (for a "good" MS).

NOTE 2: With the selected levels and duty cycle the probability that a "bad" MS (i.e. MS that averages over shorter period than 3 s) fails the test is maximized. However, it can not be guaranteed that all the MSs not fulfilling the conformance requirement of averaging or uniform sampling will fail this test.

20.21.3   R-GSM basic cell reselection

20.21.3.1   Definition

While camped on a cell of the selected PLMN the MS may need to select a different cell in order to fulfil the normal service state. This ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

20.21.3.2   Conformance requirement

1. While camped on a cell of the selected PLMN ("camped normally"), the MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

    1.1 (iii) The cell camped on (current serving cell) has become barred.

    1.2 (iv) There is a better cell (in terms of the path loss criterion C2) in the same LA, or a much better cell in another LA of the selected PLMN (using the CRH parameter).

    The MS will then reselect a new cell in order to fulfil the process goal.; 3GPP TS 03.22, subclause 4.5.

NOTE 1: Criterion (i) is tested in subclause 20.21.8 (Cell reselection when C1 (serving cell) < 0 for 5 s).

NOTE 2: Criterion (ii) is tested subclause 20.21.16 (Downlink signalling failure).

NOTE 3: Criterion (v) is tested in subclause 20.21.6 (Cell reselection timings).

2. There are various requirements that a cell must satisfy before an MS can perform normal camping on it:

    2.1 (ii) It should not be "barred".

    2.2 (iv) The radio path loss between MS and BTS must be below a threshold set by the PLMN operator. 3GPP TS 03.22, subclause 3.2.1.

NOTE 4: Criterion (i) is not relevant for cell reselection and for cell selection it is tested in subclause 20.21.1.

NOTE 5: Criterion (iv) refers to the C1 parameter.

3. The MS shall be able to calculate correctly the path loss criterion parameter C2 used for cell reselection; 3GPP TS 05.08, subclause 6.4.

4. At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and recalculate C1 and C2 values for non serving cells (if necessary). The MS shall then check whether:

    i) The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high.

    ii) The calculated value of C2 for a non-serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s, except in the case of the new cell being in a different location area in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least CELL_RESELECT_HYSTERESIS dB as defined by the BCCH data from the current serving cell, for a period of 5 s. This indicates that it is a better cell. 3GPP TS 05.08, subclause 6.6.2.

5. The MS shall attempt to decode the full BCCH data of the serving cell at least every 30 s; 3GPP TS 05.08, subclause 6.6.1.

20.21.3.3   Test purpose

1. To verify that:

    1.1 The MS meets conformance requirement 1.1.

    1.2 The MS meets conformance requirement 1.2.

2. To verify that:

2.1 The MS does not reselect a cell which is barred.

2.2 The MS does not reselect a cell which has a C1 < 0.

3. To verify that the MS calculates the C2 parameter correctly when the CELL_RESELECT_OFFSET, TEMPORARY_OFFSET and PENALTY_TIME parameters are not used.

4. To verify that the MS takes into account the CELL_RESELECT_HYSTERESIS parameter when reselecting a cell in a different location area.

5. To verify that the MS decodes the CELL_BAR_ACCESS and CELL_BAR_QUALIFY parameters from the BCCH every 30 s.

20.21.3.4 Method of test

20.21.3.4.1 Initial conditions

Parameters changed from the default values in table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	43 / -70	33 / -80	43 / -70	38 / -75	38 / -75	
RXLEV_ACCESS_MIN (dBm)	-85	-90	-90	-85	-67	
CRH	10 dB					
LAC			different from other carriers			
CBA				1		
CBQ				0		
C1	15	10	20	10	-8	
C2	15	10	20	10	-8	

The BA(BCCH) list only contains the ARFCNs of the carriers used during the test.

20.21.3.4.2 Procedure

a) The SS activates carriers 1, 2, 4 and 5. The MS is not paged on carrier 1. The SS monitors carriers 2, 4 and 5 for RA requests from the MS.

b) The MS is switched on.

c) The SS stops paging on all carriers except carrier 2. The level of carrier 2 is increased to 43 dBμVemf (C2 becomes 20 dB), and the SS monitors carrier 2 for RA requests from the MS.

d) When the SS receives a response from the MS on carrier 2, it stops paging the MS on this carrier.

e) The MS is switched off.

f) The SS is reconfigured and sets CBA = 1 on carriers 1 and 5.

g) The MS is switched on.

h) After 33 s, the SS starts paging continuously on carrier 1 and sets CBA=1 on carrier 2 and CBA=0 on carriers 1, 4 and 5.

i) When the SS receives a response on carrier 1, it stops paging the MS and waits for 25 s. (The MS should reselect and camp onto carrier 1).

j) The SS activates carrier 3, pages the MS continuously on this carrier and monitors carrier 3 for RA requests from the MS.

k) The SS increases the level of carrier 3 to 53 dBμVemf (C2 increases to 30 dB).

20.21.3.5 Test requirements

1) After step b), there shall be no response from the MS on carriers 2, 4, or 5 within 50 s.

2) In step c), the MS shall respond on carrier 2 within 20 s of increasing the level of carrier 2.

NOTE 1: 5 s to perform running average, 10 s to detect C2 differences, 2,4 s to read BCCH of carrier 2, 1 s to perform RA. Total 18,4 s, allow 20 s.

3) In step h), the MS shall respond on carrier 1 within 50 s of setting CBA=1 on carrier 2.

NOTE 2: 33 s for the MS to read the BCCH of carrier 2 (30 s + 10 %), 15 s for the MS to reselect cell 1, since the MS already has a running average on carrier 1, allow 50 s.

4) After step j), there shall be no response from the MS within 50 s.

5) After step k), the MS shall respond on carrier 3 within 20 s.

20.21.4 R-GSM cell reselection using TEMPORARY_OFFSET, CELL_RESELECT_OFFSET, POWER_OFFSET and PENALTY_TIME parameters

20.21.4.1 Definition

Void.

20.21.4.2 Conformance requirement

1. The MS shall be able to calculate correctly the path loss criterion parameter C2 used for cell reselection; 3GPP TS 05.08, subclause 6.4.

20.21.4.3 Test purpose

1. To verify that the MS calculates the C2 parameter correctly when the CELL_RESELECT_OFFSET, TEMPORARY_OFFSET and PENALTY_TIME parameters are used.

2. To verify DCS 1 800 MS correctly calculate the C2 parameter when the POWER_OFFSET parameter is present.

20.21.4.4 Method of test

20.21.4.4.1 Initial conditions

Parameters changed from the default values in table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	53 / -60	43 / -70	48 / -65	48 / -65		
RXLEV_ACCESS_MIN (dBm)	-80	-100	-85	-85		
PT		11111	40 s	60 s		
CRO		16 dB	20 dB	20 dB		
TO			20 dB	20 dB		
K = 1						
C1	20	30	20	20		
C2	20	14	20 -> 40	20 -> 40		
K = 2 (DCS1800 Class 3 MS only)						
POWER_OFFSET	0	2	6	6		

The BA(BCCH) list only contains the ARFCNs of the carriers used during the test.

20.21.4.4.2 Procedure

For testing of GSM MS, the test procedure is performed for execution counter K = 1.

For testing of DCS 1 800 MS, the test procedure is performed for execution counter K = 1 and 2:

On execution counter K = 1, the POWER_OFFSET Parameter is not present.

On execution counter K = 2, the POWER_OFFSET parameter is present.

a) The SS activates carriers 1 and 2. The MS is not paged on carrier 1. The SS monitors carrier 2 for RA requests from the MS.

b) The MS is switched on.

c) The SS increases the level of carrier 2 to 54 dBµVemf (C2 becomes 25 dB).

d) When the SS receives a response on carrier 2, the SS stops paging on that carrier and waits for 20 s (The MS should reselect and camp onto carrier 2).

e) The SS activates carriers 3 and 4 and continuously pages the MS on these carriers. The SS monitors carriers 3 and 4 for RA requests from the MS.

20.21.4.4.3 Requirements

For execution counter K = 1 and K = 2.

1) After step b), there shall be no response from the MS on carrier 2 within 50 s.

2) After step c), the MS shall respond on carrier 2 within 20 s of increasing the level of carrier 2.

3) After step e), there shall be no response from the MS on carrier 3 within 38 s of activating the carriers but, the MS shall respond on carrier 3 within 90 s. The response on carrier 3 shall be before any response on carrier 4.

NOTE: Minimum time of 38 s set by penalty timer on carrier 3 less 2 s tolerance. Maximum time, total of 33 s to read BCCH of carrier 3, 42 s for expiry of penalty timer on carrier 3, 15 s for reselection, since the MS will already have running averages on carriers 3 and 4, when the penalty timers expire, allow 90 s.

20.21.5 R-GSM cell reselection using parameters transmitted in the System Information type 2bis, type 2ter, type 7 and type 8 messages

20.21.5.1 Definition

System information (SI) type 7 and 8 are transmitted on the BCCH Ext when the system information type 4 message does not contain all information needed for cell selection.

The system information type 2 bis message is used when the system information type 2 message does not contain all neighbour cell ARFCNs.

The system information type 2 ter message is used when system information type 2 messages broadcast by one cell which are system information 2 or both system information 2 and 2bis do not contain all neighbour cell ARFCNs.

20.21.5.2 Conformance requirement

1. The MS shall be able to calculate correctly the path loss criterion parameter C2 used for cell reselection. 3GPP TS 05.08, subclause 6.4.

2 Whilst in idle mode, an MS shall continue to monitor all BCCH carriers as indicated by the BCCH allocation. 3GPP TS 05.08, subclause 6.6.1.

3 Mobile stations shall treat all ARFCNs in the set {0, 1, 2 ... 1 023} as valid ARFCN values even if the mobile station is unable to transmit or receive on that ARFCN. 3GPP TS 04.08 / 3GPP TS 44.018, subclause 10.5.2.1b.

4 The MS shall correctly decodes parameters transmitted in the system information type 2 ter message. 3GPP TS 04.08 / 3GPP TS 44.018, subclause 9.1.34.

20.21.5.3 Test purpose

1. To verify that the MS correctly calculates the C2 criterion when the parameters affecting cell reselection are transmitted in the system information type 7 and 8 messages.

2. To verify that the MS decodes parameters transmitted in the system information type 2 bis message.

3. To verify that the MS treats ARFCNs as valid ARFCNs even if the MS is unable to transmit or receive on that ARFCN.

4. To verify that the MS correctly decodes parameters transmitted in the system information type 2 ter message.

20.21.5.4 Method of test

20.21.5.4.1 Initial conditions

a) Parameters changed from the default values in table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBµV emf() / dBm)	53 / -60	32 / -81	40 / -73	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBµV emf() / dBm)	23 / -90	23 / -90	30 / -83			
BS_AG_BLKS_RES	1	1	1			
PT		0	0			
CRO		16 dB	10 dB			
TO		0 dB	0 dB			
C1	30	9	10			
C2	30	25	20			

b) The ARFCNs of carriers 1, 2 and 3 are chosen from those in table 20.21.1 with carrier 3 chosen between ARFCN 955 - 974.

c) The cell reselection parameters PENALTY_TIME, CELL_RESELECT_OFFSET and TEMPORARY_OFFSET are transmitted in the SI3, SI7 and SI8 messages on carrier 2. They are not transmitted in SI4 and the ADDITIONAL RESELECT PARAM IND parameter is set to 1.

d) The SI2bis message is transmitted on carrier 1 and contains the ARFCN of carrier 2 and ARFCNs 43, 70, 500, 550, 958, 963, 990 and 995. The ARFCN of carrier 2 is not transmitted in the SI2 message.

e) Carriers 1 and 2 are synchronized, but staggered in frame number so that the transmission of the SI3 message on carrier 2, coincides with the paging block which the MS is listening to on carrier 1.

NOTE: Under these conditions, the MS can only decode the parameters affecting cell reselection from the SI7 or SI8 messages.

To achieve this, the following conditions are used:

- BS_PA_MFRMS = 4;

- IMSI mod 1000 = 12;

- FN carrier 1 = FN carrier 2-21, for simultaneously transmitted frames.

f) The SI3 message on carrier 2 indicates that SI2ter is used on carrier 2. SI2ter message contains the ARFCN of carrier 3 and ARFCNs 45, 76, 891, 905. The ARFCN of carrier 3 is transmitted neither in the SI2 nor in the SI2bis messages on carriers 1 and 2.

20.21.5.4.2 Test Procedure

a) The SS activates the channels. The MS is not paged on carrier 1.

b) The MS is switched on.

c) After 50 s, the SS increases the level of carrier 2 to 42 dBµVemf( ).

d) When the SS receives a response on carrier 2, the SS stops paging on that carrier and after 30 s, the SS increases the level of carrier 3 to 60 dBµVemf( ).

20.21.5.5 Test Requirements

1) After step b), there shall be no response from the MS on carrier 2. There shall also be no response on carrier 3.

2) After increasing the level of carrier 2 in step c), the MS shall respond on carrier 2 within 33 s.

3) After increasing the level of carrier 3 in step d), the mobile shall respond on carrier 3 within 35 s.

20.21.6 R-GSM cell reselection timings

20.21.6.1 Definition

Void.

20.21.6.2 Conformance requirement

1. At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and recalculate C1 and C2 values for non serving cells (if necessary). The MS shall then check whether:

1.1 ii) The calculated value of C2 for a non-serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s.

1.2 In case ii) above, cell reselection shall not take place if there was a cell reselection within the previous 15 s.

1.3 Cell reselection for any other reason (see 3GPP TS 03.22) shall take place immediately, but the cell that the MS was camped on shall not be returned to within 5 s if another suitable cell can be found.

3GPP TS 05.08, subclause 6.6.2.

20.21.6.3 Test purpose

1. To verify that:

1.1 The MS does not perform a cell reselection when the C2 value for a non serving cell does not exceed the C2 value of the serving cell for a period of at least 5 s.

1.2 The MS meets conformance requirement 1.2 with an allowance for the uncertainty of the test.

1.3 When the MS performs an immediate cell reselection due to an unsuccessful random access attempt, the cell that the MS was camped onto is not returned to within 5 s when another suitable cell exists.

20.21.6.4 Method of test

20.21.6.4.1 Initial conditions

Parameters changed from the default values in table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier
RF Signal Level (dBµVemf() / dBm)	56 / -57	46 / -67	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBµVemf() / dBm)	29 / -84	33 / -80				
Max. Retrans	00	00				
C1	27	13				
C2	27	13				

Below is an alternative table of parameters for use with test equipment that cannot reach the upper RF levels as specified in the table above. These carrier levels are reduced by 5 dB and will not effect the purpose of the test case:

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	51 / -62	41 / -72	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	24 / -89	28 / -85				
Max. Retrans	00	00				
C1	27	13				
C2	27	13				

The BA(BCCH) list only contains 5 ARFCNs including the ARFCNs of the carriers used during the test.

NOTE: With 5 ARFCNs in the BA(BCCH) list and BS_PA_MFRMS=5 (default value) the MS will maintain a running average on surrounding cells over a period of 5 s.

20.21.6.4.2 Procedure

a) The SS activates the channels. The MS is not paged on any of the carriers.

b) The MS is switched on.

c) After 50 s, the SS starts paging continuously on carriers 1 and 2 for 20 s. The SS monitors carriers 1 and 2 for RA requests from the MS.

d) The SS stops paging on carriers 1 and 2 and waits for 20 s. (The MS should revert to carrier 1 due to cell reselection.)

e) The SS starts paging continuously on carrier 2.

f) The SS increases the transmit level of carrier 2 by 20 dB for a period of 4 s and then reduces the level back to the original value.

g) The SS increases the transmit level of carrier 2 by 20dB and waits for the MS to access on carrier 2. The SS records the time t from the increase in the level of carrier 2 to the first response from the MS.

h) The SS stops paging on carrier 2 and decreases the transmit level of carrier 2 back to the original value.

j) The SS waits 20 s. (The MS should revert to carrier 1 due to cell reselection.)

k) The SS increases the transmit level of carrier 2 by 20 dB. After t+2 s, the SS starts paging continuously on carrier 1 and reduces the level of carrier 2 back to the original level.

20.21.6.5 Test requirements

1) In step c), the MS shall transmit 2 RA requests on carrier 1 followed by 2 RA requests on carrier 2. Subsequent RA requests on carrier 1 shall not occur within 4,5 s of the second RA request on carrier 1.

2) In step f), there shall be no access on carrier 2 within 34 seconds of increasing the level of carrier 2.

3) After step g), the MS shall respond on carrier 2.

4) In step k), there shall be no response on carrier 1 within 11 s after the level of carrier 2 is reduced back to the original level.

NOTE: The 11 s is derived from (t+15) seconds minimum cell reselection timer minus (t+2) seconds from the start of step k) up to the reduction of the level of carrier 2. A further 2 s are subtracted to cover for any uncertainty introduced by the RA process occurring after step g).

20.21.7 R-GSM priority of cells

20.21.7.1 Definition

In general, cell prioritization is a means of encouraging MSs to select some suitable cells in preference to others.

20.21.7.2   Conformance requirement

1. During cell selection a cell with low priority indication will only be selected if a suitable cell of normal priority cannot be found; 3GPP TS 03.22, subclause 3.5.2.1.

2.

Table 1a: Parameters affecting cell priority for cell selection

CELL_BAR_QUALIFY	CELL_BAR_ACCESS	Cell selection priority	Status for cell reselection
0	0	normal	normal
0	1	barred	barred
1	0	low	normal (see note 2)
1	1	low	normal (see note 2)

   3GPP TS 05.08, table 1.a.

3. If all the following conditions are met then the "Cell selection priority" and the "Status for cell reselection" shall be set to normal:

   -   the cell belongs to the MS HPLMN;

   -   the MS is in cell test operation mode;

   -   the CELL_BAR_ACCESS is set to "1";

   -   the CELL_BAR_QUALIFY is set to "0";

   -   the Access Control class 15 is barred.

      3GPP TS 05.08, table 1.a.

20.21.7.3   Test purpose

1. To verify that the MS does not select a cell of low priority when a suitable cell of normal priority exists with a lower received signal strength.

2. To verify that the MS takes into account CELL_BAR_ACCESS and CELL BAR _QUALIFY when performing cell selection and reselection.

3. To verify that the MS meets conformance requirement 3.

20.21.7.4   Method of test

20.21.7.4.1   Initial conditions

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	33 / -80	43 / -70	33 / -80	23 / -90	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	3 / -110	23 / -90	13 / -100	13 / -100		
CBA	0	1	1	0		
CBQ	1	1	0	0		
Access class 15	barred	barred	barred	barred		
C1	30	20	20	10		

20.21.7.4.2   Procedure

a) The SS activates the carriers and monitors for RA requests from the MS on carriers 1, 2, and 4.

b) The MS is switched on.

c) The MS is switched off. The SS deactivates the carriers.

 d) The MS is placed in cell test operation mode.

NOTE: Cell test mode is a mode of operation defined in SIM administrative data field.

 e) The SS activates the carriers and monitors for RA requests from the MS on carriers 1, 2, and 3.

 f) The MS is switched on.

20.21.7.5   Test requirements

1) After step b), the first response from the MS shall be on carrier 4 within 33 s, followed by a response on carrier 1 before a response (if any) on carrier 2 within 50 s.

2) After step f), the first response from the MS shall be on carrier 3 within 33 s, followed by a response on carrier 1 before a response (if any) on carrier 2 within 50 s.

20.21.8 R-GSM cell reselection when C1 (serving cell) < 0 for 5 s

20.21.8.1   Definition

Void.

20.21.8.2   Conformance requirement

1. At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and recalculate C1 and C2 values for non serving cells (if necessary). The MS shall then check whether:

 i) The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high. 3GPP TS 05.08, subclause 6.6.2.

2. While camped on a cell of the selected PLMN ("camped normally"), the MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

 (i) The path loss criterion parameter C1 (see subclause 3.6) indicates that the path loss to the cell has become too high.; 3GPP TS 03.22, subclause 4.5.

20.21.8.3   Test purpose

1. To verify that the MS meets conformance requirement 1.

2. To verify that the MS meets conformance requirement 2.

20.21.8.4   Method of test

20.21.8.4.1   Initial conditions

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	63 / -50	33 / -80	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	43 / -70	23 / -90				
CRO	30 dB					
TO	0					
PT	0					
C1	20	10				
C2	50	10				

NOTE: With BS_PA_MFRMS = 5 (default value), the averaging time of the MS on the serving cell BCCH is 5,9 s.

20.21.8.4.2 Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2 for RA requests from the MS.

b) The MS is switched on.

c) The SS reduces signal level on carrier 1 to -80 dBm / 33 dBµV emf() for 4 s. Then, the SS raises the level back to -50 dBm / 63 dBµV emf(). (C1 becomes -10 dB and C2, 20 dB during this period).

d) The SS reduces signal level on carrier 1 to -80 dBm / 33 dBµV emf().

20.21.8.5 Test requirements

1) After step b), there shall be no access on carrier 1 or carrier 2, within 50 s.

2) After step c), there shall be no access on carrier 2 within 30 s.

3) After step d), the MS shall access on carrier 2 within 20 s.

20.21.9 R-GSM running average of the surrounding cell BCCH carrier signal levels

20.21.9.1 Definition

Void.

20.21.9.2 Conformance requirement

1. Whilst in idle mode an MS shall continue to monitor all BCCH carriers as indicated by the BCCH allocation (BA - See table 1). A running average of received level in the preceding 5 to:

   - Max. {5, ((5 × N + 6) DIV 7) × BS_PA_MFRMS / 4}

   - seconds shall be maintained for each carrier in the BCCH allocation. N is the number of non-serving cell BCCH carriers in BA and the parameter BS_PA_MFRMS is defined in 3GPP TS 05.02; 3GPP TS 05.08, subclause 6.6.1.

2. The same number of measurement samples shall be taken for all non-serving cell BCCH carriers of the BA list, and the samples allocated to each carrier shall as far as possible be uniformly distributed over each evaluation period.; 3GPP TS 05.08, subclause 6.6.1

20.21.9.3 Test purpose

1. To verify that if the MS calculates a received level average (over 5 s) for a non-serving suitable cell which results in the value of C2 exceeding the value of C2 for the serving cell, then cell reselection takes place to the non-serving cell.

2. To verify that by using suitable varying levels of signal strength for non serving cells, the MS samples on non serving cell BCCH carriers are as far as possible distributed uniformly over each evaluation period.

20.21.9.4 Method of test

20.21.9.4.1 Initial conditions

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBµV emf() / dBm)	53 / -60	33 / -80	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBµV emf() / dBm)	23 / -90	23 / -90				
C1	30	10				
C2	30	10				

BS_PA_MFRMS is set to 4 for this test.

The BA(BCCH) list only contains 7 ARFCNs including the ARFCNs of the carriers used during the test.

NOTE: With 7 ARFCNs in the BA(BCCH) list and BS_PA_MFRMS=4 the MS will maintain a running average on surrounding cells over a period of 5 s.

20.21.9.4.2 Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2.

b) The MS is switched on.

c) The SS starts switching the level of carrier 2 between -80 dBm and -57 dBm every 2,7 s and continues to do so until the end of the test.

d) The SS decreases the level of carrier 1 to -76 dBm.

NOTE: As a result of the switching in levels, the running average on carrier 2 will be between -66dBm and -71dBm, assuming that samples are distributed over five consecutive paging blocks.

20.21.9.5 Test requirements

1) After step b), there shall be no access from the MS on carrier 1 or carrier 2, within 50 s.

2) After step c), there shall be no access from the MS on carrier 1 or 2 within 25 s.

NOTE: Any potential access on is likely to occur within 20 s.

3) After step d), the MS shall access on carrier 2 within 20 s.

20.21.10 R-GSM running average of the serving cell BCCH carrier signal level

20.21.10.1 Definition

The MS is required to monitor continuously the BCCH carrier signal level of the serving cell (and to compare it to the BCCH carrier signal levels of the non-serving cells) to guarantee that it is camped on the most suitable cell.

20.21.10.2 Conformance requirement

1. For the serving cell, receive level measurement samples shall be taken at least for each paging block of the MS. The receive level average shall be a running average determined using samples collected over a period of 5 s or five consecutive paging blocks of that MS, whichever is the greater period. New receiving level average values shall be calculated as often as possible. 3GPP TS 05.08, suclause 6.6.1.

20.21.10.3 Test purpose

1. To verify that by using suitable varying levels of signal strength for the serving cell, the MS performs a running average over 5 consecutive paging blocks.

20.21.10.4 Method of test

20.21.10.4.1 Initial conditions

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBμV emf() / dBm)	63 / -50	39 / -74	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	23 / -90	23 / -90				
C1	40	16				
C2	40	16				

NOTE: With BS_PA_MFRMS = 5 (default value), the averaging time of the MS on the serving cell BCCH is 5,9 s.

20.21.10.4.2 Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2 for RA requests from the MS.

b) The MS is switched on.

c) After 50 s the SS starts switching the level of carrier 1 between -80 dBm and -50 dBm every 3 s.

NOTE: As a result of the switching in levels, the running average on carrier 1 will be between -62 dBm and -68 dBm over five consecutive paging blocks.

d) The SS increases the level of carrier 2 to -56 dBm.

20.21.10.5 Test requirement

1) After step c), the MS shall not access on carrier 2, within 25 s.

2) After step d), the MS shall access on carrier 2, within 30 s.

NOTE: 13,75 s to perform running average, 10 s to detect C2 differences, 2,4 s to read BCCH of carrier 2, 1 s to perform RA. Total 27,15 s, allow 30 s.

20.21.11 Updating the list of six strongest neighbour carriers and decoding the BCCH information of a new carrier on the list

20.21.11.1 Definition

Void.

20.21.11.2 Conformance requirement

1. The list of the 6 strongest non-serving carriers shall be updated at least as often as the duration of the running average defined for measurements on the BCCH allocation and may be updated more frequently; 3GPP TS 05.08, subclause 6.6.1.

2. When the MS recognizes that a new BCCH carrier has become one of the 6 strongest, the BCCH data shall be decoded for the new carrier within 30 s; 3GPP TS 05.08, subclause 6.6.1.

20.21.11.3 Test purpose

1. To verify that MS meets conformance requirement 1.

2. To verify that MS meets conformance requirement 2.

20.21.11.4 Method of test

20.21.11.4.1 Initial conditions

Six BCCH carriers are established with the system information contents of table 20.21.1.

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6	Carrier 7
RF signal level (dBμV emf ( )/dBm)	53 / -60	48 / -65	43 / -70	38 / -75	33 / -80	33 / -80	38 / -75
RXLEV_ACCESS_MIN	-90	-90	-90	-90	-90	-90	-110
C1	30	25	20	15	10	10	35
C2	30	25	20	15	10	10	35

The BA(BCCH) list contains only eight ARFCNs and includes those of carriers 1 to 7.

BS_PA_MFRMS is set to 3 during this test.

NOTE: The combination of 8 carriers on the BA list and BS_PA_MFRMS = 3 leads to averaging time of 5 s. Hence 5 s is also the updating time of the list of six strongest neighbour carriers.

20.21.11.4.2 Procedure

a) The SS activates carriers 1 to 6. The MS is not paged on any of the carriers.

b) The MS is switched on.

c) After 60 s, the SS activates carrier 7 and pages the MS continuously on this carrier. The SS monitors carrier 7 for RA requests from the MS.

20.21.11.5 Test requirements

1) The MS shall access on carrier 7 within 55 s of activating carrier 7.

NOTE: 5,5 s to notice new strongest carrier in top 6 (because the updating time for six strongest is 5 s (+10 %)), 33 s to read BCCH, 15 s for reselection, since the MS has already performed the running average on the new strongest carrier, allow 55 s.

20.21.12 R-GSM decoding the BCCH information of the neighbour carriers on the list of six strongest neighbour carriers

20.21.12.1 Definition

Void.

20.21.12.2 Conformance requirement

1. The MS shall attempt to decode the BCCH data block that contains the parameters affecting cell reselection for each of the 6 strongest non-serving cell BCCH carriers at least every 5 minutes; 3GPP TS 05.08, subclause 6.6.1.

NOTE: Verification of cell reselection as implicitly tested here is performed in subclause 20.21.3.

20.21.12.3 Test purpose

1. To verify that the MS decodes the BCCH data block that contains the parameters affecting cell reselection for a non-serving cell BCCH carrier, (which is in the list of six strongest neighbour cells), at least every 5 minutes. This is achieved by changing the BCCH data such that the value of C2 for the non serving cell exceeds the value of C2 for the serving cell, and observing that the MS performs cell reselection within 5 minutes plus the time allowed for cell reselection after the change of the BCCH data.

20.21.12.4 Method of test

20.21.12.4.1 Initial conditions

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBμV emf() / dBm)	38 / -75	33 / -80	OFF	OFF	OFF	OFF
C1	15	10				
C2	15	10				

20.21.12.4.2 Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2.

b) The MS is switched on.

c) The SS changes the RXLEV_ACCESS_MIN in the BCCH data of carrier 2 to be -100 dBm.

NOTE: With the above change the C2 of carrier 2 becomes 20 whereas the C2 of carrier 1 stays at 15.

20.21.12.5 Test requirements

1) After step b), there shall be no access from the MS on carrier 1 or carrier 2 within 50 s.

2) After step c), the MS shall access on carrier 2 within 345 s of the change in the BCCH data of carrier 2.

NOTE: 330 s for decode of BCCH of carrier 2 (300 s +10 %), 15 s for reselection of carrier 2, since the MS already has a running average on carrier 2.

20.21.13 R-GSM decoding the BSIC of the neighbour carriers on the list of six strongest neighbour carriers

20.21.13.1 Definition

Void.

20.21.13.2 Conformance requirement

1. The MS shall attempt to check the BSIC for each of the 6 strongest non-serving cell BCCH carriers at least every 30 s, to confirm that it is monitoring the same cell. If a change of BSIC is detected then the carrier shall be treated as a new carrier and the BCCH data redetermined; 3GPP TS 05.08, subclause 6.6.1.

NOTE: Verification of cell reselection as implicitly tested here is performed in subclause 20.21.3.

20.21.13.3 Test purpose

1. To verify that the MS will check the BSIC of the non-serving cell, which is in the list of six strongest neighbour cells, by changing the BSIC and the BCCH data of the non-serving cell such that the value of C2 for that cell exceeds the value of C2 of the serving cell, and observing that the MS performs cell reselection within the time allowed to check the BSIC, redetermine the BCCH data and perform cell reselection.

20.21.13.4 Method of test

20.21.13.4.1 Initial conditions

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBμV emf() / dBm)	38 / -75	33 / -80	OFF	OFF	OFF	OFF
C1	15	10				
C2	15	10				

20.21.13.4.2 Procedure

a) The SS activates the carriers. The MS is not paged on carrier 1. The SS monitors carriers 1 and 2.

b) The MS is switched on.

c) The SS changes the BSIC of carrier 2 by changing the Base Station Colour Code (BCC) part of the BSIC. The SS also changes the RXLEV_ACCESS_MIN in the BCCH data of carrier 2 to be -100 dBm.

NOTE: With the above change to the BCCH data the C2 of carrier 2 becomes 20 whereas the C2 of carrier 1 stays at 15.

20.21.13.5 Test requirements

1) In step b), there shall be no access from the MS on carrier 1 or carrier 2 within 50 s.

2) After step c), the MS shall access on carrier 2 within 85 s of the change in the BSIC value (and BCCH data) of carrier 2.

NOTE: 33 s for check of BSIC on carrier 2, 33 s for decode of BCCH of carrier 2, 15 s for reselection of carrier 2, since the MS already has a running average on carrier 2, allow 85 s.

20.21.14 R-GSM emergency calls

20.21.14.1 Definition

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20.21.14.2 Conformance requirement

1. When in a limited service state, the MS shall be able to initiate emergency calls; 3GPP TS 05.08, subclause 6.8.

2. When in a limited service state and if not camped on a cell, the MS shall monitor the signal strength of all 194 RF channels, and search for a BCCH carrier which has C1>0 and which is not barred. When such a carrier is found, the MS shall camp on that cell, irrespective of the PLMN identity; 3GPP TS 05.08, subclause 6.8.

3. The MS shall perform cell reselection at least among the cells of the PLMN of the cell on which the MS has camped, according to the algorithm of 3GPP TS 03.22, subclauses 4.5 and 3.7, except that a zero value of CELL_RESELECT_HYSTERESIS shall be used; 3GPP TS 05.08, subclause 6.8.

20.21.14.3 Test purpose

1. To verify that the MS shall be able to initiate emergency calls when no suitable cells of the selected PLMN are available, but at least one acceptable cell is available.

2. To verify that the MS selects a cell with C1 > 0 and CBA = 0 when no suitable cells of the selected PLMN are available.

3. To verify that the MS, when performing cell reselection in the limited service state, uses CELL_RESELECT_HYSTERESIS = 0.

20.21.14.4 Method of test

20.21.14.4.1 Initial conditions

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBμV emf() / dBm)	38 / -75	33 / -80	33 / -80	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	23 / -90	43 / -70	23 / -90			
CELL_BAR_ACCESS	1 (barred)	0	0			
MCC,MNC	forbidden	forbidden	forbidden			
CELL_RESELECT_HYST	0	0	14 dB			
C1	15	-10	10			

NOTE: All the BCCH carriers belong to the same PLMN, which is not the MS's home PLMN and is in the SIM's forbidden PLMN's list.

20.21.14.4.2 Procedure

a) The SS activates the carriers. The SS monitors for RA attempts from the MS on carriers 1, 2 and 3 for the duration of the test.

b) The MS is switched on.

c) 50 s after switch on, an emergency call is initiated on the MS.

d) The SS changes the CBA of carrier 1 to 0.

NOTE 1: The MS should reselect to carrier 1 because it should not take into account the CELL_RESELECT_HYST value of 14 but use 0 instead.

e) After 345 s an emergency call is initiated on the MS.

NOTE 2: 330 s to detect change of BCCH data, 15 s to perform reselection of carrier 1, since the MS already has a running average on carrier 1.

20.21.14.5 Test requirements

1) In step c), the first access by the MS shall be on carrier 3.

2) In step e), the first access from the MS shall be on carrier 1.

20.21.15 R-GSM cell reselection due to MS rejection "LA not allowed"

20.21.15.1 Definition

While camped on a cell of the selected PLMN the MS may need to select a different cell in order to fulfil the normal service state. This ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

This process goes on while camping on a cell which pertains to an LA which is placed in the list of "forbidden LAIs for regional provision of service".

20.21.15.2 Conformance requirement

1. In response to a registration attempt, when receiving an LU reject with cause value "LA not allowed", the MS stores this LAI in a list of "forbidden LAIs for regional provision of service", to prevent repeated attempts to access a cell of the forbidden LA, 3GPP TS 03.22, subclause 3.3.

2. If the MS has received the cause 'LA not allowed', it shall ignore this fact when selecting a cell to camp on, i.e. it shall not reject a cell for camping on because that cell is part of a LA where this cause has been received, 3GPP TS 03.22, subclause 3.5.4.

3. In response to a registration attempt, when receiving an LU reject with cause value "LA not allowed", the MS continues to perform normal cell-reselection, 3GPP TS 03.22, subclause 4.4.2

4. A new LU attempt shall only be performed when a new LA (or new PLMN) is entered according to the cell reselection procedure, 3GPP TS 03.22, subclause 3.3 and figure 4.

NOTE: LA stands for "Location Area" and LU stands for "Location Update".

20.21.15.3 Test purpose

1. To verify that if an LU is rejected with cause "LA not allowed" that the LAI of that cell is written into a forbidden list which prevents the MS from performing LU onto another cell in that LA. This is verified indirectly in test purposes 2, 3 and 4.

2. To verify that the MS will not reject a cell for camping on because that cell is part of a LA in the list of "forbidden LAIs for regional provision of service". This is verified indirectly by making the MS attempt an emergency call and checking that the channel request message is transmitted on the correct cell.

3. To verify that the MS when receiving an LU reject with cause value "LA not allowed", the MS continues to perform normal cell-reselection:

   Cell reselection is triggered if there is a better cell (in terms of the path loss criterion C2) in the same LA, or a much better cell in another LA of the selected PLMN (using the CRH parameter). 3GPP TS 03.22, subclauses 3.4 and 4.5.

4. To verify that a new LU attempt will be performed when a new LA (or new PLMN) is entered, 3GPP TS 03.22, subclause 3.3 and figure 4.

20.21.15.4 Method of test

20.21.15.4.1 Initial conditions

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	63 / -50	54 / -59	44 / -69	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	53 / -60	35 / -78	29 / -84			
CRH	14	0	10			
LAC	H1111	H2222	H1111			
ATT	1	1	1			
C1	10	19	15			
C2	10	19	15			

20.21.15.4.2 Procedure

a) The SS activates the carriers. The SS monitors all RA requests from MS on carriers 1, 2 and 3 until step e) has been completed. Only idle-paging is sent on all channels.

b) The MS is switched on.

c) When the MS performs an IMSI attach onto carrier 1, the SS shall reject it with cause "LA not allowed".

d) 30 s after the MS has returned to idle mode (channel release after LU reject), the MS is manually commanded to set up an emergency call.

NOTE 1: C2 of carrier 3>C2 of carrier 1. Carriers 1 and 3 belong to the same LA.

e) The SS rejects the CM service request from the MS, with a CM service reject message with cause value #17 (Network Failure).

NOTE 2: Cause values #4 (IMSI unknown in VLR) or #6 (Illegal ME) lead to unwanted behaviour of the mobile.

f) 10 s after the MS has returned to idle mode (channel release after CM service reject), the SS increases the level of carrier 2 to 65 dBμV emf().

NOTE 3: C2 of carrier 2 = 30, now larger than C2 of carrier 3 + CRH.

g) The SS shall accept any LU on carrier 2.

20.21.15.5 Test requirements

1) After step b), the MS shall respond on carrier 1 within 33 s.

2) In step d), the MS shall access on carrier 3 with a channel request message, within 15 s of being commanded to set up the emergency call.

3) After increasing the level of carrier 2 in step f), the MS shall reselect and access onto carrier 2 requesting an LU within 30 s.

NOTE: 13,75 s to perform running average, 10 s to detect C2 differences, 2,4 s to read BCCH of carrier 2, 1 s to perform RA. Total 27,15 s, allow 30 s.

20.21.16 R-GSM downlink signalling failure

20.21.16.1 Definition

See conformance requirement.

20.16.2 Conformance requirement

The downlink signalling failure criterion is based on the downlink signalling failure counter DSC.

1. When the MS camps on a cell, DSC shall be initialized to a value equal to the nearest integer to 90/N where N is the BS_PA_MFRMS parameter for that cell (see 3GPP TS 05.02).

2. Thereafter, whenever the MS attempts to decode a message in its paging subchannel; if a message is successfully decoded DSC is increased by 1,(however never beyond the nearest integer to 90/N).

3. Whenever the MS can not successfully decode a message in its paging subchannel the DSC is decreased by 4.

4. When DSC reaches 0, a downlink signalling failure shall be declared. A downlink signalling failure shall result in cell reselection, 3GPP TS 03.22, subclause 4.5 (ii) and 3GPP TS 05.08, subclause 6.5.

NOTE: The network sends the paging subchannel for a given MS every BS_PA_MFRMS multiframes. The requirement for network transmission on the paging subchannel is specified in 3GPP TS 04.08 / 3GPP TS 44.018. The MS is required to attempt to decode a message every time its paging subchannel is sent.

20.21.16.3 Test purpose

1. To verify that the MS initializes the DSC counter in accordance with the conformance requirement. This is verified indirectly.

2. To verify that whenever the MS successfully decodes a message on paging subchannel, the DSC is increased by 1, (however never beyond the nearest integer to 90/N). This is verified indirectly.

3. To verify that whenever the MS can not successfully decode a message on paging subchannel, the DSC decreased by 4. This is verified indirectly.

4. To verify that when the DSC reaches 0, a downlink signalling failure shall be declared and the MS will perform cell reselection.

20.21.16.4 Method of test

20.21.16.4.1 Initial conditions

Two BCCH carriers are established with the system information contents of table 20.21.1.

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBμV emf() / dBm)	43 / -70	33 / -80	OFF	OFF	OFF	OFF
C1 = C2	20	10				

NOTE: The DSC counter will have a value 18 (90/5).

20.21.16.4.2 Procedure

a) The MS is switched on. On carrier 1 valid layer 3 messages shall be sent in the paging blocks, but not paging the MS (idle paging). On carrier 2 the MS is paged continuously in all paging blocks.

b) After 40 s the SS sends corrupted data (using random data, wrong parity bits see 3GPP TS 05.03, subclauses 4.3 and 4.1.2 or other lower layer error) in four successive paging blocks to carrier 1 and then reverts to sending normal data.

NOTE 1: Sending corrupted, i.e. non-decodable data on four successive paging blocks should decrease the DSC to 2.

c) The SS monitors all accesses on both carriers for 30 s.

d) The SS sends corrupted data in five successive paging blocks to carrier 1 and then reverts to sending normal data.

NOTE 2: Sending random, data on five successive paging blocks should decrease the DSC to < 0 and cause a cell reselection.

e) The SS monitors all accesses on both carriers for 30 s.

20.21.16.5 Test requirements

1) There shall be no access to carrier 2 in test steps a) and c).

2) The MS shall access on carrier 2 at test step e) within 15 s.

20.21.17 R-GSM cell selection if no suitable cell found in 10 s

20.21.17.1 Definition

See conformance requirement.

20.21.17.2 Conformance requirement

If no suitable cell is found in cell reselection process within 10 s, the cell selection algorithm of 3GPP TS 03.22 shall be performed, 3GPP TS 05.08; subclause 6.6.2.

20.21.17.3 Test purpose

To verify that the MS fulfils the conformance requirement.

20.21.17.4 Method of test

20.21.17.4.1 Initial conditions

One BCCH carrier is established with the system information contents of table 20.21.1.

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF signal level (dBµV emf() / dBm)	43 / -70	OFF	OFF	OFF	OFF	OFF
C1 = C2	20					

20.21.17.4.2 Procedure

a) The MS is switched on. Idle paging is sent on carrier 1.

b) After the MS indicates service the SS reduces the transmit level of carrier 1 to 13 dBµV emf() (so that C1 of carrier 1 becomes -10) and turns on a new carrier (carrier 2) at a level of 33 dBµV emf(). Carrier 2 shall not be in the MS BA list (i.e. it shall not be one of the carriers that MS has been monitoring after camped on carrier 1).

c) The SS shall monitor all accesses on carriers 1 and 2 for 60 s.

NOTE: The access on carrier 2 should not take longer than 50 s. (5 s to rxlev averages, 5 s for C1 < 0 duration, 10 s for searching another suitable cell, 30 s for cell selection), 60 s is a safe time to wait.

20.21.17.5 Test requirements

The MS shall access on carrier 2 at test step c) within 60 s.

20.21.18 R-GSM cell reselection due to MS rejection "Roaming not allowed in this LA"

20.21.18.1 Definition

While camped on a cell of the selected PLMN the MS may need to select a different cell in order to fulfil the normal service state. This ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

The MS looks for suitable neighbour cells which satisfies 4 constraints including that It should not be in an LA which is in the list of "forbidden LAs for roaming".

20.21.18.2 Conformance requirement

1. To prevent repeated attempts to have roaming service on a not allowed LA, when the MS is informed that an LA is forbidden, the LA is added to a list of "forbidden LAs for roaming" which is stored in the MS, 3GPP TS 03.22, subclause 3.1.

2. If the MS has received the cause "Roaming not allowed in this LA", in response to a LU attempt, the Network Selection Procedure shall be started, 3GPP TS 03.22; subclause 4.3.3 L3, 3GPP TS 04.08 / 3GPP TS 24.008; subclause 4.4.4.7.

3. The MS can only perform camping on a suitable cell, which:

   - should not be in an LA which is in the list of "forbidden LAs for roaming" 3GPP TS 03.22, subclause 3.2.1.

NOTE: LA stands for "Location Area" and LU stands for "Location Update".

20.21.18.3 Test purpose

1. To verify that if an LU is rejected with cause "Roaming not allowed in this LA", that the LAI of that cell is written into a forbidden list which prevents the MS from camping onto any cell in that LA.

2. To verify that if the MS has received the cause "Roaming not allowed in this LA", in response to a LU attempt, the Network Selection Procedure is initiated. This is verified indirectly by test purpose 3, in that the new LA is accessed as part of cell selection, hence CRH is disregarded.

3. To verify that if an LU is rejected, when attempting LU in a LA with LAI = LAI1, with cause "Roaming not allowed in this LA" and only cells of the selected PLMN are available, the MS will only camp and attempt LU in any LA with LAI <> LAI1.

20.21.18.4 Method of test

20.21.18.4.1 Initial conditions

Parameters changed from Default values table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBμV emf() / dBm)	63 / -50	53 / -60	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBμV emf() / dBm)	23 / -90	23 / -90				
MNC	MNC <> HPLMN	MNC <> HPLMN				
MCC	MCC of HPLMN	MCC of HPLMN				
CRH	0	0				
LAC	H1111	H2222				
ATT	1	1				
C1	40	30				
C2	40	30				

20.21.18.4.2 Procedure

a) The MS is switched on. Idle paging is sent on all carriers.

b) The SS monitors all RA requests from MS on carriers 1 and 2.

c) When the MS performs an IMSI attach onto carrier 1, the SS shall reject it with cause "Roaming not allowed in this LA".

d) The SS shall accept any LU on carrier 2.

e) The SS monitors all RA requests from MS on carriers 1 to 2.

20.21.18.5 Test requirements

1) The MS should respond on carrier 1 within 33 s of switch on.

2) After LU reject, the MS shall initiate the Network Selection Procedure and access onto Carrier 2 as part of cell selection within 33 s from returning to idle mode after the LU reject.

NOTE: The timing requirement in b) is given only for testing purposes only. No timing requirements are defined for the Network Selection Procedure, but the time allowed for cell selection (see 20.21.1) should be adequate.

3) After the LU reject on carrier 1, there shall be no more access attempts on this carrier.

20.21.19 R-GSM cell selection on release of SDCCH and TCH

20.21.19.1 Definition

20.21.19.2 Conformance requirement

1. When the SS releases a TCH or SDCCH and returns to idle mode, it shall, as quickly as possible camp on the BCCH carrier of the cell whose channel has just been released. If the full BCCH data for that cell was not decoded in the preceding 30 s, the MS shall then attempt to decode the full BCCH data. Until the MS has decoded the BCCH data required for determining the paging group, it shall also monitor all paging blocks on timeslot 0 of the BCCH carrier for possible paging messages that might address it. If the MS receives a page before having decoded the full BCCH data for the cell, the MS shall store the page and respond once the full BCCH data has been decoded, provided that the cell is not barred and the MSs access class is allowed. 3GPP TS 05.08, subclause 6.7.

20.21.19.3 Test purpose

1. To verify that on release of a TCH or an SDCCH, the MS camps as quickly as possible on the BCCH carrier of the cell whose channel has just been released.

NOTE: This is implicitly tested by the MS responding to a paging request. The decoding of BCCH data cannot be explicitly tested. However, the MS shall monitor for paging messages which may address it if it decodes the BCCH.

20.21.19.4 Method of test

20.21.19.4.1 Initial conditions

a) Parameters changed from default values in table 20.21.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5	Carrier 6
RF Signal Level (dBmV emf() / dBm)	53 / -60	33 / -80	OFF	OFF	OFF	OFF
RXLEV_ACCESS_MIN (dBmV emf() / dBm)	23 / -90	23 / -90				
BS_PA_MFRMS	2	2				
ATT	1					
C1	30	10				
C2	30	10				

b) Carrier 1 is configured to have a combined control channel.

c) Carrier 2 is configured to have a non combined control channel.

20.21.19.4.2 Test procedure

a) The SS activates the carriers. No paging messages are transmitted on carrier 1 or carrier 2.

b) The MS is switched on.

c) In response to the MS access for IMSI attach, the SS allocates a combined SDDCH/4, accepts the IMSI attach procedure and then releases the link. After 0,5 s but within 1 s of transmitting the UA frame on completion of the IMSI attach procedure, the SS transmits a single PAGING REQUEST in the appropriate paging block of the MS on carrier 1.

d) When the MS responds to paging, the SS establishes a call on a traffic channel.

e) The SS increases the level of carrier 2 to 63 dBmV emf().

f)   After 10 s the SS performs a handover to another TCH, with the parameters of carrier 2 indicated in the CELL DESCRIPTION information element of the HANDOVER COMMAND message.

g)   After a further 10 s, the SS clears down the call. After 0,5 s but within 1 second of transmitting the UA frame, the SS transmits a single PAGING REQUEST on carrier 2 in the appropriate paging block of the MS.

20.21.19.5   Test requirements

1)   After step b) the MS shall access in order to commence an IMSI attach procedure on carrier 1 within 33 s.

2)   In step c), the MS shall respond to paging within 3 seconds of transmitting the PAGING REQUEST.

3)   In step g), the MS shall respond to paging within 3 seconds of transmitting the PAGING REQUEST.

20.22   GPRS Cell Selection and Reselection

The absolute accuracy of the MS signal level measurements is assumed to be ±6 dB. A difference of at least 8 dB is allowed for cases of discrimination between C1, C31, C32 values and 0.

The relative accuracy of the MS signal level measurements is assumed to be ±3 dB for the signal levels used in the tests of this subclause. A difference of at least 5 dB is allowed for cases of discrimination between C1 and C31 and C32 values on different carriers.

NOTE 1:   The accuracy of MS signal level measurements is specified in 3GPP TS 05.08. For all of the tests in this subclause, the signal levels used are greater than 1 dB above reference sensitivity level.

NOTE 2:   The tolerance on timers specified in 3GPP TS 05.08 is ±10 % except for PENALTY_TIME where it is ±2 s. In the tests of this subclause, the test requirements include these tolerances. Consequently, the times stated in the test requirement sometimes differ from the corresponding timer in the conformance requirement.

Where pulsed signals are specified, the SS tolerance on pulse width is ±2 % and the SS tolerance on power level ±1 dB.

The MS shall perform cell re-selection according to the idle mode procedures defined in clause 6 of 3GPP TS 05.08 and therefore tests defined in clause 20 of TS 51.010 apply.

The support of GPRS shall be indicated in SYSTEM INFORMATION TYPE 3 message. In addition, the support of GPRS shall be indicated in either SYSTEM INFORMATION TYPE 4 or SYSTEM INFORMATION TYPE 7 and 8 messages. If GPRS is supported, SYSTEM INFORMATION TYPE 13 message shall be sent. SI 13 message shall not be sent if GPRS is not supported (3GPP TS 04.08 / 3GPP TS 44.018, subclause 3.2.2.1. Additional requirements for the broadcast of system information in a cell supporting GPRS are specified in 3GPP TS 04.60. The GPRS support is indicated by the presence of the field GPRS Indicator in the SI Rest Octets (3GPP TS 04.08 / 3GPP TS 44.018, subclauses 10.5.2.34; 10.5.2.35, 10.5.2.36 and 10.5.2.37).

The following definitions are applicable to tests 20.22.1 to 20.22.31:

-   Carrier X supports GPRS : the SS includes the field GPRS Indicator in SI 3 Rest Octets and in SI 4 Rest Octets.

-   The SS enables GPRS on carrier X : the SS starts including the field GPRS Indicator in SI 3 Rest Octets and in SI 4 Rest Octets.

-   The SS disables GPRS on carrier X : the SS stops including the field GPRS Indicator in SI 3 Rest Octets and in SI 4 Rest Octets.

Unless otherwise stated in the method of test, in all of the tests of this subclause:

-   The SIM is in the idle updated state in the default registration area with a TMSI and PTMSI assigned at the beginning of each test.

-   By default idle paging is transmitted on the PCH according to 3GPP TS 04.08 / 3GPP TS 44.018, subclause 3.2.2.2.

-   Where MS paging is specified within a test, TMSI is to be used on CCCH

- The Scheduling of System Information should be such that a complete set of consistent SI messages, including SI13 were applicable, can be decoded within 8 multiframes (8 × 51 frames).

- The MS is configured to automatically attach to GPRS at switch on by using the PICS/PIXIT Statement "Automatic GPRS attach procedure at switch on or power on Yes/No" as in GPRS Attach procedure tests (see subclause 44.2.1). For MS that does attach at power on, the SS shall accept access request with cause 'one phase access' in determining test verdict where applicable.

- The network simulation settings as specified in section 40 shall be applied unless otherwise stated in section 20.22.

Table 20.22.1: Default values of the system information or Packet Measurement Order fields

Parameter	3GPP TS 04.60 reference	Abbr.	Normal Setting
PRIORITY_CLASS	11.2.20	PC	1
HCS_THR	11.2.20	HT	-110dBm
GPRS_RESELECT_OFFSET	11.2.20	GRO	0 dB
NC_REPORTING_PERIOD_I	11.2.23	RP	61.44s
NETWORK_CONTROL_ORDER	11.2.23	NCO	NC0
CELL_RESELECT_HYST	11.2.20	CRH	0 dB
GPRS_TEMPORARY_OFFSET	11.2.20	GTO	0 db
GPRS_PENALTY_TIME	11.2.20	GPT	10s
GPRS_MS_TXPWR_MAX_CCH	11.2.20	GMTMC	Max. output power of MS
GPRS_RXLEV_ACCESS_MIN	11.2.20	GRAM	-90 dBm
BA(GPRS) ARFCN	11.2.20	BA	All 0 except values in Table 20.22.1a (broadcast in in SYSTEM INFORMATION TYPE 2 and 2bis.)

Table 20.22.1a: ARFCNs for Single Band Tests

Band	ARFCNs
GSM 450	259, 263, 269, 275, 279, 283, 287, 292
GSM 480	306, 310, 316, 322, 326, 330, 334, 339
GSM 710	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511
GSM 750	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511
T-GSM 810	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511
GSM 850 GSM 900	130, 136, 145, 152, 168, 170, 176, 177, 181, 185, 189, 193, 197, 207,219, 251 both P-GSM and E-GSM ARFCNs are broadcast: GSM: 3, 9, 18, 25, 41, 43, 49, 50, 54, 58, 62, 66, 70, 80, 92, 124 E-GSM: 985, 989, 995, 1010, 1014
DCS 1800	512, 543, 568, 589, 602, 641, 662, 683, 696, 711, 732, 754, 794, 851, 870, 871, 872, 884
PCS1900	512, 543, 568, 589, 602, 629, 641, 653, 662, 683, 696, 711, 727, 732, 754, 777, 794, 809

20.22.1   Void

20.22.2   Void

20.22.3   Void

20.22.4   Void

20.22.5   Void

20.22.6   Void

20.22.7   Void

20.22.8   Cell selection when the best cell does not support GPRS

20.22.8.1   Definition

Cell selection is a process in which an MS, whenever a new PLMN is selected, attempts to find a suitable cell of that PLMN to camp on. Two methods of searching for a suitable cell are possible, normal cell selection and stored list cell selection. The process ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink. The support of GPRS is not a condition to select a cell. Once the MS is camped on a cell, access to the network is allowed.

20.22.8.2   Conformance requirement

1. … the MS shall be able to select the correct (fourth strongest) cell and be able to respond to paging on that cell within 30 seconds of switch on, when the three strongest cells are not suitable. This assumes a valid SIM with PIN disabled and ideal radio conditions

   3GPP TS 05.08 / 3GPP TS 45.008, subclause 6.1.

2. There are various requirements that a cell must satisfy before an MS can perform normal camping on it:

   2.1 (i)   It should be a cell of the selected PLMN;

   2.2 (ii)   It should not be "barred" (see subclause 3.5.1);

   2.3 (iii) It should not be in an LA which is in the list of "forbidden LAs for roaming";

   2.4 (iv)   The radio path loss between MS and BTS must be below a threshold set by the PLMN operator. This is estimated as shown in subclause 3.6. 3GPP TS 03.22, subclause 3.2.1.

   NOTE: Criteria 2.3 (iii) is not applicable for Cell Selection.

3. Initially the MS looks for a cell which satisfies these 4 constraints ("suitable cell") by checking cells in descending order of received signal strength. If a suitable cell is found, the MS camps on it, 3GPP TS 03.22, subclause 3.2.1.

4. The MS shall be able to calculate correctly the path loss criterion parameter C1, used for cell selection and reselection, 3GPP TS 05.08, subclause 6.4.

20.22.8.3   Test purpose

1. To verify that the MS meets conformance requirement 1. even when one of the other cells supports GPRS.

2. To verify that:

   2.1 The MS does not select a cell of a PLMN, which is not the selected PLMN.

   2.2 The MS does not select a cell which is "barred".

   2.4 The MS does not select a cell with C1 < 0.

3. To verify that the MS selects suitable cells in descending order of received signal strength.

4. To verify that the MS does not select a cell with C1 < 0.

20.22.8.4   Method of test

20.22.8.4.1   Initial conditions

Parameters changed from the default values in table 20.22.1.

Parameter	Cell A	Cell B	Cell C	Cell D	Cell E
	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Carrier 5
Channel Type Carried	BCCH	BCCH	BCCH	BCCH	BCCH
RF Signal Level (dBm)	-75	-80	-70	-60	-70
GPRS Support	N	Y	N	N	N
CBA	0	0	0	1	0
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90	-60
GPRS_RXLEV_ACCESS_MIN	--	--	--	--	--
MNC	Default	Default	See Table 20.1c	Default	Default
MCC	Default	Default	002	Default	Default
C1	15	10	20	30	-10

NOTE 1: For an E-GSM MS carrier 1 and carrier 5 ARFCNs are chosen in the E-GSM band, carrier 3 and carrier 4 ARFCNs in the P-GSM band.

NOTE 2: Carrier 2 supports GPRS without PBCCH channel in the cell.

NOTE 3: Carriers 1, 3, 4 and 5 do not support GPRS.

20.22.8.4.2   Procedure

a) The SS activates and pages on the MS on all carriers. All Carriers are monitored for RA requests from the MS.

b) The MS is switched on.

20.22.8.5   Test requirements

1) After step b), the first response from the MS shall be on carrier 1 within 33 s. There shall be no response from the MS on any other carrier.

20.22.9   Cell reselection when the best cell does not support GPRS

20.22.9.1   Definition

While camped on a cell of the selected PLMN the MS may need to select a different cell in order to fulfil the normal service state. This ensures that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink. The target cell should be reselected despite it does not support GPRS.

20.22.9.2   Conformance requirement

1. While camped on a cell of the selected PLMN ("camped normally"), the MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

1.1 (iii) The cell camped on (current serving cell) has become barred.

1.2 (iv) There is a better cell (in terms of the path loss criterion C2) in the same LA, or a much better cell in another LA of the selected PLMN (using the CRH parameter).

The MS will then reselect a new cell in order to fulfil the process goal.; 3GPP TS 03.22, subclause 4.5.

NOTE 1: Criterion (i) is tested in subclause 20.8 (Cell reselection when C1(serving cell) < 0 for 5 s).

NOTE 2: Criterion (ii) is tested subclause 20.16 (Downlink signalling failure).

NOTE 3: Criterion (v) is tested in subclause 20.6 (Cell reselection timings).

2. There are various requirements that a cell must satisfy before an MS can perform normal camping on it:

    2.1 (ii)   It should not be "barred".

    2.2 (iv) The radio path loss between MS and BTS must be below a threshold set by the PLMN operator. 3GPP TS 03.22, subclause 3.2.1.

NOTE 4: Criterion (i) is not relevant for cell reselection and for cell selection it is tested in subclause 20.1.

NOTE 5: Criterion (iv) refers to the C1 parameter.

3. The MS shall be able to calculate correctly the path loss criterion parameter C2 used for cell reselection; 3GPP TS 05.08, subclause 6.4.

4. At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and recalculate C1 and C2 values for non serving cells (if necessary). The MS shall then check whether:

    i)   The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high.

    ii) The calculated value of C2 for a non-serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s, except in the case of the new cell being in a different location area or, for a GPRS MS, in a different routing area or always for a GPRS MS in ready state in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least CELL_RESELECT_HYSTERESIS dB as defined by the BCCH data from the current serving cell, for a period of 5 seconds. This indicates that it is a better cell. 3GPP TS 05.08, subclause 6.6.2.

5. The MS shall attempt to decode the full BCCH data of the serving cell at least every 30 s; 3GPP TS 05.08, subclause 6.6.1.

20.22.9.3 Test purpose

20.22.9.3.1 Test purpose for procedure 1

1. To verify that:

    1.1 The MS meets conformance requirement 1.1.

    1.2 The MS meets conformance requirement 1.2.

2. To verify that:

    2.1 The MS does not reselect a cell which is barred.

    2.2 The MS does not reselect a cell which has a C1 < 0.

    2.3 The MS does reselect a cell even if does not support GPRS.

    2.4 The MS keeps camping on the serving cell despite it does not support GPRS and there is a non-serving suitable cell with a lower C2 that supports GPRS.

    2.5 The MS does not attempt to attach to GPRS when camping on a cell that does not support GPRS despite there is a non-serving suitable cell with a lower C2 that supports GPRS.

3. To verify that the MS takes into account the CELL_RESELECT_HYSTERESIS parameter when reselecting a cell in a different location area or if MS in Ready State, whether this cell supports GPRS or not.

Method of test for procedure 1

Initial Condition

Parameters changed from the default values in table 20.22.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Channel Type Carried	BCCH	BCCH	BCCH	BCCH
RF Signal Level (dBμV emf() / dBm)	43 / -70	33 / -80	38 / -75	38 / -75
GPRS Support	Y	N	N	N
RXLEV_ACCESS_MIN (dBm)	-85	-90	-85	-67
CRH	10 dB	Default	Default	Default
LAC	Default	Default	Default	Default
CBA	Default	Default	1	Default
CBQ	Default	Default	0	Default
C1	15	10	10	-8
C2	15	10	10	-8

NOTE 1: Carrier 1 support GPRS without PBCCH channel in the cell.

NOTE 2: Carriers 2, 3 and 4 do not support GPRS.

The BA(BCCH) list only contains the ARFCNs of the carriers used during the test.

Procedure

a) The SS activates carriers 1, 2, 3 and 4 with paging enabled on Carriers 2, 3 and 4.

b) The MS is switched on.

c) The MS should select and camp onto carrier 1 and complete the GPRS Attach procedure (Ready Timer deactivated).

d) The SS disables GPRS on carrier 1 and enables GPRS on carrier 2.

e) The SS enables GPRS on carrier 1 and disables GPRS on carrier 2.

f) The level of carrier 2 is increased to 43 dBμVemf (C2 becomes 20 dB), and the SS monitors carrier 2 for RA requests from the MS.

g) The level of carrier 2 is increased to 53 dBμVemf (C2 becomes 30 dB), and the SS monitors carrier 2 for RA requests from the MS.

Test requirements

1) After step c), there shall be no response from the MS on carriers 2, 3, or 4 within 50 s.

NOTE 1: 33 s for the MS to read the BCCH of carrier 2 (30 s + 10 %), 15 s for the MS to reselect another cell, since the MS already has a running average on carrier 1, allow 50 s.

2) After step d), there shall be no response from the MS on carriers 2, 3, or 4 within 345 s.

NOTE 2: 330 s for the MS to read the BCCH of carrier 2 (300 s + 10 %), 15 s for the MS to reselect another cell, since the MS already has a running average on carrier 1.

3) After step e), there shall be no response from the MS on carriers 2, 3, or 4 within 345 s.

4) After step f), there shall be no response from the MS on carriers 2, 3, or 4 within 50 s.

5) In step g), the MS shall respond on carrier 2 within 20 s of increasing the level of carrier 2.

NOTE 3: 5 s to perform running average, 10 s to detect C2 differences, 2,4 s to read BCCH of carrier 2, 1 s to perform RA. Total 18,4 s, allow 20 s.

20.22.9.3.2   Test purpose for procedure 2

2.1 To verify that the MS does not camp on a barred cell.

4. To verify that the MS decodes the CELL_BAR_ACCESS parameter from the BCCH every 30 s.

Method of test for procedure 2

Initial Condition

Parameters changed from the default values in table 20.22.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Channel Type Carried	BCCH	BCCH	BCCH	BCCH
RF Signal Level (dBμV emf() / dBm)	38 / -75	43 / -70	43 / -70	38 / -75
GPRS Support	N	Y	Y	N
RXLEV_ACCESS_MIN (dBm)	-85	-90	-90	-85
LAC	Default	Default	different from other carriers	Default
CBA	Default	Default	1	1
CBQ	Default	Default	Default	0
C1	10	20	20	10
C2	10	20	20	10

NOTE 1: Carrier 2 and 3 support GPRS without PBCCH channel in the cell.

NOTE 2: Carriers 1 and 4 do not support GPRS.

The BA(BCCH) list only contains the ARFCNs of the carriers used during the test.

Procedure

a) The SS activates all carriers with paging enabled on Carriers 1, 3 and 4. The MS is switched on. The MS should select and camp onto carrier 2 and complete the GPRS Attach procedure (Ready Timer deactivated).

b) After 33 s, the SS sets CBA = 1 on carrier 2.

Test requirements

1) In step b), the MS shall access Carrier 1 within 50 s of setting CBA=1 on carrier 2.

20.22.10 Void

20.22.11 Void

20.22.12 Cell Selection on "LA Not Allowed"

20.22.12.1   Definition

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20.22.12.2   Conformance requirement

If the MS has received the cause "LA Not Allowed" it shall ignore this fact when selecting a cell to camp on (3GPP TS 03.22, subclause 3.2.1).

20.22.12.3   Test purpose

To verify that the MS does not reject a cell because the cell is a part of the LA for which it has received the cause "LA Not Allowed".

NOTE: During GPRS Attach, the MS receives an ATTACH REJECT message with cause 'LA not allowed". The MS shall then camp on any acceptable cell and shall be able to make emergency calls.

20.22.12.4   Method of test

Initial conditions

Parameter	Cell 1	Cell 2
Channel Type carried	BCCH	BCCH
RF Signal Level (dBm)	-60	-75
Serving Cell Parameters		
RXLEV_ACCESS_MIN (dBm)	-90	-90
CELL_BAR_ACCESS	0	1
LAC	Default	Default
C1	30	15

NOTE: Serving Cell Parameters are coded and transmitted on the specified Channel Type

20.22.12.4.2   Procedure

a) The SS activates all the Carriers.

b) MS is Switched on.

c) The SS sends an Attach Reject Message on Cell 1 with cause as "LA not allowed".

d) The MS is manually commanded to set up an emergency call.

20.22.12.5   Test Requirements

1) After Step b) the response shall be on Cell 1.

2) In step d), the MS shall access on Cell 1 with a channel request message, within 15 s of being commanded to set up the emergency call.

NOTE: Cell 2 is barred and hence it is not suitable for Camping.

20.22.13 Void

20.22.14 Void

20.22.15 Cell Reselection/ ready state / no reselection

20.22.15.1   Definition

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20.22.15.2   Conformance requirement

At least every 5 s, the MS shall calculate the value of C1 and C2 for the serving cell and recalculate C1 and C2 values for non-serving cells (if necessary). 3GPP TS 05.08 subclause 6.6.2.

The MS shall then check whether:

i) the path loss criterion (C1) for the current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high.

ii) The calculated value of C2 for a non-serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s except:

a) in the case of a new cell being in a different Location Area or, for a GPRS MS, in a different routing area or always for a GPRS MS in ready state in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least CELL_RESELECT_HYSERISIS dB as defined by the BCCH data from the current serving cell, for a period of 5 s.

20.22.15.3 Test purpose

To verify that the MS does not reselect because of a C2 criteria when GMM is in ready state (MS GPRS attached) and when the C2 value for adjacent cell exceeds the C2 value of the serving cell by at least CELL_RESELECT_HYSTERESIS dB for a period of less than 5 s.

NOTE: The serving cell C2 decreases before mobile is out of ready state with the following conditions.

a) C2 (Serving) + CELL_RESELECT_HYSTERESIS > C2 (Adjacent).

b) C2 (Serving) + CELL_RESELECT_HYSTERESIS < C2(Adjacent) for < 5 s.

20.22.15.4 Method of Test

Initial Conditions

Parameters changed from the default values in table 20.22.1.

Parameter	Cell 1 Carrier1	Cell 2 Carrier2
Channel Type carried	BCCH	BCCH
RF Signal Level (dBm)	-55 to –75	-60
RXLEV_ACCESS_MIN (dBm)	-90	-90
CRH	10	Default
C2	35 to 15	30

NOTE 1: MS must be configured to Initiate GPRS Attach on Power On.

NOTE 2: Cell reselection criteria from the above parameters:

$[C2(s)+CRH = 25] < [C2(n) = 30]$

for a period of less than 5 s, where 's' denotes the serving cell and 'n' denotes the non-serving cell. After 5 s, C2 of serving cell goes back to the original higher value.

$[C2(s)+CRH = 45] > [C2(n) = 30]$

NOTE 3: Each Cell Supports GPRS without PBCCH

20.22.15.4.2 Procedure

a) The SS activates both carriers. The MS is paged continuously on Carrier 2.

b) MS is switched on.

c) The SS completes the GPRS Attach procedure (Ready Timer deactivated).

d) The C2 value for carrier 1 is decreased by 20 dB for < 5 s.

20.22.15.5 Test requirements

1) The MS shall camp on carrier 1 within 33 s after step b), and initiate the GPRS Attach procedure.

2) The MS is in GMM Ready State after step c).

3) After step d) there shall be no access on Carrier 2 for 50s.

20.22.16 Cell Reselection/ ready state/ Reselection and Cell update procedure

20.22.16.1 Definition

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20.22.16.2 Conformance requirement

The MS is required to perform the following measurements to ensure that the path loss criterion to the serving cell is acceptable.(3GPP TS 05.08 subclause 6.6.2).

At least every 5s the MS shall calculate the value of C1 and C2 for the serving cell and re-calculate C1 and C2 values for non serving cells (if necessary). The MS shall then check whether:

1) The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high.

2) The calculated value of C2 for non -serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s, except:

   a) in the case of new cell being in a different location area, for a GPRS MS, in a different routing area or always for a GPRS Ms in ready state in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least CELL_RESELECT_HYSTERSIS dB as defined by the BCCH data from the current serving cell, for a period of 5 s; or

   b) in case of a cell reselection occurring within the previous 15 s in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least 5dB for a period of 5 s.

   This indicates that it is a better cell.

A cell update takes place when the MS enters a new cell inside the current RA and the MS is in READY state. If the RA has changed, a routeing area update is executed instead of a cell update (3GPP TS 03.60 subclause 6.9.11).

20.22.16.3 Test purpose

1. To verify that the MS reselects an adjacent cell because of a C2 criteria when GMM is in ready state (MS GPRS attached) and when the C2 value for adjacent cell exceeds the C2 value of the serving cell by at least CELL_RESELECT_HYSTERESIS dB for a period of 5 s.

2. To verify that the MS performs the cell update procedure (when the cell is in the same Routing Area) and

   C2(Serving) + CELL_RESELECT_HYSTERESIS < C2(Adjacent) for at least 5 s.

20.22.16.4 Method of Test

Initial Conditions

Parameters changed from the default values in table 20.22.1.

Parameter	Cell 1 Carrier1	Cell 2 Carrier2
Channel Type carried	BCCH	BCCH
RF Signal Level (dBm)	-60 to –75	-65
RXLEV_ACCESS_MIN (dBm)	-90	-90
CRH (dB)	6	Default
C2	30 to 15	25

NOTE 1: Cell reselection criteria from the above parameters:

   [C2(s) = 15] < [C2(n) = 25] for a period > 5 s.

   [C2(s)+CRH = 21] < [C2(n) = 25] for a period > 5 s.

NOTE 2: Each Cell Supports GPRS without PBCCH

Procedure

   a) The SS activates both carriers.

   b) MS is switched on.

   c) The SS completes the GPRS Attach procedure (Ready Timer deactivated). The SS waits 20s.

d) The C2 value for carrier 1 is decreased by 15 dB.

20.22.16.5 Test requirements

1) The MS shall camp on carrier 1 within 33 s after step b) and initiate a GPRS Attach procedure.

2) The MS is in GMM ready state after step c).

3) After step d) the MS shall initiate the Cell Update procedure on Carrier 2 within 22s.

NOTE 1: Time allowed includes 5.9s to perform running average on Carrier 1 (based on BS_PA_MFRMS of 5), 5s to update C2, 5s to check the C2 value for adjacent cell exceeds the C2 value of the serving cell by at least CELL_RESELECT_HYSTERESIS, 2.4s to decode BCCH carrier, 1s for reselection and 10% timer tolerance.

20.22.17 C2 reselection in another RA - no cell reselection

20.22.17.1 Definition

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20.22.17.2 Conformance requirement

The MS is required to perform the following measurements to ensure that the path loss criterion to the serving cell is acceptable.(3GPP TS 05.08 subclause 6.6.2)

At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and re-calculate C1 and C2 values for non serving cells(if necessary).The MS shall then check whether:

1) The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high.

2) The calculated value of C2 for non-serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s, except:

a) in the case of new cell being in a different location area, for a GPRS MS, in a different routing area or always for a GPRS Ms in ready state in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least CELL_RESELECT_HYSTERSIS dB as defined by the BCCH data from the current serving cell, for a period of 5 s; or

b) in case of a cell reselection occurring within the previous 15 s in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least 5dB for a period of 5 s.

This indicates that it is a better cell.

A cell update takes place when the MS enters a new cell inside the current RA and the MS is in READY state. If the RA has changed, a routeing area update is executed instead of a cell update (3GPP TS 03.60 subclause 6.9.11).

20.22.17.3 Test purpose

To verify that the MS does not reselecting an adjacent cell when the cell is in a routing area different from the serving cell's one and when the C2 value for the adjacent cell does not exceed the C2 value of the serving cell for a period of 5 s by at least CRH dB.

20.22.17.4   Method of Test

Initial Conditions

Parameter	Cell 1	Cell 2	Cell 3	Cell 4
	Carrier1	Carrier2	Carrier3	Carrier4
Channel Type carried	BCCH	BCCH	BCCH	BCCH
RF Signal (dBm)	-60 to -80	-65	-75	-75
CBA	0	0	0	0
RXLEV_ACCESS_MI N (dBm)	-100	-100	-100	-100
CRH (dB)	+10	Default	Default	Default
C1	40 to 20	35	25	25
C2	40 to 20	35	25	25

NOTE 1: Carrier 1 and carrier 3 are in same routing area, carrier 2 and carrier 4 are in different routing area from carriers 1 and 3.

NOTE 2: Each Cell Supports GPRS without PBCCH

20.22.17.4.2   Procedure

a) The SS activates all carriers. The MS is continuously paged on Carriers 2, 3 and 4.

b) MS is switched ON.

c) The SS shall complete the GPRS attach procedure (Ready timer deactivated). The SS waits 20s.

d) Decrease the RF level of Carrier 1 such that the following conditions are met for a period of less than 5 s.

- C2(adjacent) > C2(Serving);

- C2+CRH(serving cell) < C2(adjacent cell).

20.22.17.5   Test requirements

1) MS shall camp on Carrier 1 after step b) and initiate a GPRS attach procedure within 33s.

2) The MS is in GMM ready state after step c).

3) After step d) there shall be no access on Carriers 2, 3 or 4 for 50s.

20.22.18 C2 reselection in another Routing Area - Routing Area Update

20.22.18.1   Definition

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20.22.18.2   Conformance requirement

The MS is required to perform the following measurements to ensure that the path loss criterion to the serving cell is acceptable.(3GPP TS 05.08 subclause 6.6.2)

At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and re-calculate C1 and C2 values for non serving cells(if necessary).The MS shall then check whether:

1) The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high.

2) The calculated value of C2 for non -serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s, except:

a) in the case of new cell being in a different location area, for a GPRS MS, in a different routing area or always for a GPRS Ms in ready state in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least CELL_RESELECT_HYSTERSIS dB as defined by the BCCH data from the current serving cell, for a period of 5 s; or

    b) in case of a cell reselection occurring within the previous 15 s in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least 5 dB for a period of 5 s.

    This indicates that it is a better cell.

A cell update takes place when the MS enters a new cell inside the current RA and the MS is in READY state. If the RA has changed, a routeing area update is executed instead of a cell update (3GPP TS 03.60 subclause 6.9.11).

20.22.18.3 Test purpose

1. To Verify that when the MS is in ready state, the MS reselects an adjacent cell when the cell is in a routing area different from the serving cell's one and when the C2 value for the adjacent cell exceed the C2 value of the serving cell for a period of 5 s by at least CRH dB.

2. To verify that the MS performs the Normal Routing Area Update procedure.

20.22.18.4 Method of Test

Initial Conditions:

Parameter	Cell 1 Carrier1	Cell 2 Carrier2	Cell 3 Carrier3	Cell4 Carrier4
Channel Type carried	BCCH	BCCH	BCCH	BCCH
RF Signal (dBm)	-60 to −80	-65	-75	-75
CBA	0	0	0	0
RXLEV_ACCESS_MIN (dBm)	-100	-100	-100	-100
CRH (dB)	+10	Default	Default	Default
C1	40 to 20	35	25	25
C2	40 to 20	35	25	25

NOTE 1: Carrier 1 and carrier 3 are in same routing area.

NOTE 2: Carrier 2 and carrier 4 are in different routing area from carrier 1 and carrier 3.

NOTE 3: Each Cell Supports GPRS without PBCCH

20.22.18.4.2 Procedure

a) The SS activates all carriers.

b) MS is switched ON.

c) SS Completes the GPRS attach procedure (Ready timer deactivated).

d) The RF level of Carrier 1 is decreased to −80 dBm such that the following condition is met:

    - C2(serving) +CRH< C2(adjacent cell).

20.22.18.5 Test requirements

1) MS shall camp on Carrier 1 after step b) and initiate a GPRS attach procedure within 33s.

2) The MS is in GMM ready state after step c). The SS waits 20s.

3) After step d) the MS shall reselect to carrier 2 within 22s. The MS shall initiate the Routing Area Update procedure.

NOTE 1: Time allowed includes 5.9s to perform running average on Carrier 1 (based on BS_PA_MFRMS of 5), 5s to update C2, 5s to check the C2 value for adjacent cell exceeds the C2 value of the serving cell by at least CELL_RESELECT_HYSTERESIS, 2.4s to decode BCCH carrier, 1s for reselection and 10% timer tolerance.

20.22.19 Borders between routing areas - reselection of a GPRS cell in a homogenous network

20.22.19.1 Definition

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20.22.19.2 Conformance requirement

The MS is required to perform the following measurements (see 3GPP TS 03.22) to ensure that the path loss criterion to the serving cell is acceptable.

At least every 5s the MS shall calculate the value of C1 and C2 for the serving cell and re-calculate C1 and C2 values for non serving cells(if necessary).The MS shall then check whether:

1) The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high.

2) The calculated value of C2 for non -serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s, except:

   a) in the case of new cell being in a different location area, for a GPRS MS, in a different routing area or always for a GPRS Ms in ready state in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least CELL_RESELECT_HYSTERSIS (CRH) dB as defined by the BCCH data from the current serving cell, for a period of 5 s; or

   b) in case of a cell reselection occurring within the previous 15 s in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least 5dB for a period of 5 s.

   This indicates that it is a better cell.

Reference: 3GPP TS 05.08, section 6.6.2.

20.22.19.3 Test purpose

To Verify that the MS does not reselect a cell in a different routing area when another one is suitable in the same routing area even if C2 is lower.

20.22.19.4 Method of Test

Initial Conditions

Parameter	Cell 1	Cell 2	Cell 3	Cell 4
	Carrier1	Carrier2	Carrier3	Carrier4
Channel Type carried	BCCH	BCCH	BCCH	BCCH
RF Signal (dBm)	-60 to –75	-65	-70	-80
CBA	0	0	0	0
RXLEV_ACCESS_MI N (dBm)	-100	-100	-100	-100
CRH	+14	Default	+14	Default
C1	40 to 25–	35	30	20
C2	40 to 25–	35	30	20

NOTE 1: Carrier 1 and carrier 3 are in same routing area.

NOTE 2: Carrier 2 and carrier 4 are in different routing area then carrier 1 and carrier 3.

NOTE 3: Each Cell Supports GPRS without PBCCH

NOTE 4: The Ready Timer length should be set to 0 so that the MS immediately enters the GMM Standby State on completion of the GPRS Attach (ref. 03.60, 6.2.1).

20.22.19.4.2 Procedure

a) The SS activates all carriers. The MS is paged continuously on Carriers 2, 3 and 4.

b) MS is switched ON.

c) The SS completes the GPRS attach procedure.

d) The RF level of Carrier 1 is decreased such that C1 is 25 for 5 s.

20.22.19.5 Test requirements

1) The MS shall camp on carrier 1 after step b) and initiate the GPRS attach procedure.

2) The MS is in GMM Standby State after Step c).

3) After step d) the MS shall reselect to carrier 3 as:

$$(C2(Carrier\ 1)+CRH = 39) > (C2(Carrier\ 2) = 35)$$

$$(C2(Carrier\ 1) = 25) < (C2(Carrier\ 3) = 30)$$

The MS should respond to Paging on Carrier 3 only within 30s.

NOTE: Time allowed includes 18.75s running average of neighbour cells (based on max BA list of 20 specified in 20.22 for an E-GSM MS), 5s to update C2, 2.4s to decode BCCH, 1s to reselect and 10% tolerance. Allow 30s.

20.22.20 Void

20.22.21 Void

20.22.22 Cell Reselection with cells in different Routing area

20.22.22.1 Definition

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20.22.22.2 Conformance requirement

At least for every new sample or every second, whichever is the greatest, the MS shall update RLA_P and calculate the value of C1, C31 and C32 for the serving cell and the non-serving cells; 3GPP TS 05.08, subclause 10.1.2. The MS shall make a cell re-selection if:

a. The path loss criterion parameter (C1) for the serving cell falls below zero.

b. A non-serving suitable cell (see 3GPP TS 03.22) is evaluated to be better than the serving cell. The best cell is the cell with highest value of C32 among:

- Those cells that have the highest PRIORITY_CLASS among those that fulfill the criterion $C31 \geq 0$; or

- All cells, if no cells fulfill the criterion $C31 \geq 0$;

- If the parameter C32_QUAL is set, positive GRPS_RESELECT_OFFSET values shall be only be applied to the neighbor cell with the highest RLA_P value of those cells for which C32 is compared above.

PRIORITY_CLASS and C32_QUAL are broadcast on PBCCH of the serving cell.

When evaluating the best cell, the following hysteresis values shall be subtracted from the C32 value for the neighbor cells:

- in standby state, if the new cell is in the same routing area: 0.

- in ready state, if the new cell is in the same routing area:

- GPRS_CELL_RESELECT_HYSTERESIS. If the parameter C31_HYST is set;

  - GPRS_CELL_RESELECT_HYSTERESIS shall also be subtracted from the C31 value for the neighbour cells.

- in standby or ready state, if the new cell is in a different routing area:

  - RA_RESELECT_HYSTERESIS.

- in case of a cell re-selection occurred within the previous 15 s: 5 dB.

  - GPRS_CELL_RESELECT_HYSTERESIS, C31_HYST and RA_RESELECT_HYSTERESIS are broadcast on PBCCH of the serving cell.

The cell re-selection procedures defined in subclauses 10.1.1 to 10.1.3 (of 3GPP TS 05.08) apply to the MS attached to GPRS if a PBCCH exists in the serving cell. These procedures shall also apply for cells for which GPRS cell re-selection parameters are provided to the MS in a Packet Cell Change Order or Packet Measurement Order message. Otherwise the MS shall perform cell re-selection according to the idle mode procedures defined in clause 6 of 3GPP TS 05.08.

20.22.22.3   Test purpose

To verify that the MS reselects to the correct cell by calculating C32 correctly when one of the cells is in a different routing area. When the MS is in the Standby or ready state, on triggering of a reselection, when it considers a suitable cell which happens to be in a different Routing Area, the C32 value of the new cell must be reduced by RARH for comparison.

20.22.22.4   Method of test

Initial conditions

Parameter	Cell 1 Carrier1	Cell 2 Carrier2	Cell 3 Carrier3
Channel Type carried	BCCH	BCCH	BCCH
RF Signal (dBm)	-60 to -80	-65	-70
GPRS_RXLEV_ACCESS_MIN (dBm)	-90	-90	-90
RA COLOUR	001	010	001
RARH (dB)	10	Default	Default
GPRS_PRIORITY_CLASS		0	0
GPRS_HCS_THR		-90	-90
C1	30 to 10	25	20
C31	0	25	20
C32	30 to 10	15	20

NOTE 1: The BA(BCCH) list only contains the ARFCNs of the carriers used during the test.

NOTE 2: The value of RXLEV_ACCESS_MIN is obtained from the SI messages for reselection. NOTE 3: When a neighbouring cell belongs to a different RA, RARH value is deduced from its C32 value during reselection, if the MS is in Standby or Ready state. In absence of PBCCH, when RARH is not available, CRH (from SI messages on BCCH) is used instead (3GPP TS 05.08 subclause 10.1.1).

NOTE 3: GPRS reselection parameters for carrier 1 shall be converted from the idle mode cell reselection parameters received on System Information 4 on BCCH according to 3GPP TS 05.08 table 3a.

20.22.22.4.2   Procedure

a) All the carriers are activated and MS is switched ON. The MS is paged continuously on Carriers 2 and 3.

b) SS completes the GPRS Attach procedure. (Ready Timer is set to default.)

c) Send GPRS reselection parameters through Packet Measurement Order message.

d) SS waits until MS goes into Standby Mode (expiry of Ready Timer). The RF level of carrier 1 is reduced to -80 dBm, hence Reselection is triggered.

20.22.22.5   Test Requirements

1) After step a) the MS camps on Carrier 1 and initiates the GPRS Attach procedure.

2) After step d) the MS should respond on Carrier 3 within 11s.

NOTE 1: Time allowed includes 5.9s to perform running average on Carrier 1 (based on BS_PA_MFRMS of 5), 2.4s to decode BCCH carrier, 1s for reselection and 10% timer tolerance.

20.22.23 Void

20.22.24 Void

20.22.25 Void

20.22.26 Void

20.22.27 Void

20.22.28 Void

20.22.29 Packet Measurement order procedure / Downlink transfer / Normal case/ 3G cell reselection dedicated parameters

20.22.29.1   Conformance requirement

For a multi-RAT MS, cells or frequencies with other radio access technologies may be included in 3G Cell Reselection list (see 3GPP TS 04.18). The network controls the measurements for reselection of these cells by the parameter Qsearch_I broadcast on BCCH. Qsearch_I defines a threshold and also indicates whether these measurements shall be performed when RLA_C (see subclause 6.6.1) of the serving cell is below or above the threshold. These measurements may be performed less frequently than measurements of GSM cells as described in subclause 6.6.1, in order to conserve MS power.

The MS shall be able to identify and select a new best UTRAN cell on a frequency, which is part of the 3G Cell Reselection list, within 30 seconds after it has been activated under the condition that there is only one UTRAN frequency in the list and under good radio conditions. For test purposes the following radio conditions can be used: Serving GSM cell at RXLEV= -70 dBm, with 6 GSM neighbours at RXLEV= -75 dBm. Then either an UTRAN FDD neighbour cell or an UTRAN TDD neighbour cell is switched on. The radio conditions for the UTRAN FDD cell are as follows (see TS 25.101 for definitions):

Parameter	Unit	UTRAN FDD Cell
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
DPCH_Ec/Ior	dB	$-\infty$
OCNS_Ec/Ior	dB	-0.94
$\hat{I}_{or}/I_{oc}$	dB	10
I_{oc}	dBm/3.84 MHz	-70
CPICH_Ec/Io	dB	-10.4
CPICH RSCP	dBm	-70
FDD_Qoffset	Integer	5 (-12dB)
FDD_Qmin	Integer	7 (-12 dB)
Qsearch_I	Integer	7 (search always)
Propagation Condition	AWGN	

The radio conditions for the UTRAN TDD cell (3.84 Mcps) are as follows (see 3GPP TS 25.123 for definitions and for the values of the remaining configuration parameters):

Parameter	Unit	UTRA TDD Cell (3.84 Mcps)	
Timeslot Number		0	8
P-CCPCH_Ec/Ior	dB	-3	
SCH_Ec/Ior	dB	-9	-9
SCH_t$_{offset}$	Integer	0	0
PICH_Ec/Ior	dB		-3
OCNS_Ec/Ior	dB	-3.12	-3.12
PCCPCH RSCP	dBm	-70	-70
TDD_Qoffset	Integer	5 (-90dBm)	
Qsearch_I	Integer	7 (search always)	
Propagation Condition		AWGN	

NOTE: On timeslot 8 the P-CCPCH is not transmitted; on that timeslot, the PCCPCH RSCP defines the power level of the beacon channel.

The radio conditions for the UNTRAN TDD cell (1.28 Mcps) are as follows:

Parameter	Unit	LCR TDD Cell (1.28 Mcps)
PCCPCH_Ec/Ior	dB	-3
PICH_Ec/Ior	dB	-3
OCNS_Ec/Ior	dB	-3.12
PCCPCH RSCP	dBm	-70
TDD_Qoffset	Integer	5 (-90dBm)
Qsearch_I	Integer	7 (search always)
Propagation Condition		AWGN

The allowed time is increased by 30 seconds for each additional UTRAN frequency in the 3G Cell Reselection list. However, multiple UTRAN cells on the same frequency in the list do not increase the allowed time.

A multi-RAT MS shall be able to monitor 64 UTRAN cells, divided into (depending on the MS capability):

- FDD cells on up to 3 FDD frequencies, with a maximum of 32 cells per frequency; and/or
- TDD cells on up to 3 TDD frequencies with a maximum of 32 cells per frequency.

The MS shall attempt to read and store UTRAN predefined configurations using the rules defined in 3GPP TS 25.331 with the following exceptions:

- The MS shall build a list of at most 16 predefined configurations, read from the BCCH of the identified UTRAN cells of equivalent PLMNs.

- After PLMN selection (see 3GPP TS 23.122), the MS shall delete any old list of predefined configurations and as soon as possible attempt to read the predefined configurations from one identified UTRAN cell of the selected PLMN or of an equivalent PLMN.

- The MS shall attempt to update the list of predefined configurations every 60 minutes.

In case of a conflict with GSM tasks, the GSM tasks take precedence.

NOTE: Instead of reading new predefined configurations from a PLMN, the MS may use previously received predefined configurations for that PLMN according to the rules in 3GPP TS 25.331.

The MS shall report the list of predefined configurations in the UTRAN CLASSMARK CHANGE message (see 3GPP TS 04.18).

References

3GPP TS 05.08, subclause 6.6.4

20.22.29.2 Test Purpose

To verify that the 3G search parameters and neighbour cell description are correctly used by the MS in order to reselect a 3G cell.

To verify that the individual parameters are used by the MS instead of broadcast 3G cell reselection parameters when the MS receives a PACKET MEASUREMENT ORDER message.

20.22.29.3 Method of test

Initial conditions

System Simulator:

1 GSM/GPRS cell, operating in NC0, 1 UTRAN neighbour cell.

Parameter	Unit	Cell 1 (GSM)
Test Channel		1
RF Signal Level	dBm	-70

For MS supporting FDD:

Parameter	Unit	Cell 2 (UTRAN)
Test Channel		1
CPICH_Ec (FDD)	dBm / 3.84 MHz	OFF to –70

For MS supporting TDD:

Parameter	Unit	Cell 2 (UTRAN)
Test Channel		1
PCCPCH_Ec (TDD)	dBm / 1.28 MHz	OFF to –70

-   3GPP TS 34.108, subclause 6.1 shall be referenced for default parameters of UTRAN Cell.

-   3GPP TS 34.123-3, subclause 8.3.2 shall be referenced for configuring channels on UTRAN Cell.

-   Qrxlevmin value for Cell 2 (UTRAN) is set to -115 dBm in SIB3 and SIB 4 (see specific message contents).

Mobile Station:

MS is in Packet Idle mode and GPRS attached.

PDP context established.

Specific PICS statements:

-   Support of UTRAN FDD (TSPC_Type_UTRAN_FDD)

-   Support of UTRAN TDD (TSPC_Type_UTRAN_TDD)

Foreseen final state of the MS

-   MS is in Packet Idle mode.

Test procedure

The GSM/GPRS cell operates in NC0. The MS is brought into downlink packet transfer mode on GSM carrier. The SS sends a PACKET MEASUREMENT ORDER message, setting Qsearch_P to "Never". The SS activates UTRAN carrier with higher RF signal strength than GSM carrier. The MS shall stay camping in the cell of Carrier 1. During the transfer, the SS sends a PACKET MEASUREMENT ORDER message, setting 3G search to "Always".

The GPRS 3G Cell Reselection list includes UTRAN frequencies.

If the UTRAN operates in FDD mode, the MS then reselects (see TS 25.304) a UTRAN FDD cell when its measured RSCP value exceeds the value of RLA_P for the serving cell by the value FDD_GPRS_Qoffset for a period of 5 seconds and the UTRAN cell measured Ec/No value is equal or greater than the value FDD_Qmin, where FDD_Qmin and FDD_Qoffset are broadcast on BCCH of the serving cell.

If the UTRAN operates in TDD mode, the MS then reselects a UTRAN TDD cell when its measured RSCP value exceeds the value of TDD_Qoffset.

The UTRAN neighbour cell is suitable and the parameters required to determine if it is suitable are broadcast on BCCH of the UTRAN cell.

Maximum duration of the test

3 minutes

Expected Sequence

This sequence is performed for each UTRAN mode the MS supports.

Step	Direction	Message	Comments
1	MS		The MS is GPRS attached and has activated a PDP context (see PICS) on GSM carrier.
2	SS -> MS	IMMEDIATE ASSIGNMENT	Sent on a PCH block corresponding to the MS's paging group, including a packet downlink assignment with correct TLLI.Triggers the MS to monitor the assigned PDCH. With a valid RRBP.
3	MS -> SS	PACKET CONTROL ACK	MS acknowledges on PACCH the IMMEDIATE ASSIGNMENT
4	SS->MS	PACKET MEASUREMENT ORDER	Sent on PACCH of GSM carrier PMO message contains Qsearch_P set to "Never". Note: NETWORK_CONTROL_ORDER stil indicates NC0
5	SS->MS		SS sends downlink data,
6		Void	
7			For FDD: Activate UTRAN carrier setting the CPICH Ec level to –70 dBm / 3.84 MHz For TDD: Activate UTRAN carrier setting the PCCPCH Ec level to –70 dBm / 1.28 MHz. Repetition of step 5 for 15 secs during which TBF is maintained
8			The SS verifies that no RRC CONNECTION REQUEST is received from the MS
9	SS->MS	PACKET MEASUREMENT ORDER	Sent on PACCH of GSM carrier; the PMO message contains Qsearch_P set to "Always". Note: NETWORK_CONTROL_ORDER stil indicates NC0 Repetition of step 5 for 30 secs during which TBF is maintained.
10			Check that after 15s, the MS does not camp any more on the GSM cell: the MS stops sending PACKET DOWNLINK ACK/NACK messages when requested.
11	MS -> SS	RRC CONNECTION REQUEST	Verify that the MS has reselected the UTRAN carrier. The SS verifies that the time between the end of Step 9 and the RRC CONNECTION REQUEST is between 5 secs and 30 secs.

Specific message contents

System Information Block type 3 and 4

Use the same message type found in clause 6.1.0b of TS 34.108, with the following exceptions:

- Qrxlevmin	-58 (-115)

IMMEDIATE ASSIGNMENT in step 2

As in section 41.2.6.1.

SYSTEM INFORMATION TYPE 2quater (Instance 1 of 1) for FDD mode:

MESSAGE_TYPE	00000111
MP_CHANGE_MARK	0
SI2quater_INDEX	0000
SI2quater_COUNT	0000
3G Neighbour Cells Description	
UTRAN FDD Description	
Repeated UTRAN FDD Neighbour Cells	
FDD-ARFCN	
	0 See TS 34.108, clause 6.1.5, table 6.1.1,(Parameter UTRA RF Channel Number)
FDD_Indic0	Set to 0
NR_OF_FDD_CELLS	Set to 1
GPRS 3G MEASUREMENT Parameters Description	
Qsearch_P	Set to 7: always search for 3G cells..
3G_SEARCH_PRIO	Indicates if 3G cells may be searched when BSIC decoding is required. Set to 1 = yes
3G MEASUREMENT Parameters Description	
Qsearch_I	Set to 7: always search for 3G cells..
FDD_Qoffset	Applies an offset to RLA_P for cell re-selection to access technology/mode: -12dB.
FDD_Qmin	Minimum threshold for Ec/No for UTRAN FDD cell re-selection: -12 dB.

SYSTEM INFORMATION TYPE 2quater (Instance 1 of 1) for TDD mode:

MESSAGE_TYPE	00000111
MP_CHANGE_MARK	0
SI2quater_INDEX	0000
SI2quater_COUNT	0000
3G Neighbour Cells Description	
UTRAN TDD Description	
Repeated UTRAN TDD Neighbour Cells	
NR_OF_TDD_CELLS	Set to 1
GPRS 3G MEASUREMENT Parameters Description	
Qsearch_P	Set to 7: always search for 3G cells.
3G_SEARCH_PRIO	Indicates if 3G cells may be searched when BSIC decoding is required. Set to 1 = yes
3G MEASUREMENT Parameters Description	
Qsearch_I	Set to 7: always search for 3G cells..
TDD_Qoffset	Set to 5: cell re-selection to 3G TDD cell when PCCPCH RSCP of TDD cell exceeds -90dbm.

PACKET MEASUREMENT ORDER in step 4:

MESSAGE_TYPE	0000 11
PAGE_MODE	00 Normal Paging
TLLI	10 (address is TLLI)
-	Same as the value received from MS
PMO_INDEX	0 0 0 first message
PMO_COUNT	0 0 0 one message expected
{ 0	1 < NC Measurement Parameters }	1 NC Measurement Parameters available
NC Measurement Parameters	
NETWORK_CONTROL_ORDER	0 0 NC0
{ 0	1 < NC_NON_DRX_PERIOD	1 Additional NC parameters available
< NC_REPORTING_PERIOD_I	NC_NON_DRX_PERIOD = 000
< NC_REPORTING_PERIOD_T }	(No non-DRX mode after a measurement report has been sent)
	NC_REPORTING_PERIOD_I = 111
	(61.44 sec)
	NC_REPORTING_PERIOD_T = 011
	(3.84 sec)
{ 0	1 < NC_FREQUENCY_LIST }	1 NC Frequency list struct available
{ 0	1 { < NR_OF_REMOVED_FREQ >	0 no NC Frequency removed
{ 1 < List of added Frequency >}	1 List of added Frequency available
List of added Frequency	
< START_FREQUENCY >	BCCH ARFCN of Cell BBSIC of Cell B1 cell
< BSIC >	selection parameters present
{ 0	1 < Cell selection params >}	
Cell selection params	
< CELL_BAR_ACCESS_2 >	0
< EXC_ACC >	1
< SAME_RA_AS_SERVING_CELL >	1
{ 0	1 < GPRSPower information >	1 GPRS power info present
< GPRS_RXLEV_ACCESS_MIN >	011111 -- -80 dBm
< GPRS_MS_TXPWR_MAX_CCH > }	01010
{ 0	1 < GPRS Selection Info >	1 GPRS Selection Info present
< GPRS_TEMPORARY_OFFSET >	000
< GPRS_PENALTY_TIME : bit (5) > }	00000
{ 0	1 < GPRS Reselection Info > }	1 GPRS Reselection Info present
< GPRS_RESELECT_OFFSET > }	10000
{ 0	1 < HCS parameter Info }	1 HCS parameter Info present
< PRIORITY_CLASS >	001
< HCS_THR >	10100
{ 0	1 < SI13 PBCCH LOCATION Info> } ;	0 No SI13 PBCCH LOCATION Info present
Frequency Info continued	
< NR_OF_FREQUENCIES >	00010
< FREQ_DIFF_LENGTH : bit (3) >	000
< FREQUENCY_DIFF >	1
< BSIC >	BSIC of Cell B0 no cell selection parameters
{ 0	1 < Cell selection params > }	present
< FREQUENCY_DIFF >	1
< BSIC >	BSIC of Cell B0 no cell selection parameters
{ 0	1 < Cell selection params > }	present
0;	Ending repetition of < List of added Frequency >
{ 0	1 < EXT Measurement Parameters > }	0 No EXT Measurement Parameters present
{ null	0 bit**	1 Additions in release 98 >	1 Additions in release 98
{ 0	1 < LSA Parameters > }	0 No LSA parameters present
{ null	0 bit**	1 Additions in release 99 >	1 Additions in release 99
{ 0	1 < ENH Measurement Parameters > }	1 ENH Measurement Parameters present
ENH Measurement Parameters	
{ 0 < BA_IND Info	1 < PSI3_CHANGE_MARK > }	0
< BA_IND>	0 3G Neighbour Cell Description not present
< 3G_BA_IND>	0 GPRS REP PRIORITY Description not present
< PMO_IND >	0 GPRS MEAS Parameters Description not
< REPORT_TYPE >	present
< REPORTING_RATE >	1 GPRS 3G MEASParameters Description present
< INVALID_BSIC_REPORTING >	1111 -- never
{ 0	1 < 3G Neighbour Cell Description > }	1
{ 0	1 < GPRS REP PRIORITY Description > }	0 FDD_REP_QUANT Info not present
{ 0	1 < GPRS MEASUREMENT Parameters Description	0 FDD_REPORTING_OFFSET Info not present

> }
    { 0 | 1 < GPRS 3G MEASUREMENT Parameters Description > }
       < Qsearch_P >
       < 3G_SEARCH_PRIO>
       { 0 | 1 < FDD_REP_QUANT Info > }
       { 0 | 1 < FDD_REPORTING_OFFSET Info >}
       { 0 | 1 < TDD_MULTIRAT_REPORTING Info> }
       { 0 | 1 < TDD_REPORTING_OFFSET Info >}
       { 0 | 1 < CDMA2000_MULTIRAT_REPORTING Info> }
       { 0 | 1 < CDMA2000_REPORTING_OFFSET Info >}
    { null | 0 bit** | 1 Additions in release R4 >
< padding bits >
	0 TDD_MULTIRAT_REPORTING Info not present
	0 TDD_ REPORTING_OFFSET Info not present
	0 CDMA 2000_MULTIRAT_REPORTING info not present
	0 CDMA2000_ REPORTING_OFFSET Info not present
	
	-
	Spare Padding

PACKET MEASUREMENT ORDER in step 9:

Same as PACKET MEASUREMENT ORDER in step 4, except:

Qsearch_P	Set to 7 ("Always")

20.22.29a Packet Measurement order procedure / Downlink transfer / Normal case/ 3G cell reselection dedicated parameters with GEA2 and UEA2 ciphering

20.22.29a.1 Conformance requirement

Identical to 20.22.29.1

20.22.29a.2 Test Purpose

Identical to 20.22.29.2 but the ciphering algorithms GEA 2 and UIA2/UEA2 are used instead.

20.22.29a.3 Method of test

Identical to 20.22.29.3.

Specific message contents

Similar to the specific message contents in 20.22.29 except the Rel-7 IE are used and the UE capability to support UIA2/UEA2 and GEA2 are checked instead.

20.22.29b Packet Measurement order procedure / Downlink transfer / Normal case/ 3G cell reselection dedicated parameters with GEA3 and UEA2 ciphering

20.22.29b.1 Conformance requirement

Identical to 20.22.29.1

20.22.29b.2 Test Purpose

Identical to 20.22.29.2 but the ciphering algorithms GEA 3 and UIA2/UEA2 are used instead.

20.22.29b.3 Method of test

Identical to 20.22.29.3.

Specific message contents

Similar to the specific message contents in 20.22.29 except the Rel-7 IE are used and the UE capability to support UIA2/UEA2 and GEA3 are checked instead.

20.22.29c Packet Measurement order procedure / Downlink transfer / Normal case/ 3G cell reselection dedicated parameters with GEA4 and UEA2 ciphering

20.22.29c.1 Conformance requirement

Identical to 20.22.29.1

20.22.29c.2 Test Purpose

Identical to 20.22.29.2 but the ciphering algorithms GEA 4 and UIA2/UEA2 are used instead.

20.22.29c.3 Method of test

Identical to 20.22.29.3.

Specific message contents

Similar to the specific message contents in 20.22.29 except the Rel-9 IE are used and the UE capability to support UIA2/UEA2 and GEA4 are checked instead.

20.22.30 Cell Reselection/usage of BA(GPRS)

20.22.30.1 Cell Reselection/usage of BA(GPRS)/ Most suitable cell not in BA(GPRS)

20.22.30.1.1 Conformance requirement

Whilst in packet idle mode (see 03.64) an MS shall continuously monitor all BCCH carriers as indicated by the BA(GPRS) list and the BCCH carrier of the serving cell. References

3GPP TS 05.08, subclause 10.1.1.1

20.22.30.1.2 Test Purpose

To verify that the MS uses the BA(GPRS) list for the reselection and measurement. If the most suitable cell is not in the BA(GPRS) list, then it is not considered for the reselection.

20.22.30.1.3 Method of test

Initial conditions

Parameter	Cell A	Cell B	Cell C
Channel Type Carried	BCCH	BCCH	BCCH
RF Signal Level (dBm)	-60	-70	-70
RXLEV_ACCESS_MIN (dBm)	-85	-85	-85
NETWORK_CONTROL_ORDER	NC2	NC0	NC0
NC_REPORTING_PERIOD_I	3.84 sec	Default	Default
C1	25 to -10	15	15 to 35
C32	25 to -10	15	15 to 35

NOTE 1: All cells support GPRS. Network Control Reporting information is broadcasted using the SI2 Quater.

NOTE 2: Cell C is not a part of BA(GPRS) - i.e. NC frequency List of PMO and BA(BCCH) -, Cell B is part of BA(GPRS)on Cell A

Procedure

a) The SS activates all Cells.

b) MS is switched ON.

c) The MS shall complete the GPRS attach procedure on Cell A(Ready Timer deactivated).

d) SS increases the signal strength of Cell C to -50dBm.

e) SS receives measurement report till the measurements of Cell B are included in it.

f) SS sends a PACKET MEASUREMENT ORDER changing the NC mode to NC0.

g) SS reduces the signal strength of Cell A to -95 dBm.

20.22.30.1.4 Test Requirements

1) MS shall camp on Cell A after step b) and initiate the attach procedure.

2) In step e), MS should not include the measurements of Cell C in the measurement reports. This is checked up to Max{5s, 5 consecutive paging blocks of that MS} to ensure the MS has completed the running average measurements of the neighbour cells.

3) In step f), SS checks that the MS stays on Cell A, and does not reselect to Cell C, even though Cell C is better than Cell A for a period of 5s + Max{5s, 5 consecutive paging blocks of the MS}.

4) In step g), the MS shall respond on Cell B even though the Cell C is better than Cell B for reselection, as Cell C is not a part of BA(GPRS). The response should be within the time given in the note below.

NOTE: Time allowed includes Max{5s, 5 consecutive paging blocks of the MS} for MS to determine C32 of Cell C is greater than Cell A, 2 seconds to decode BCCH and 1 sec for re-selection.

20.22.30.2 Cell Reselection / usage of BA(GPRS) / Change of BA(GPRS)

20.22.30.2.1 Conformance requirement

Whilst in packet idle mode (see 03.64) an MS shall continuously monitor all BCCH carriers as indicated by the BA(GPRS) list and the BCCH carrier of the serving cell.

References

3GPP TS 05.08, subclause 10.1.1.1.

20.22.30.2.2 Test Purpose

To verify that if the BA(GPRS) list is changed in the broadcast, MS uses the new BA(GPRS).

20.22.30.2.3 Method of test

Initial conditions

Parameter	Cell A	Cell B	Cell C
Channel Type Carried	BCCH	BCCH	BCCH
RF Signal Level (dBm)	-60	-70	-70
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90
NETWORK_CONTROL_ORDER	NC2	NC0	NC0
NC_REPORTING_PERIOD_I	3.84 sec	Default	Default
C1	30	20	20
C32	30	20	20

NOTE 1: All cells support GPRS. Network Control Reporting information is broadcasted using the SI2 Quater.

NOTE 2: Cell C is not a part of BA(GPRS) - i.e. NC frequency List of PMO and BA(BCCH) - , Cell B is part of BA(GPRS) on Cell A.

Procedure

a) The SS activates all Cells.

b) MS is switched ON.

c) The SS shall complete the GPRS attach procedure on Cell A(Ready Timer deactivated).

d) The SS increases the signal strength of Cell C to -50dBm.

e) SS receives NC measurement report till the measurements of Cell B are included in the PACKET MEASUREMENT REPORT.

f) SS changes the broadcast information to include Cell C as a part of the BA(GPRS) on Cell A.

g) SS receives NC measurement report till the measurements of Cell B and Cell C are included in the PACKET MEASUREMENT REPORT.

h) SS sends a PACKET MEASUREMENT ORDER changing the NC mode to NC0. PACKET MEASUREMENT ORDER must be sent within NC_REPORTING_PERIOD_I from receiving latest PACKET MEASUREMENT REPORT.

20.22.30.2.4 Test Requirements

1) MS shall camp on Cell A after step b) and initiate the attach procedure.

2) In step e), MS should not include the measurements of Cell C in the measurement reports. This is verified up to Max{5s, 5 consecutive paging blocks of that MS} to ensure the MS has completed the running average measurements of the neighbour cells.

3) In step g), SS checks that the MS stays on Cell A for a minimum period of 8 * 51 Multiframes (complete update of BCCH content) + Max{5s, 5 consecutive paging blocks of the MS} (for MS to update running average) + 5s (to give erroneous MS time to reselect including the periodical SI13 decoding to identify BCCH_CHANGE_MARK change and the following SI update).

4) After step h), the MS shall respond on Cell C within the time given in the note below.

Note: Time allowed includes Max{5s, 5 consecutive paging blocks of the MS} for MS to determine C32 of cell C is greater than cell A, 2 seconds to decode BCCH and 1 sec for re-selection.

20.22.30.3 Cell Reselection/usage of BA(GPRS)/ Measurement on first 32 entries.

20.22.30.3.1 Conformance requirement

Whilst in packet idle mode (see 03.64) an MS shall continuously monitor all BCCH carriers as indicated by the BA(GPRS) list and the BCCH carrier of the serving cell.

The GSM Neighbour Cell list may contain up to 96 GSM Neighbour Cells. The total number of GSM frequencies to measure shall not exceed 32. If the list includes more than 32 frequencies, the MS shall only measure the 32 frequencies with the lowest indices.

References

3GPP TS 05.08, subclause 10.1.1.1

3GPP TS 04.60, subclause 5.6.3.2

20.22.30.3.2 Test Purpose

To verify that if the BA(GPRS) includes more than 32 frequencies in that case MS shall only measure the 32 frequencies with lowest indices.

20.22.30.2.3 Method of test

Initial conditions

Parameter	Cell A	Cell B	Cell C
Channel Type Carried	BCCH	BCCH	BCCH
RF Signal Level (dBm)	-60	-70	-70
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90
NETWORK_CONTROL_ORDER	NC2	NC0	NC0
NC_REPORTING_PERIOD_I	3.84 sec	Default	Default
C1	30	20	20
C32	30	20	20

NOTE 1: All cells support GPRS. Network Control Reporting information is broadcasted using the SI2 Quater.

NOTE 2: Cell B is 32nd while Cell C is 33rd in the BA(GPRS) - i.e. BA(BCCH) - on Cell A.

Procedure

   a) The SS activates all Cells.

   b) MS is switched ON.

   c) The MS shall complete the GPRS attach procedure (Ready Timer deactivated) on Cell A.

   d) SS receives 25 NC measurement reports in idle mode.

20.22.30.3.4   Test Requirements

   1) After step b) MS shall camp on Cell A and initiate the attach procedure.

   2) In step d), SS checks that the MS includes measurements of Cell B in the PACKET MEASUREMENT REPORT while the measurements of Cell C are not included in any of the measurement reports.

20.22.31 Network controlled cell reselection / Transfer mode

20.22.31.1   Network controlled cell reselection / Downlink transfer / Normal case/ Location and Routing Area Update/ NMO I

20.22.31.1.1   Conformance requirement

When a cell reselection is initiated by the network for an individual mobile station, the cell change order procedure is started by sending a PACKET CELL CHANGE ORDER message to the mobile station on the PCCCH or PACCH.

Upon receipt of the PACKET CELL CHANGE ORDER message the mobile station shall start timer T3174.

When a cell reselection is made controlled by the network, the mobile station shall act upon the IMMEDIATE_REL value which has been received in the Packet Cell Change Order: if required, the mobile station shall abort any TBF in progress by immediately ceasing to decode the downlink, ceasing to transmit on the uplink, stopping all RLC/MAC timers except for timers related to measurement reporting. The mobile station shall then switch to the identified specified new cell and shall obey the relevant RLC/MAC procedures on this new cell.

To initiate a combined routing area updating procedure the MS sends the message ROUTING AREA UPDATE REQUEST to the network, starts timer T3330 and changes to state GMM-ROUTING-UPDATING-INITIATED and MM LOCATION UPDATING PENDING. The value of the update type IE in the message shall indicate "combined RA/LA updating". If for the last attempt to update the registration of the location area a MM specific procedure was performed, the value of the update type IE in the ROUTING AREA UPDATE REQUEST message shall indicate "combined RA/LA updating with IMSI attach". Furthermore the MS shall include the TMSI status IE if no valid TMSI is available.

20.22.31.1.2   References

   3GPP TS 04.60, subclauses 8.4 and 5.5.1.1.

   3GPP TS 04.08 / 3GPP TS 24.008 subclause 4.7.5.2.

20.22.31.1.3   Test Purpose

To test the behaviour of the MS when the network triggers a Packet Cell Change Order to a cell belonging to another routing area, whereas the network mode of operation I is active, i.e:

   To verify that the MS switches to the new cell under network control.

   To verify that the MS performs the Combined Routing Area Update procedure.

20.22.31.1.4   Method of test

Initial conditions

    System simulator:

      All 3 Cells should be activated.

Parameters changed from the default values in table 20.22.1.

Parameter	Cell A	Cell B	Cell C
Channel Type Carried	BCCH	BCCH	BCCH
RF Signal Level (dBm)	-60	-80	-70
RXLEV_ACCESS_MIN (dBm)	-100	-100	-100
NETWORK_CONTROL_ORDER	NC2	NC2	NC2
NC_REPORTING PERIOD_T (s)	0,96	--	0,96
Network Mode of Operation	NMO 1	NMO 1	NMO 1
RAC	Default	Default	Different to default
LAC	Default	Default	Different to default
C1	40-20	20-40	30
C32	40-20	20-40	30

20.22.31.1.5   void

20.22.31.1.6   Foreseen final state of the MS

   -   MS is in Transfer mode on Cell C.

20.22.31.1.7   Test procedure

   a)   The MS is switched on and completes GPRS Attach procedure (ready timer deactivated) on Cell A. MS is PDP context activated and brought into packet transfer mode.

   b)   The RF level of Cell A is reduced to -80 dBm. (C32 becomes 20).

   c)   The SS waits 15 s after the RF level of Cell A is reduced before sending Packet Cell Change Order, with the IMMEDIATE_REL bit set to FALSE, to the MS to select Cell C. The MS shall complete a combined RA/LA unpdate procedure on Cell C.

   d)   The RF level of Cell B is increased to -60 dBm. (C32 becomes 40).

   e)   The SS waits 15 s after increasing the RF level of Cell B to ensure no RA update takes place on Cells A or B.

   NOTE: During the TBF, T3158 may expire and thus PACKET MEASUREMENT REPORT could be sent at any time while the downlink transfer is in progress. The SS shall be prepared for this.

20.22.31.1.8   Test Requirements

   1)   After step b) there should be no response (RA update or cell update) on Cell B or C.

   2)   After step c) there should be a response on Cell C. Since the LA update is combined with the RA update, there should be no LA update on Cell C.

     Note: Time allowed includes 2 seconds to decode BCCH and 5 sec for re-selection.

   3)   After step d) there should be no response on Cell A or B.

   Note: Time allowed includes max(1 second, 1 paging block of the MS) + 2 seconds to decode BCCH + 1s for reselection + 1s tolerance.

20.22.31.1.9   Maximum duration of the test

4 minutes

20.22.31.2 Network controlled cell reselection / Downlink transfer / Normal case/ Location and Routing Area Update/ NMO II

20.22.31.2.1 Conformance requirement

When a cell reselection is initiated by the network for an individual mobile station, the cell change order procedure is started by sending a PACKET CELL CHANGE ORDER message to the mobile station on the PCCCH or PACCH.

Upon receipt of the PACKET CELL CHANGE ORDER message the mobile station shall start timer T3174.

When a cell reselection is made controlled by the network, the mobile station shall act upon the IMMEDIATE_REL value which has been received in the Packet Cell Change Order: if required, the mobile station shall abort any TBF in progress by immediately ceasing to decode the downlink, ceasing to transmit on the uplink, stopping all RLC/MAC timers except for timers related to measurement reporting. The mobile station shall then switch to the identified specified new cell and shall obey the relevant RLC/MAC procedures on this new cell.

To initiate the normal routing area updating procedure, the MS sends the message ROUTING AREA UPDATE REQUEST to the network, starts timer T3330 and changes to state GMM-ROUTING-AREA-UPDATING-INITIATED. The message ROUTING AREA UPDATE REQUEST shall contain the P-TMSI signature when received within a previous ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message.

If the routing area updating request has been accepted by the network, a ROUTING AREA UPDATE ACCEPT message shall be sent to the MS. The network may assign a new P-TMSI and/or a new P-TMSI signature for the MS. If a new P-TMSI and/or P-TMSI signature have been assigned to the MS, it/they shall be included in the ROUTING AREA UPDATE ACCEPT message together with the routing area identification.

If the network operates in mode II or III, then a GPRS-attached MS that has the capability to be simultaneously GPRS-attached and IMSI-attached shall perform the (non-combined) Routing Area Update procedures, and either:

- access the non-GPRS common control channels for CS operation (the way that CS operation is performed in parallel with GPRS operation is an MS implementation issue outside the scope of the present document); or

- if CS operation is not desired, depending on system information that defines whether or not explicit detach shall be used, either:

    - avoid all CS signalling (in which case the MS may be implicitly IMSI detached after a while); or

    - perform an explicit IMSI detach via the non-GPRS common control channels (if the MS was already IMSI-attached).

20.22.31.2.2 References

3GPP TS 04.60, subclauses 8.4 and 5.5.1.1.

3GPP TS 04.08 / 3GPP TS 24.008 subclause 4.7.5.1.

3GPP TS 03.60, subclause 6.5

20.22.31.2.3 Test Purpose

To test the behaviour of the MS when the network triggers a Packet Cell Change Order to a cell belonging to another routing area, whereas the network mode of operation II is active, i.e:

To verify that the cell change order procedure is started when the MS receives a PACKET CELL CHANGE ORDER message.

To verify that the MS switches to the new cell under network control.

To verify that the MS performs separate Normal Location and Routing Area Update procedures.

20.22.31.2.4   Method of test

Initial conditions

System simulator:

Parameters changed from the default values in table 20.22.1.

Parameter	Cell A	Cell B	Cell C
	Carrier 1	Carrier 2	Carrier 3
Channel Type Carried	BCCH	BCCH	BCCH
RF Signal Level (dBm)	-60	-80	-70
Serving Cell Parameters			
RXLEV_ACCESS_MIN (dBm)	-100	-100	-100
NETWORK_CONTROL_ORDER	NC2	NC2	NC2
NC_REPORTING PERIOD_T (s)	0,96	--	0,96
Network Mode of Operation	NMO 2	NMO 2	NMO 2
RAC	Default	Default	Different to default
LAC	Default	Default	Different to default
C1	40-20	20-40	30
C32	40-20	20-40	30

20.22.31.2.5   void

20.22.31.2.6   Foreseen final state of the MS

-   MS is in Transfer mode on carrier 3.

20.22.31.2.7   Test procedure

a) The MS is switched on and completes GPRS Attach procedure (ready timer deactivated) on carrier 1. MS is PDP context activated and brought into packet transfer mode.

b) The RF level of carrier 1 is reduced to -80 dBm. (C32 becomes 20).

c) The SS waits 15 s after the RF level of carrier 1 is reduced before sending Packet Cell Change Order, with the IMMEDIATE_REL bit set to FALSE, to the MS to select carrier 3. The MS shall complete Routing Area Update procedure and Location Update procedure on carrier 3.

d) The RF level of carrier 2 is increased to -60 dBm. (C32 becomes 40).

e) The SS waits 15 s after increasing the RF level of carrier 2 to ensure no RA update takes place on carriers 1 and 2.

NOTE: During the TBF, T3158 may expire and thus PACKET MEASUREMENT REPORT could be sent at any time while the downlink transfer is in progress. The SS shall be prepared for this.

20.22.31.2.8   Test Requirements

1) After step b) there should be no response on carriers 2 or 3.

2) After step c) there should be a response on carrier 3 (the order in which the LA and RA updates occur is not the subject of this test).

Note: Time allowed includes 2 seconds to decode BCCH and 5 sec for re-selection.

20.22.31.2.9   Maximum duration of the test

4 minutes

20.23   Void

20.24 SoLSA Cell Selection and Reselection

All GSM test cases presented in 3GPP TS 11.10 clause 20 are applicable for SoLSA ME with or without LSA SIM. Nevertheless, if LSA SIM are used, it must be checked that no LSA subscription matches the information broadcast by the cell. Otherwise, test cases dealing with cell reselection would fail.

The cell re-selection tests defined in the following sections apply to the SoLSA MS if an LSA support exists in the serving cell. Otherwise the SoLSA MS shall perform cell re-selection according to the idle mode procedures defined in clause 6 of 3GPP TS 05.08.

The SS transmits one BCCH carrier per cell as indicated in the initial conditions for each test. These are referred to as carrier 1, carrier 2, etc. Each of these cell control channels are non-combined with SDCCHs. It is assumed that the SS can simultaneously transmit seven BCCH carriers and monitor three random access channels. In some cases, a test is performed in multiple stages in order that the requirements can be tested within the above constraints.

For any SoLSA MS all the carriers are in its supported band(s) of operation. For an E-GSM mobile station at least one of the carriers is in the extension band and one of the carriers is in the primary band.

Unless otherwise stated in the method of test, in all of the tests of this subclause:

- The SS is continuously paging the SoLSA MS on all carriers at the start of the test and does not respond to RACH requests from the SoLSA MS. Where a test specifies that the SoLSA MS is not paged on a particular carrier, only idle paging is transmitted according to 3GPP TS 04.18, subclause 3.2.2.2.

- The default values of the system information data fields given in table 20.24.1 are used.

- The SIM is in the idle updated state in the default location area with a TMSI assigned at the beginning of each test.

- The ARFCNs used for the carriers in each test are chosen from those in table 20.24.1 with adjacent carriers separated by a minimum of three channels.

The absolute accuracy of the SoLSA MS signal level measurements is assumed to be ±6 dB. A difference of at least 8 dB is allowed for cases of discrimination between C1, C2 or C4 values and 0.

The relative accuracy of the SoLSA MS signal level measurements is assumed to be ±3 dB for the signal levels used in the tests of this subclause. A difference of at least 5 dB is allowed for cases of discrimination between C1, C2 or C4 values on different carriers.

NOTE 1: The accuracy of SoLSA MS signal level measurements is specified in 3GPP TS 05.08. For all of the tests in this subclause, the signal levels used are greater than 1 dB above reference sensitivity level.

NOTE 2: The tolerance on timers specified in 3GPP TS 05.08 is ±10 % except for PENALTY_TIME where it is ±2 s. In the tests of this subclause, the test requirements include these tolerances. Consequently, the times stated in the test requirement sometimes differ from the corresponding timer in the conformance requirement.

Where pulsed signals are specified, the SS tolerance on pulse width is ±2 % and the SS tolerance on power level ±1 dB.

NOTE 3: Additional to the abbreviations and definitions in 3GPP TR 21.905 the following definitions are used within this subclause.

Definitions

LSA cell	A cell in which SoLSA features are possible
LSA only SIM	A SIM with LSA only access
LSA SIM	A SIM with SoLSA files
Normal LSA cell	An LSA cell which is not an LSA exclusive access cell
Normal LSA SIM	An LSA SIM which is not an LSA only SIM
SoLSA ME	An ME supporting SoLSA
SoLSA MS	A SoLSA ME with LSA SIM

Table 20.24.1: Default values of the system information fields

Parameter	Reference	Abbr.	Normal Setting
Cell channel description	3GPP TS 04.18, 10.5.2.1b	-	Any values
MAX retrans	3GPP TS 04.18, 10.5.2.29	-	1
TX-integer	3GPP TS 04.18, 10.5.2.29	-	Any value
CELL_BAR_QUALIFY	3GPP TS 04.18, 10.5.2.35	CBQ	0
CELL_BAR_ACCESS	3GPP TS 04.18, 10.5.2.29	CBA	0 (not barred)
AC CN	3GPP TS 04.18, 10.5.2.29	AC	All 0
RE	3GPP TS 04.18, 10.5.2.29	RE	0 (re-establishment allowed)
NCC	3GPP TS 04.18, 10.5.2.2	NCC	Any value
Cell Identity	3GPP TS 24.008, 10.5.1.1	CI	Any values
MCC, MNC	3GPP TS 24.008, 10.5.1.3	PLMN	MS Home PLMN
MCC_ESC, MNC_ESC	3GPP TS 23.003, 4.1	escape PLMN	MCC = 901, MNC = 08
LAC	3GPP TS 24.008, 10.5.1.3	LAC	Any value
ATT	3GPP TS 04.18, 10.5.2.11	-	0 (Attach/Detach not allowed)
BS_AG_BLKS_RES	3GPP TS 04.18, 10.5.2.11	-	Any values
CCCH_CONF	3GPP TS 04.18, 10.5.2.11	-	1 basic physical channel used for CCCH, non-combined with SDCCHs.
T3212	3GPP TS 04.18, 10.5.2.11	-	Any values
BS_PA_MFRMS	3GPP TS 04.18, 10.5.2.11	BPM	5 frames
Cell Options	3GPP TS 04.18, 10.5.2.3	-	Any values
CELL_RESELECT_HYSTERESIS	3GPP TS 04.18, 10.5.2.4	CRH	4 dB
MS_TXPWR_MAX_CCH	3GPP TS 04.18, 10.5.2.4	MTMC	Max. output power of MS
RXLEV_ACCESS_MIN	3GPP TS 04.18, 10.5.2.4	RAM	-90 dBm
CELL_RESELECT_OFFSET	3GPP TS 04.18, 10.5.2.35	CRO	0
TEMPORARY_OFFSET	3GPP TS 04.18, 10.5.2.35	TO	0
PENALTY_TIME	3GPP TS 04.18, 10.5.2.35	PT	0
Power Offset	3GPP TS 04.18, 10.5.2.35	PO	0
BA ARFCN	3GPP TS 04.18, 10.5.2.22	BA	All 0 except:
LSA Identifier	3GPP TS 24.008, 10.5.3.11	LSA ID	Any value
LSA Offset	3GPP TS 04.18,10.5.2.35; 3GPP TS 05.08, 9. table 1	LSA_OFFSET	0
Priority Threshold	3GPP TS 04.18, 10.5.2.35 3GPP TS 05.08, 9 and table 1	PRIO_THR	0

Table 20.24.1a: ARFCNs for Single Band Tests

Band	ARFCNs	broadcast in SYSTEM INFORMATION type
GSM 450	259, 263, 269, 275, 279, 283, 287, 292	SI2
GSM 480	306, 310, 316, 322, 326, 330, 334, 339	SI2
GSM 710	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511	SI2
GSM 750	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511	SI2
T-GSM 810	441, 446, 452, 455, 461, 462, 466, 470, 477, 485, 493, 511	SI2
GSM 850	130, 136, 145, 152, 168, 170, 176, 177, 181, 185, 189, 193, 197, 207,219, 251	SI2
GSM 900	both P-GSM and E-GSM ARFCNs are broadcast:	
	GSM: 3, 9, 18, 25, 41, 43, 49, 50, 54, 58, 62, 66, 70, 80, 92, 124	SI2
	E-GSM: 985, 989, 995, 1010, 1014	SI2bis
DCS 1800	512, 543, 568, 589, 602, 641, 662, 683, 696, 711, 732, 754, 794, 851, 870, 871, 872, 884	SI2
PCS1900	512, 543, 568, 589, 602, 641, 662, 683, 696, 711, 732, 754, 794	SI2

Table 20.24.1b: ARFCNs for Multiband Tests

Band	ARFCNs	broadcast in SYSTEM INFORMATION type
GSM 450	259, 263, 269, 275, 279, 283, 287, 292	SI2 (GSM 450 cell) & SI2ter (other band cell)
GSM 480	306, 310, 316, 322, 326, 330, 334, 339	SI2 (GSM 480 cell) & SI2ter (other band cell)
GSM 710	441, 452, 461, 477, 493, 511	SI2 (GSM 710 cell) & SI2ter (other band cell)
GSM 750	441, 452, 461, 477, 493, 511	SI2 (GSM 750 cell) & SI2ter (other band cell)
T-GSM 810	441, 452, 461, 477, 493, 511	SI2 (T-GSM 810 cell) & SI2ter (other band cell)
GSM 850	136, 152, 170, 177, 185, 193, 207, 251	SI2 (GSM 850 cell) & SI2ter (other band cell)

GSM 900	3, 18, 41, 49, 62, 70, 92, 124	SI2 (GSM 900 cell) & SI2ter (other band cell)
DCS 1800	512, 568, 602, 662, 696, 732, 794, 870	SI2 (DCS 1800 cell) & SI2ter (other band cell)
PCS 1900	512, 568, 602, 662, 696, 732, 794	SI2 (PCS 1900 cell) & SI2ter (other band cell)

Default values of the SIM card

The "LSA only access indicator" byte of file EF$_{SAI}$ on the SIM card shall be disabled unless otherwise stated (see subclause 20.24).

General initial conditions:

1. Following LSA shall be defined in the fields of the EF$_{SLL}$ (3GPP TS 11.11, subclause 10.4.1.2) and in the LSA descriptor files (GSM 11.11, subclause 10.4.1.3) on the SIM card used for testing.

	LSA ID	CI	LAC	LAC + CI	PLMN code (see NOTE)	LSA Priority	Idle mode support	LSA indication for idle mode
LSA1	54 66.001				HPLMN	0	On	Off
LSA2	66.000				HPLMN	0	Off	On
LSA3	9.000.000			2 + [250..254]	HPLMN	8	On	On
LSA4	9.000.001				HPLMN	8	Off	Off
LSA5	30.000	[256..260]			HPLMN	15	On	On
LSA6	5		1		HPLMN	7	On	On
LSA7	100		10	3 + 500	HPLMN	0	On	On
LSA8	9.000.001				VPLMN	15	On	On
LSA9	54				VPLMN	8	On	On
NOTE:	VPLMN is a set of values for MCC and MNC for the LSA which shall not be in the list of the forbidden PLMNs on the SIM card.							

2. List of values, that shall not be found in the SIM card, in order to be sure that the SoLSA MS is not subscribed to the LSA defined by the current carrier.

	LSA ID	CI	LAC	LAC + CI
LSA value	[250..255]	[5000..5005]	5	5 + [5000..5005]

3. The initial condition "escape PLMN" is set to "Yes" in the following tables of this subclause, in case of testing with an LSA exclusive access cell.

General Remark

1) Elementary File EF$_{SLL}$ (3GPP TS 11.11, subclause 10.4.1.2)

The information regarding 'idle mode support' and 'LSA indication for idle mode' is contained on the SIM card, in the Elementary File EF$_{SLL}$ SoLSA LSA List (identifier '4F31') and, more precisely, in the 'Configuration Parameters' byte.

File EF$_{SLL}$ is represented in the table below, from 3GPP TS 11.11, subclause 10.4.1.2.

Each LSA is described by one record that is linked to an LSA Descriptor file. Each record contains information of the PLMN, priority of the LSA, information about the subscription and may also contain a text string and/or an icon that identifies the LSA to the user. The text string can be edited by the user.

Identifier: '4F31'	Structure: linear fixed		Optional
Record length: X + 10 bytes		Update activity: low	

Access Conditions:
    READ   CHV1
    UPDATE   CHV1
    INVALIDATE   ADM
    REHABILITATE ADM			

Bytes	Description	M/O	Length
1 to X	LSA name	O	X bytes
X+1	Configuration parameters	M	1 byte
X+2	RFU	M	1 byte
X+3	Icon Identifier	M	1 byte
X+4	Priority	M	1 byte
X+5 to X+7	PLMN code	M	3 bytes
X+8 to X+9	LSA Descriptor File Identifier	M	2 byte
X+10	LSA Descriptor Record Identifier	M	1 byte

- Configuration parameters

    Contents: Icon qualifier, control of idle mode support and control of LSA indication for idle mode.

    Coding:

```
┌──┬──┬──┬──┬──┬──┬──┬──┐
│b8│b7│b6│b5│b4│b3│b2│b1│
└──┴──┴──┴──┴──┴──┴──┴──┘
                      └──── Icon qualifier
                   └─────── Idle mode support
                └────────── LSA indication for idle mode
 └─────────────────────────  RFU
```
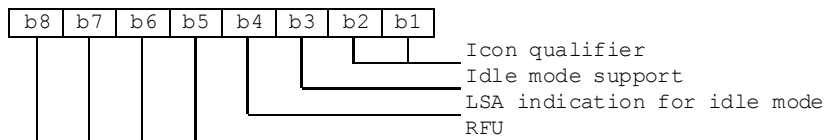
    Idle mode support:

    Contents: The idle mode support is used to indicate whether the ME shall favour camping on the LSA cells in idle mode.

    b3 = 0:Idle mode support disabled
    b3 = 1:Idle mode support enabled

    LSA indication for idle mode:

    Contents: The LSA indication for idle mode is used to indicate whether or not the ME shall display the LSA name when the ME is camped on a cell within the LSA.

    b4 = 0:LSA indication for idle mode disabled
    b4 = 1:LSA indication for idle mode enabled

- Priority

    Contents: Priority of the LSA which gives the ME the preference of this LSA relative to the other LSAs.

    Coding:

```
┌──┬──┬──┬──┬──┬──┬──┬──┐
│b8│b7│b6│b5│b4│b3│b2│b1│
└──┴──┴──┴──┴──┴──┴──┴──┘
                └────────── Priority
 └─────────────────────────  RFU
```
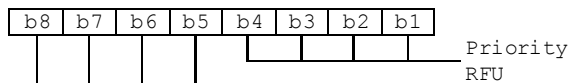
    '0' is lowest priority, 'F' is highest.

- PLMN code

    Contents: MCC + MNC for the LSA.

    Coding: according to 3GPP TS 04.08 [15] / 3GPP TS 24.008 and EF$_{LOCI}$.

- LSA Descriptor File Identifier:

  Contents: these bytes identify the EF which contains the LSA Descriptors forming the LSA.

  Coding: byte X+8: high byte of the LSA Descriptor file;
  byte X+9: low byte of the LSA Descriptor file.

- LSA Descriptor Record Identifier:

  Contents: this byte identifies the number of the first record in the LSA Descriptor file forming the LSA.

  Coding: binary.

2) Elementary Files "LSA Descriptor File" (3 GPP TS 11.11, subclause 10.4.1.3)

The information regarding the LSA identification is contained on the SIM card in the LSA descriptor files, more precisely in the byte 'LSA descriptor type and number' (see table below, from 3GPP TS 11.11, subclause 10.4.1.3).

Residing under DF_{SoLSA}, there may be several LSA Descriptor files. These EFs contains one or more records again containing LSA Descriptors forming the LSAs. LSAs can be described in four different ways. As a list of LSA IDs, as a list of LAC + CIs, as a list of CIs or as a list of LACs. As the basic elements (LSA ID, LAC + CI, CI and LAC) of the four types of lists are of different length, they can not be mixed within one record.

Different records may contain different kinds of lists within the EFs.

Identifier: '4FXX'		Structure: linear fixed		Optional
Record length: n*X+2 bytes			Update activity: low	
Access Conditions: READ CHV1 UPDATE ADM INVALIDATE ADM REHABILITATE ADM				
Bytes	Description		M/O	Length
1	LSA descriptor type and number		M	1 byte
2 to X+1	1st LSA Descriptor		M	X bytes
X+2 to 2X+1	2nd LSA Descriptor		M	X bytes
(n-1)*X+2 to n*X+1	nth LSA Descriptor		M	X bytes
n*X+2	Record Identifier		M	1 byte

- LSA descriptor type and number:

  Contents: The LSA descriptor type gives the format of the LSA descriptor and the number of valid LSA Descriptors within the record.

  Coding:

b8	b7	b6	b5	b4	b3	b2	b1

  LSA descriptor type
  Number of LSA Descriptors
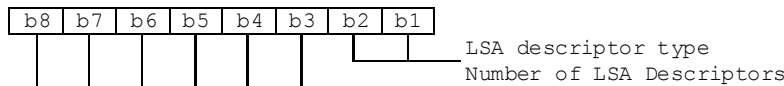
The bit 1 and bit 2 of the first byte of the LSA descriptor file identify the LSA descriptor type.

- LSA descriptor type:

  Contents: Gives the format of the LSA Descriptors.

  b2, b1: 00: LSA ID. identification of the LSA is done by means of the LSA ID
  01: LAC + CI identification of the LSA is done by means of the LAC + CI
  10: CI identification of the LSA is done by means of the CI
  11: LAC identification of the LSA is done by means of the LAC

3) Elementary File EF$_{SAI}$ (3GPP TS 11.11, subclause 10.4.1.1)

This EF contains the 'LSA only access indicator'.This EF shall always be allocated if DF$_{SoLSA}$ is present.

If the indicator is set, the network will prevent terminated and/or originated calls when the MS is camped in cells that are not included in the list of allowed LSAs in EF$_{SLL}$. Emergency calls are, however, always allowed.

The EF also contains a text string which may be displayed when the MS is out of the served area(s).

Identifier: '4F30'		Structure: transparent	Optional
File size: X + 1 bytes		Update activity: low	

Access Conditions:
    READ   CHV1
    UPDATE   ADM
    INVALIDATE   ADM
    REHABILITATE ADM			

Bytes	Description	M/O	Length
1	LSA only access indicator	M	1 byte
2 to X+1	LSA only access indication text	M	X bytes

- LSA only access indicator

    Contents: indicates whether the MS is restricted to use LSA cells only or not.

    Coding:

b8	b7	b6	b5	b4	b3	b2	b1

```
b1=0: LSA only access not activated
b1=1: LSA only access activated

RFU
```
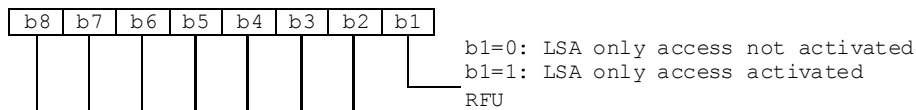
- LSA only access indication text

    Contents: text to be displayed by the ME when it's out of LSA area.

20.24.1   SoLSA Cell Selection suitable cell

20.24.1.1   Definition

SoLSA Cell selection is a process in which a SoLSA MS, whenever a new PLMN is selected, attempts to find a "suitable cell" of that PLMN to camp on. Two methods of searching for a "suitable cell" are possible, normal cell selection and stored list cell selection. The process ensures that the SoLSA MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink. Once the SoLSA MS is camped on a cell, access to the network is allowed.

20.24.1.2   Conformance requirement

1. The SoLSA MS shall be able to select the strongest "suitable cell" and be able to respond to paging on that cell within 30 s of switch on. This requires a valid normal LSA SIM with PIN disabled and ideal radio conditions; 3GPP TS 05.08, subclause 6.1. And it requires a list of LSAs for the subscriber stored on the SIM; 3GPP TS 11.11, subclause 10.4.1.2.

    NOTE 1: For camping on an LSA cell the LSA subscription is not necessary except for camping on an LSA exclusive access cell; 3GPP TS 03.73, subclause 11.4.2.

    NOTE 2: There should be no extra delay in cell selection procedure; 3GPP TS 02.43, subclause 4.2.2.

2. There are various requirements that a cell must satisfy before a SoLSA MS can perform normal camping on it:

    2.1 (i) It should be a cell of the selected PLMN.

    2.2 (ii) It should not be "barred".

2.3(iv) The radio path loss between SoLSA MS and BTS must be below a threshold set by the PLMN operator.

2.4 (v) It should not be an LSA exclusive access cell to which the SoLSA MS does not subscribe.

3GPP TS 03.22, subclause 3.2.1.

NOTE 3: Criteria (iii) is not applicable for Cell Selection.

3. Initially the SoLSA MS looks for a cell which satisfies these 5 constraints ("suitable cell") by checking cells in descending order of received signal strength. If a "suitable cell" is found, the SoLSA MS camps on it; 3GPP TS 03.22, subclause 3.2.1.

4. The SoLSA MS shall be able to calculate correctly the path loss criterion parameter C1, used for cell selection and reselection; 3GPP TS 05.08, subclause 6.4.

5. The LSA identification shall be stored on the SIM card in the LSA descriptor files. LSAs can be described in four different ways; 3GPP TS 11.11, subclause 10.4.1.3:

   - as a list of LSA IDs (3 bytes);

   - as a list of LAC + CIs (4 bytes);

   - as a list of CIs (2 bytes);

   - as a list of LACs (2 bytes); or

   - as a combination of the lists above.

20.24.1.3   Test purpose

The SoLSA MS shall be able to select a "suitable cell" according to the normal cell selection criteria. The identification of the LSA is done by using the LSA ID, the CI, the LAC or the LAC + CI.

20.24.1.4   Method of tests

20.24.1.4.1   SoLSA Cell Selection suitable cell / LSA identified by LSA ID

20.24.1.4.1.1   Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24).

b) Parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/-70	13/-100	53/-60	63/-50
CBA	0	0	1	0
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90
MNC				1
MCC				002
C1	20	-10	30	40
LSA ID	66.001	66.001	66.001	66.001
LAC	5	5	5	5
CI	5.000	5.001	5.002	5.003
Matching LSA on SIM	LSA1	LSA1	LSA1	-
Escape PLMN	No	No	No	No

c) Parameters changed from the default values in table 20.24.1; further initial conditions (for test procedure step g)

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBµV emf() / dBm)	43/-70	13/-100	53/-60	OFF
CBA	0	0	1	
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
C1	20	-10	30	
LSA ID	250	66.001	250	
LAC	5	5	5	
CI	5.000	5.001	5.002	
Matching LSA on SIM	-	LSA1	-	
Escape PLMN	Yes	Yes	No	

20.24.1.4.1.2 Test Procedure

a) The SS activates all carriers according to table b) and monitors carriers 1, 2 and 4 for RA requests from the SoLSA MS.

b) The SoLSA MS is switched on.

c) The SoLSA MS is switched off.

d) The SS monitors carrier 3 for RA requests from the SoLSA MS.

e) The SoLSA MS is switched on.

f) The SoLSA MS is switched off.

g) The SS is reconfigured according to table c). The SS monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

h) The SoLSA MS is switched on.

i) The SoLSA MS is switched off.

j) The SS is reconfigured and the level of carrier 2 increases to 33 dBµV / - 80 dBm (C1 increases to 10 dBm). The SS monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

k) The SoLSA MS is switched on.

20.24.1.4.1.3 void

20.24.1.4.1.4 Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s. There shall be no response from the SoLSA MS on the other monitored carriers.

NOTE 1: 33 s for cell selection, 10 s for communicating the data between SIM and ME, 5 s for search of a matching LSA on SIM: allow 50 s.

2) There shall be no response from the SoLSA MS on the monitored carrier after step e) within 60 s.

NOTE 2: Any potential access is likely to occur within 50 s.

3) After step h), there shall be no response from the SoLSA MS on the monitored carriers within 60 s (carrier 1 is not fulfilling conformance requirement 2.4).

4) After step k), the first response from the SoLSA MS shall be received on carrier 2 within 50 s. There shall be no response from the SoLSA MS on the other monitored carriers.

20.24.1.4.2 SoLSA Cell Selection suitable cell / LSA identified by LAC + CI

20.24.1.4.2.1 Initial conditions

a) Identification of the LSA by means of LAC + CI (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/-70	13/-100	53/-60	63/-50
CBA	0	0	1	0
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90
MNC				1
MCC				002
C1	20	-10	30	40
LSA ID	250	250	250	250
LAC	2	2	2	2
CI	250	251	252	253
Matching LSA on SIM	LSA3	LSA3	LSA3	-
Escape PLMN	No	No	No	No

c) Parameters changed from the default values in table 20.24.1; further initial conditions (for test procedure step g).

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/-70	13/-100	53/-60	OFF
CBA	0	0	1	
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
C1	20	-10	30	
LSA ID	250	250	250	
LAC	2	2	5	
CI	5000	250	251	
Matching LSA on SIM	-	LSA3	-	
Escape PLMN	Yes	Yes	No	

20.24.1.4.2.2   Test Procedure

a) The SS activates all carriers according to table b) and monitors carriers 1, 2 and 4 for RA requests from the SoLSA MS.

b) The SoLSA MS is switched on.

c) The SoLSA MS is switched off.

d) The SS monitors carrier 3 for RA requests from the SoLSA MS.

e) The SoLSA MS is switched on.

f) The SoLSA MS is switched off.

g) The SS is reconfigured according to table c). The SS monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

h) The SoLSA MS is switched on.

i) The SoLSA MS is switched off.

j) The SS is reconfigured and the level of carrier 2 increases to 33 dBμV / - 80 dBm (C1 increases to 10 dBm). The SS monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

k) The SoLSA MS is switched on.

20.24.1.4.2.3   void

20.24.1.4.2.4   Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s. There shall be no response from the SoLSA MS on the other monitored carriers.

2) There shall be no response from the SoLSA MS on the monitored carrier after step e) within 60 s.

NOTE: Any potential access is likely to occur within 50 s.

3) After step h), there shall be no response from the SoLSA MS on the monitored carriers within 60 s.

4) After step k), the first response from the SoLSA MS shall be received on carrier 2 within 50 s. There shall be no response from the SoLSA MS on the other monitored carriers.

20.24.1.4.3 SoLSA Cell Selection suitable cell / LSA identified by CI

20.24.1.4.3.1 Initial conditions

a) Identification of the LSA by means of CI (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/-70	13/-100	53/-60	63/-50
CBA	0	0	1	0
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90
MNC				1
MCC				002
C1	20	-10	30	40
LSA ID	250	250	250	250
LAC	5	5	5	5
CI	257	258	259	260
Matching LSA on SIM	LSA5	LSA5	LSA5	-
Escape PLMN	No	No	No	No

c) Parameters changed from the default values in table 20.24.1; further initial conditions (for test procedure step g).

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/-70	13/-100	53/-60	OFF
CBA	0	0	1	
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
C1	20	-10	30	
LSA ID	250	250	250	
LAC	5	5	5	
CI	5.000	258	5.001	
Matching LSA on SIM	-	LSA5	-	
Escape PLMN	Yes	Yes	No	

20.24.1.4.3.2 Test Procedure

a) The SS activates all carriers according to table b) and monitors carriers 1, 2 and 4 for RA requests from the SoLSA MS.

b) The SoLSA MS is switched on.

c) The SoLSA MS is switched off.

d) The SS monitors carrier 3 for RA requests from the SoLSA MS.

e) The SoLSA MS is switched on.

f) The SoLSA MS is switched off.

g) The SS is reconfigured according to table c). The SS monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

h) The SoLSA MS is switched on.

i) The SoLSA MS is switched off.

j) The SS is reconfigured and the level of carrier 2 increases to 33 dBμV / -80 dBm (C1 increases to 10 dBm). The SS monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

k) The SoLSA MS is switched on.

20.24.1.4.3.3 void

20.24.1.4.3.4 Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s. There shall be no response from the SoLSA MS on the other monitored carriers.

2) There shall be no response from the SoLSA MS on the monitored carrier after step e) within 60 s.

NOTE: Any potential access is likely to occur within 50 s.

3) After step h), there shall be no response from the SoLSA MS on the monitored carriers within 60 s.

4) After step k), the first response from the SoLSA MS shall be received on carrier 2 within 50 s. There shall be no response from the SoLSA MS on the other monitored carriers.

20.24.1.4.4 SoLSA Cell Selection suitable cell / LSA identified by LAC

20.24.1.4.4.1 Initial conditions

a) Identification of the LSA by means of LAC (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/-70	13/-100	53/-60	63/-50
CBA	0	0	1	0
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90
MNC				1
MCC				002
C1	20	-10	30	40
LSA ID	250	250	250	250
LAC	1	1	1	1
CI	5.000	5.001	5.002	5.003
Matching LSA on SIM	LSA6	LSA6	LSA6	-
Escape PLMN	No	No	No	No

c) Parameters changed from the default values in table 20.24.1; further initial conditions (for test procedure step g).

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/-70	13/-100	53/-60	OFF
CBA	0	0	1	
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
C1	20	-10	30	
LSA ID	250	250	250	
LAC	5	1	5	
CI	5.000	5.001	5.002	
Matching LSA on SIM	-	LSA6	-	
Escape PLMN	Yes	Yes	No	

20.24.1.4.4.2 Test Procedure

a) The SS activates all carriers according to table b) and monitors carriers 1, 2 and 4 for RA requests from the SoLSA MS.

b) The SoLSA MS is switched on.

c) The SoLSA MS is switched off.

d) The SS monitors carrier 3 for RA requests from the SoLSA MS.

e) The SoLSA MS is switched on.

f) The SoLSA MS is switched off.

g) The SS is reconfigured according to table c). The SS monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

h) The SoLSA MS is switched on.

i) The SoLSA MS is switched off.

j) The SS is reconfigured and the level of carrier 2 increases to 33 dBμV / -80 dBm (C1 increases to 10 dBm). The SS monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

k) The SoLSA MS is switched on.

20.24.1.4.4.3 void

20.24.1.4.4.4 Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s. There shall be no response from the SoLSA MS on the other monitored carriers.

2) There shall be no response from the SoLSA MS on the monitored carrier after step e) within 60 s.

NOTE: Any potential access is likely to occur within 50 s.

3) After step h), there shall be no response from the SoLSA MS on the monitored carriers within 60 s.

4) After step k), the first response from the SoLSA MS shall be received on carrier 2 within 50 s. There shall be no response from the SoLSA MS on the other monitored carriers.

20.24.2 SoLSA Cell (Re)Selection Emergency Call

20.24.2.1 Definition

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20.24.2.2 Conformance requirement

1. The SoLSA MS shall be able to initiate emergency calls when no "suitable cells" of the selected PLMN are available, but at least one acceptable cell is available. The SoLSA MS is in limited service state.
An LSA exclusive access cell is "suitable" only if the LSA of the cell is one of the allowed LSA according to the SIM. Emergency calls are always allowed if no cells are found suitable; 3GPP TS 03.73, subclause 11.4.2.

2. When in a limited service state and if not camped on a cell, the MS shall monitor the received signal level of all RF channels within its band of operation, and search for a BCCH carrier which has C1 > 0 and which is not barred. When such a carrier is found, the MS shall camp on that cell, irrespective of the PLMN identity; 3GPP TS 05.08, subclause 6.8.

3. The MS shall perform cell reselection at least among the cells of the PLMN of the cell on which the MS has camped, according to the algorithm of 3GPP TS 03.22, except that a zero value of CELL_RESELECT_HYSTERESIS shall be used.

20.24.2.3 Test purpose

1. To verify that the SoLSA MS shall be able to initiate emergency calls when no "suitable cells" of selected PLMN are available, but at least one acceptable cell is available. The available cells are:

   a) LSA exclusive access cells of the selected PLMN with no LSA subscription.

   b) Normal LSA cell of forbidden PLMN.

2. To verify that the MS selects a cell with C1>0 and CBA = 0 when no suitable cells of the selected PLMN are available.

3. To verify that the MS, when performing cell reselection in the limited service state, uses CELL_RESELECT_HYSTERESIS = 0, 3GPP TS 05.08, subclause 6.8.

20.24.2.4   Method of test

20.24.2.4.1   Initial conditions

a) Parameters changed from the default values in table 20.24.1; further initial conditions for LSA exclusive access cell.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dbµV emf() / dBm)	38/ -75	23 / -90	33 / -80	OFF
RXLEV_ACCESS_MIN (dBm)	-90	-80	-90	
CBA	1 (barred)	0	0	
MCC, MNC	Home PLMN	Home PLMN	Home PLMN	
CRH (dB)	0	0	14	
C1	15	-10	10	
LSA_ID	250	251	252	
LAC	5	5	5	
CI	5000	5001	5002	
Matching LSA on SIM	-	-	-	
Escape PLMN	Yes	Yes	Yes	

b) Parameters changed from the default values in table 20.24.1; further initial conditions for normal LSA cell.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBµV emf() / dBm)	38/ -75	23 / -90	33 / -80	OFF
RXLEV_ACCESS_MIN (dBm)	-90	-80	-90	
CBA	1 (barred)	0	0	
MCC, MNC	forbidden	forbidden	forbidden	
CRH (dB)	0	0	14	
C1	15	-10	10	
LSA_ID	250	251	252	
LAC	5	5	5	
CI	5000	5001	5002	
Matching LSA on SIM	-	-	-	
Escape PLMN	No	No	No	

NOTE: All the BCCH carriers belong to the same PLMN, which is not the MS's home PLMN and which is in the SIM's forbidden PLMN list.

Run the following test procedure twice by using two different sets of initial conditions:

-   using initial conditions a);

-   using initial conditions b).

20.24.2.4.2   Test Procedure

a) The SS activates the carriers. The SS monitors carriers 1, 2 and 3 for RA requests for the duration of the test.

b) The SoLSA MS is switched on.

c) 60 s after switch on, an emergency call is initiated on the SoLSA MS.

d) The SS changes the CBA of carrier 1 to 0.

NOTE 1: The MS should reselect carrier 1 because it should not take into account the CRH value of 14 but use 0 instead.

e) After 350 s an emergency call is initiated on the SoLSA MS.

NOTE 2: 330 s to detect change of BCCH data on neighbour cell, 15 s to perform reselection of carrier 1 since the SoLSA MS already has a running average on carrier 1, 5 s for search of a matching LSA on SIM.

20.24.2.4.3 void

20.24.2.4.4 Test requirements

1) In step c), the first access of the SoLSA MS shall be on carrier 3.

2) In step e), the first access of the SoLSA MS shall be on carrier 1.

20.24.3 SoLSA Cell Reselection / idle mode support enabled

General Remark

The identification of the LSA is done by means of the LSA ID, see General Remark 2) in subclause 20.24.

20.24.3.1 General conformance requirement

1. There are various requirements that a cell must satisfy before a SoLSA MS can perform normal camping on it:

   i) It should be a cell of the selected PLMN.

   ii) It should not be "barred".

   iii) It should not be in an LA which is in the list of "forbidden LA for roaming".

   iv) The radio path loss between SoLSA MS and BTS must be below a threshold set by the PLMN operator.

   v) It should not be an LSA exclusive access cell to which the SoLSA MS does not subscribe.

   3GPP TS 03.22, subclause 3.2.1.

2. While camped on a cell of the selected PLMN ("camped normally"), the SoLSA MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

   - The cell camped on (current serving cell) has become barred.

   - There is a better cell (in terms of the path loss criterion C2) in the same LA, or a much better cell in another LA of the selected PLMN (using the CRH parameter).

   - The SoLSA MS will then reselect a new cell in order to fulfil the process goal.

   3GPP TS 03.22, subclause 4.5.

3. At least for every new sample or every second, whichever is the greatest, the SoLSA MS calculates the value of C1, C2 and C4 for the serving cell and the non-serving cells. The SoLSA MS shall make a cell reselection if:

   i) The path loss criterion parameter (C1) for the serving cell falls below zero for a period of 5 s.

   ii) A non-serving suitable cell (see 3GPP TS 03.22) is evaluated to be better than the serving cell for a period of 5 s. The best cell is:

   - the cell with the highest value of C2 + LSA_OFFSET among those cells that have highest LSA priority among those that fulfil the criteria C4 $\geq$ 0; or

   - the cell with the highest value of C2 among all cells, if no cell fulfil the criterion C4 $\geq$ 0.

   LSA_OFFSET and LSA ID(s) are broadcast on BCCH. LSA priority is defined by the list of LSAs for the subscriber stored on the SIM. Cells with no LSA priority, e.g. non-LSA cells, are given LSA priority lower than 0. If no LSA_OFFSET parameter is broadcast, LSA_OFFSET shall be set to 0.

   When evaluating the best cell, the following hysteresis values shall be subtracted from the C2 value for the neighbour cells:

   - if the new cell is in the same location area: 0.

   - if the new cell is in a different location area:

- CELL_RESELECT_HYSTERESIS, which is broadcast on BCCH of the serving cell.

- in case of a cell reselection occurred within the previous 15 s: 5 dB.

3GPP TS 05.08, subclause 6.6.3.

4. Cell reselection for any other reason shall take place immediately, but the cell that the SoLSA MS was camped on shall not be returned to within 5 s if another suitable cell can be found. If valid receive level averages are not available, the SoLSA MS shall wait until these values are available and then perform the cell reselection if it is still required. The SoLSA MS may accelerate the measurement procedure within the requirements in 3GPP TS 05.08, subclause 6.6.1 to minimise the cell reselection delay. 3GPP TS 05.08, subclause 6.6.3.

5. If no suitable cell is found within 10 s, the cell selection algorithm of 3GPP TS 03.22 shall be performed. Since information concerning a number of channels is already known to the SoLSA MS, it may assign high priority to measurements on the strongest carriers from which it has not previously made attempts to obtain BCCH information, and omit repeated measurements on the known ones. 3GPP TS 05.08, subclause 6.6.3.

6. At least every 5 s the MS shall calculate the value of C1 and C2 for the serving cell and re-calculate C1 and C2 values for non serving cells (if necessary). The MS shall then check whether:

   i) The path loss criterion (C1) for current serving cell falls below zero for a period of 5 s. This indicates that the path loss to the cell has become too high.

   ii) The calculated value of C2 for a non-serving suitable cell exceeds the value of C2 for the serving cell for a period of 5 s, except;

   a) in the case of the new cell being in a different location area or, for a GPRS MS, in a different routing area or always for a GPRS MS in ready state in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least CELL_RESELECT_HYSTERESIS dB as defined by the BCCH data from the current serving cell, for a period of 5 s; or

   b) in case of a cell reselection occurring within the previous 15 s in which case the C2 value for the new cell shall exceed the C2 value of the serving cell by at least 5 dB for a period of 5 s.

   This indicates that it is a better cell.

   3GPP TS 05.08, subclause 6.6.2.

7. The SoLSA MS shall attempt to decode the full BCCH data of the serving cell at least every 30 s; 3GPP TS 05.08, subclause 6.6.1.

8. The signal strength threshold criterion parameter C4 is used to determine whether prioritised LSA cell reselection shall apply and is defined by:

   $$C4 = A - PRIO\_THR$$

   where

   $$A = RLA\_C - RXLEV\_ACCESS\_MIN$$

   and PRIO_THR is the signal threshold for applying LSA reselection. PRIO_THR is broadcast on the BCCH. If the idle mode support is disabled for the LSA (3GPP TS 11.11, subclause 10.4.1.2) or if the cell does not belong to any LSA to which the MS is subscribed or if no PRIO_THR parameter is broadcast, PRIO_THR shall be set to ∞.

   3GPP TS 05.08, subclause 6.4.

9. The LSA identification is stored on the SIM card within the descriptor file for the LSA. 3GPP TS 11.11, subclause 10.4.1.3.

20.24.3.2 SoLSA Cell Reselection / idle mode support enabled / LSA Priority

20.24.3.2.1 Definition

While camped on a cell of the selected PLMN the SoLSA MS may need to select a different cell in order to fulfil the normal service state. This ensures that the SoLSA MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

Idle mode support for SoLSA on the SIM card is enabled (see General Remark 1. in subclause 20.24).

20.24.3.2.2 Conformance requirement

1. While camped on a cell of the selected PLMN ("camped normally"), the SoLSA MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

   - The cell camped on (current serving cell) has become barred.

   - There is a better cell (in terms of the path loss criterion C2) in the same LA.

   - The SoLSA MS will then reselect a new cell in order to fulfil the process goal.

     3GPP TS 03.22, subclause 4.5.

2. A SoLSA MS with SIM indicating LSA subscription shall always try to reselect the cell with highest LSA priority according to the information stored on the SIM. 3GPP TS 03.73, subclause 11.4.2.

20.24.3.2.3 Test purpose

To verify that the SoLSA MS when idle mode support for SoLSA on the SIM card is enabled shall favour camping on those LSA cells with the highest LSA priority the SoLSA MS is subscribed to.

20.24.3.2.4 Method of test

20.24.3.2.4.1 Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	63/-50	53/-60	33 /-80	OFF
CBA	0	0	0	
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
LAC				
C1	40	30	10	
C2	40	30	10	
C4	40	30	10	
LSA IDs	66.001	9.000.000	30.000	
	250	66.001	66.001	
	251	250	9.000.000	
	252	251	250	
LAC	5	5	5	
CI	5000	5001	5002	

c) Further initial conditions (Carrier 1-3 are normal LSA cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA1	LSA1, LSA3	LSA1, LSA3, LSA5	
Escape PLMN	No	No	No	

d) Further initial conditions (Carrier 1-3 are LSA exclusive access cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA1	LSA1, LSA3	LSA1, LSA3, LSA5	
Escape PLMN	Yes	Yes	Yes	

Run the following test procedure twice by using two different sets of initial conditions:

- using initial conditions a), b) and c);

- using initial conditions a), b) and d).

20.24.3.2.4.2 Test Procedure

a) The SS activates carriers 1, 2 and 3 and monitors these carriers for RA requests from the SoLSA MS.

b) The SoLSA MS is switched on.

c) After approx. 60 s the SS is reconfigured and carrier 3 becomes barred (CBA = 1) in order to give the MS the time to perform cell reselection on carrier 3.

d) The SS is reconfigured and the level of carrier 2 is decreased to 13 dBμVemf() / -100 dBm. (C2 decreases to -10 dB).

20.24.3.2.4.3 void

20.24.3.2.4.4 Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 (highest C1) within 50 s (Cell Selection).

NOTE 1: 33 s for the MS to read the BCCH of carrier 3 (30 s + 10 %), 10 s for communicating the data between SIM and ME, 5 s for search of a matching LSA on SIM. Total 48 s, allow 50 s.

2) The following response from the SoLSA MS shall be received on carrier 3 within 25 s after the first response on carrier 1 (Reselection, highest LSA Priority (15)).

NOTE 2: 5 s for the running average, 10 s to detect C2 differences, 2,4 s to read BCCH of carrier 1, 1 s to perform RA, 5 s for search of a matching LSA on SIM. Total 23,4 s, allow 25 s.

3) After step c), there shall be response from the SoLSA MS on carrier 2 within 55 s after carrier 3 has been barred (Highest LSA Priority on the SIM (8)).

NOTE 3: 30 s for the MS to read the BCCH of carrier 3, 20 s to reselect carrier 2, 5 s for search of a matching LSA on SIM: total 55 s.

4) After step d), there shall be response from the SoLSA MS on carrier 1 within 25 s after carrier 2 has been reconfigured.

NOTE 4: 5 s for the running average, 10 s to detect C2 differences, 2,4 s to read BCCH of carrier 1, 1 s to perform RA, 5 s for search of a matching LSA on SIM. Total 23,4 s, allow 25 s.

20.24.3.3 SoLSA Cell Reselection / idle mode support enabled / LSA Priority / different location area

20.23.3.3.1 Definition

While camped on a cell of the selected PLMN the SoLSA MS may need to select a different cell in order to fulfil the normal service state. This ensures that the SoLSA MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

Idle mode support for SoLSA on the SIM card is enabled (See General Remark 1. of subclause 20.24).

20.24.3.3.2 Conformance requirement

1. While camped on a cell of the selected PLMN ("camped normally"), the SoLSA MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

- The cell camped on (current serving cell) has become barred.

- There is a better cell (in terms of the path loss criterion C2) in the same LA, or a much better cell in another LA of the selected PLMN (using the CRH parameter).

- The SoLSA MS will then reselect a new cell in order to fulfil the process goal.

  3GPP TS 03.22, subclause 4.5.

2. A SoLSA MS with SIM indicating LSA subscription shall always try to reselect the cell with highest LSA priority according to the information stored on the SIM. 3GPP TS 03.73, subclause 11.4.2.

3. The LSA identification shall be stored on the SIM card in the LSA descriptor files (EF). LSAs can be described in four different ways (see 3GPP TS 11.11, subclause 10.4.1.3):

- as a list of LSA IDs (3 bytes);

- as a list of LAC + CIs (4 bytes);

- as a list of CIs (2 bytes);

- as a list of LACs (2 bytes); or

- as a combination of the lists above.

20.24.3.3.3 Test purpose

To verify that the SoLSA MS when idle mode support for SoLSA on the SIM card is enabled shall favour camping on those LSA cells with the highest C2 among those cells with the highest LSA priority the SoLSA MS is subscribed to even if the cell belongs to a different location area.

20.24.3.3.4 Method of test

20.24.3.3.4.1 Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/ -70	33/ -80	33 / -80	13 / -100
CBA	0	0	0	0
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90
CRH (dB)	10		10	
C1	20	10	10	-10
C2	20	10	10	-10
C4	20	10	10	-10
LSA ID	54	54	54	30.000
LAC	5	5	3	3
CI	5000	5001	5002	5003

c) Further initial conditions (Carrier 1-3 are normal LSA cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA1	LSA1	LSA1	LSA5
Escape PLMN	No	No	No	No

d) Further initial conditions (Carrier 1-3 are LSA exclusive access cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA1	LSA1	LSA1	LSA5
Escape PLMN	Yes	Yes	Yes	Yes

e) Identification of the LSA by means of:

- LSA ID on Carrier 1;

- LAC + CI on Carrier 2;

- LAC on Carrier 3;

- CI on carrier 4.

(see subclause 20.24. General remark 2.)

f) Parameters changed from the default values in table 20.24.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/ -70	33/ -80	33 / -80	13 / -100
CBA	0	0	0	0
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90
CRH (dB)	10		10	
C1	20	10	10	-10
C2	20	10	10	-10
C4	20	10	10	-10
LSA ID	100	250	250	250
LAC	3	3	10	5
CI	5000	500	5002	256

g) Further initial conditions (Carrier 1-4 are normal LSA cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA7	LSA7	LSA7	LSA5
Escape PLMN	No	No	No	No

h) Further initial conditions (Carrier 1-4 are LSA exclusive access cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA7	LSA7	LSA7	LSA5
Escape PLMN	Yes	Yes	Yes	Yes

Run the following test procedure twice by using four different sets of initial conditions:

- using initial conditions a), b) and c);

- using initial conditions a), b) and d);

- using initial conditions e), f) and g);

- using initial conditions e), f) and h).

20.24.3.3.4.2   Test Procedure

a) The SS activates carriers 1, 2 and 3 and monitors these carriers for RA requests from the SoLSA MS. Carrier 4 is switched off.

b) The SoLSA MS is switched on.

c) The SS is reconfigured and the level of carrier 3 is increased to 63 dBμV emf() / -50 dBm (C2 increases to 40 dB).

d) The SS is reconfigured and the level of carrier 2 is increased to 63 dBμV emf() / -50 dBm (C2 increases to 40 dB).

e) The SS is reconfigured and carrier 3 becomes barred (CBA = 1).

f) The SS activates carrier 4 and monitors carriers 1, 2 and 4. Carrier 3 is switched off.

g) The SS is reconfigured and the level of carrier 4 is increased to 33 dB µV emf () / -80 dBm (C2 increases to 10 dB).

20.24.3.3.4.3   void

20.24.3.3.4.4   Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s. (Cell Selection, highest C1). There shall be no response from the SoLSA MS on any other carrier within 35 s after first response on carrier 1.

NOTE 1: Any potential access is likely to occur within 25 s.

2) After step c), there shall be response from the SoLSA MS on carrier 3 within 25 s after increasing the level of carrier 3 (now highest C2 (C2-CRH), for cells with C4 > 0).

3) After step d), there shall be no response from the SoLSA MS on carrier 2 within 35 s after increasing the level of carrier 2 (still highest C2/C2-CRH for carrier 3).

NOTE 2: Any potential access is likely to occur within 25 s.

4) After step e), there shall be response from the SoLSA MS on carrier 2 within 55 s after carrier 3 becomes barred.

5) After step f), there shall be no response from the SoLSA MS on carrier 4 within 60 s after carrier 4 is switched on (Highest LSA Priority (15), but C2 < 0).

6) After step g), there shall be response from the SoLSA MS on carrier 4 within 25 s after increasing level of carrier 4 (not highest C2, but C4 > 0 and highest LSA Priority (15) on the SIM).

20.24.3.4   SoLSA Cell Reselection / idle mode support enabled / Priority Threshold

20.24.3.4.1   Definition

While camped on a cell of the selected PLMN the SoLSA MS may need to select a different cell in order to fulfil the normal service state. This ensures that the SoLSA MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

Idle mode support for SoLSA on the SIM card is enabled (see General Remark 1 in subclause 20.24).

20.24.3.4.2   Conformance requirement

The SoLSA MS shall be able to calculate correctly the signal strength threshold criterion parameter C4 which is to determine whether prioritised LSA cell reselection shall apply.

The signal strength threshold criterion parameter C4 is used to determine whether prioritised LSA cell reselection shall apply and is defined by:

C4 = A - PRIO_THR

Where:

A is defined as above and PRIO_THR is the signal threshold for applying LSA reselection. PRIO_THR is broadcast on the BCCH. If the idle mode support is disabled for the LSA (see 3GPP TS 11.11) or if the cell does not belong to any LSA to which the MS is subscribed or if no PRIO_THR parameter is broadcast, PRIO_THR shall be set to ∞.

3GPP TS 05.08, subclause 6.4.

20.24.3.4.3   SoLSA Cell Reselection / idle mode support enabled / Priority Threshold any value

20.24.3.4.3.1   Test purpose

To verify that the SoLSA MS is able to reselect cells correctly according to parameter PRIO_THR. (parameter C4 criterion).

20.24.3.4.3.2   Method of test

20.24.3.4.3.2.1   Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24. General remark 2.)

b) Parameters changed from the default values in table 20.24.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBµV emf() / dBm)	47 / - 66	55 / -58	63 / -50	OFF
CBA	0	0	0	
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
C1	15	25	40	
C2	15	25	40	
PRIO_THR (level / dB)	1 / 6	6 / 36	2 / 12	
C4	9	-11	28	
LSA ID	66.001	9.000.000	30.000	
LAC	5	5	5	
CI	5000	5001	5002	

NOTE: The level of PRIO_THR is evaluated according to 3GPP TS 05.08, clause 9 and table 1.

c) Further initial conditions (Carrier 1-3 are normal LSA cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA1	LSA3	LSA5	
Escape PLMN	No	No	No	

d) Further initial conditions (Carrier 1-3 are LSA exclusive access cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA1	LSA3	LSA5	
Escape PLMN	Yes	Yes	Yes	

Run the following test procedure twice by using two different sets of initial conditions:

-   using initial conditions a), b) and c);

-   using initial conditions a), b) and d).

20.24.3.4.3.2.2   Test Procedure

a) The SS activates carriers 1, 2 and 3 and monitors these carriers for RA requests from the SoLSA MS.

b) The SoLSA MS is switched on.

c) Carrier 3 is barred (CBA = 1).

d) The PRIO_THR value of carrier 2 is set to 0 dB (level 0).

e) The PRIO_THR value of carrier 2 is set to 36 dB (level 6).

20.24.3.4.3.2.3   void

20.24.3.4.3.2.4   Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 3 within 50 s after switch on.

2) After step c), the SoLSA MS shall respond on carrier 1 within 55 s after barring of carrier 3 (Highest Priority + C4 > 0).

3) After step d), the SoLSA MS shall respond on carrier 2 within 55 s after changing the PRIO_THR value of carrier 2 (C4 > 0 + Highest C2+LSA_OFFSET).

4) After step e), the SoLSA MS shall respond on carrier 1 within 55 s after changing the PRIO_THR value of carrier 2 (C4 > 0, Highest priority).

20.24.3.4.4 SoLSA Cell Reselection / idle mode support enabled / Priority Threshold infinite

20.24.3.4.4.1 Test purpose

To verify that the SoLSA MS is able to reselect cells correctly according to parameter C2 among those cell not fulfilling C4 ≥ 0.

20.24.3.4.4.2 Method of test

20.24.3.4.4.2.1 Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	63 / -50	53 / -60	58 / -55	31 / -82
CBA	0	0	0	0
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90
CRH (dB)	10			
PRIO_THR (level / dB)	7 / 'infinite'	7 / 'infinite'	7 / 'infinite'	
C1	40	30	35	8
C2	40	30	35	8
C4	<0	<0	<0	8
LSA_OFFSET (level / dB)		*5 / 32*		
LSA ID	66.001	66.001	9.000.000	30.000
LAC	5	5	3	3
CI	5000	5001	5002	5003

c) Further initial conditions (Carrier 1-4 are normal LSA cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA1	LSA1	LSA3	LSA5
Escape PLMN	No	No	No	No

d) Further initial conditions (Carrier 1-4 are LSA exclusive access cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA1	LSA1	LSA3	LSA5
Escape PLMN	Yes	Yes	Yes	Yes

Run the following test procedure twice by using two different sets of initial conditions:

- using initial conditions a), b) and c);

- using initial conditions a), b) and d).

20.24.3.4.4.2.2 Test Procedure

a) The SS activates carriers 1, 2 and 3 and monitors these carriers for RA requests from the SoLSA MS. Carrier 4 is switched off.

b) The SoLSA MS is switched on.

c) The SS is reconfigured and the level of carrier 1 is decreased to 33 dBμV emf() / -80 dBm (C2 of carrier 1 becomes 10).

d) The SS is reconfigured and the level of carrier 3 is increased to 63 dBμV emf() / -50 dBm (C2 of carrier 3 becomes 40).

e) Carrier 1 is switched off. Carrier 4 is switched on. The SS monitors carriers 2, 3 and 4.

20.24.3.4.4.2.3 void

20.24.3.4.4.2.4 Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s. There shall be no response from the SoLSA MS on any other carrier within 35 s after the first response on carrier 1.

NOTE 1: Any potential access is likely to occur within 25 s.

2) After step c), there shall be response from the SoLSA MS on carrier 2 within 25 s after carrier 1 has been reconfigured (Highest C2/C2-CRH).

3) After step d), there shall be response on carrier 3 within 25 s after carrier 2 has been reconfigured (Highest C2/C2-CRH).

4) After step e), there shall be response on carrier 4 within 60 s after the system has been reconfigured (idle mode support enabled for carrier 4).

NOTE: 5,5 s to notice new strongest carriers on top 6 (because the updating time for the 6 strongest is 5 s (±10%)), 33 s to read BCCH, 15 s for reselection, 5 s for search of a matching LSA on SIM. Allow 60 s.

20.24.3.5 SoLSA Cell Reselection / idle mode support enabled / LSA Priority / LSA_OFFSET

20.24.3.5.1 Definition

While camped on a cell of the selected PLMN the SoLSA MS may need to select a different cell in order to fulfil the normal service state. This ensures that the SoLSA MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

20.24.3.5.2 Conformance requirement

While performing cell reselection, the SoLSA MS shall be able to calculate correctly the signal strength threshold criterion parameter consisting of $C2 + LSA\_OFFSET$ to determine which LSA cell shall be selected among those having the same LSA priority; 3GPP TS 05.08, subclause 6.6.3.

20.24.3.5.3 Test Purpose

To verify that the SoLSA MS shall be able to reselect the cell with the highest value of $C2 + LSA\_OFFSET$ among those cells that have highest LSA priority and fulfil the criteria $C4 \geq 0$.

20.24.3.5.4 Method of test

20.24.3.5.4.1 Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBµV emf() / dBm)	63 / -50	43 / -70	33 / -80	OFF
CBA	0	0	0	
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
C1	40	20	10	
C2	40	20	10	
C4	40	20	10	
LSA_OFFSET (level / dB)	0 / 0	1 / 4	4 / 24	
LSA ID	30.000	66.001	66.001	
LAC	5	5	5	
CI	5000	5001	5002	

NOTE: The level of LSA_OFFSET is evaluated according to 3GPP TS 05.08, clause 9 and table 1.

c) Further initial conditions (Carrier 1-3 are normal LSA cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA5	LSA1	LSA1	
Escape PLMN	No	No	No	

d) Further initial conditions (Carrier 1-3 are LSA exclusive access cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	LSA5	LSA1	LSA1	
Escape PLMN	Yes	Yes	Yes	

Run the following test procedure twice by using two different sets of initial conditions:

- using initial conditions a), b) and c);

- using initial conditions a), b) and d).

20.24.3.5.4.2 Test Procedure

a) The SS activates carriers 1, 2 and 3 and monitors these carriers for RA requests from the SoLSA MS.

b) The SoLSA MS is switched on.

c) Carrier 1 is barred (CBA = 1).

d) Carrier 3 is barred (CBA = 1).

20.24.3.5.4.3 void

20.24.3.5.4.4 Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 after 50 s. (highest value of C1). There shall be no response from the SoLSA MS on other carriers within 35s after the first response sent on carrier 1.

NOTE: Any potential access is likely to occur within 25 s.

2) After step c), the SoLSA MS shall respond on carrier 3 within 55 s after carrier 1 becomes barred. (same priority as for LSA on carrier 2 but highest value of C2+LSA_OFFSET).

3) After step d), the SoLSA MS shall respond on carrier 2 within 55 s after carrier 3 becomes barred.

20.24.3.6 SoLSA Cell Reselection / idle mode support enabled / LSA Priority / cell combinations

20.24.3.6.1 Definition

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20.24.3.6.2 Conformance requirement

1. While camped on a cell of the selected PLMN ("camped normally"), the SoLSA MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

   - The cell camped on (current serving cell) has become barred.

   - There is a better cell (in terms of the path loss criterion C2) in the same LA.

   - The MS will then reselect a new cell in order to fulfil the process goal.

     3GPP TS 03.22, subclause 4.5.

2. The SoLSA MS shall reselect the correct cell when subscription for normal LSA cells and LSA exclusive access cells varies; GSM 03.73, subclauses 4.3.1 and 4.3.3.

The setting of the LSA only bit on the SIM shall not influence the behaviour of the cell reselection: for subscribers with LSA only access call unrelated service requests are accepted even outside of the allowed LSAs. 3GPP TS 03.73, subclause 4.5.4.

3. When MS is out of the allowed LSA it shall be registered in PLMN but indicate subscriber/service specific "out of LSA area" notification. It shall be a network controlled function to prevent terminated or/and originated calls. Emergency calls are however always allowed. 3GPP TS 02.11, subclause 5.3.

20.24.3.6.3   Test purpose

To verify that the SoLSA MS shall reselect the correct cell when subscription for normal LSA cells and LSA exclusive access cells varies. The setting of LSA only bit on the SIM shall not influence the behaviour of the cell reselection.

20.24.3.6.4   Method of tests

20.24.3.6.4.1   Initial conditions

a) Parameters changed from the default values in table 20.24.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	53/ -60	43/ -70	63 / -50	OFF
CBA	0	0	0	
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
C1	30	20	40	
C2	30	20	40	
C4	30	20	<0	

b) Further parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
LSA ID	9.000.000	30.000	250	
LAC	5	5	5	
CI	5000	5001	5002	
Matching LSA on SIM	LSA3	LSA5	-	
Escape PLMN	Yes	No	No	

c) Further parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
LSA ID	250	9.000.000	250	
LAC	5	5	5	
CI	5000	5001	5002	
Matching LSA on SIM	-	LSA3	-	
Escape PLMN	No	Yes	No	

d) Further parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
LSA ID	250	30.000	250	
LAC	5	5	5	
CI	5000	5001	5002	
Matching LSA on SIM	-	LSA5	-	
Escape PLMN	No	No	Yes	

e) Further parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
LSA ID	250	250	250	
LAC	5	5	5	
CI	5000	5001	5002	
Matching LSA on SIM	-	-	-	
Escape PLMN	Yes	No	No	

f) Identification of the LSA by means of LSA ID (see subclause 20.24. General remark 2).

Run the following test procedures twice using two different sets of initial conditions:

- with an LSA only SIM;

- with a normal LSA SIM.

20.24.3.6.4.2.1   Test Procedure

Using conditions from table a), b) and f).

a) The SS activates the carriers 1, 2, 3 and monitors these carriers for RA requests from the SoLSA MS.

b) The SoLSA MS is switched on.

c) The SS is reconfigured and carrier 3 becomes barred (CBA = 1).

d) The SS is reconfigured and carrier 2 becomes barred (CBA = 1) and carrier 3 becomes not barred (CBA = 0).

20.24.3.6.4.2.2   void

20.24.3.6.4.2.3   Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 3 within 50 s. There shall be no response from the SoLSA MS on any other carrier within 35 s after the first response on carrier 3.

NOTE 1: Any potential access is likely to occur within 35 s.

2) After step c), there shall be response from the SoLSA MS on carrier 2 within 60 s after activating of carriers 2 and 3. (Highest LSA Priority on the SIM (15) for C4 ≥ 0 in the present subscription).

NOTE 2: 5,5 s to notice new strongest carriers on top 6 (because the updating time for the 6 strongest is 5 s (±10%)), 33 s to read BCCH, 15 s for reselection, 5 s for search of a matching LSA on SIM. Allow 60 s.

3) After step d), there shall be response from SoLSA MS on carrier 1 within 55 s after carrier 2 has become barred (highest priority (8) with C4 ≥ 0).

20.24.3.6.4.3.1   Test Procedure

Using conditions from table a), c) and f).

a) The SS activates carrier 1 and monitors that carrier for RA requests from the SoLSA MS. Carrier 2 and 3 are switched off.

b) The SoLSA MS is switched on.

c) The SS activates the carriers 2 and 3 (carrier 1 is still switched on) and monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

d) The SS is reconfigured and the carrier 2 becomes barred (CBA = 1).

20.24.3.6.4.3.2   void

20.24.3.6.4.3.3   Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s.

2) After step c), there shall be response from the SoLSA MS on carrier 2 after 60 s (highest LSA Priority on the SIM (8) with C4 ≥ 0).

3) After step d), there shall be response from SoLSA MS on carrier 3 within 55 s after carrier 2 becomes barred (no subscription, Highest C2).

20.24.3.6.4.4.1   Test Procedure

Using conditions from table a), d) and f).

a) The SS activates the carrier 1 and monitors that carrier for RA requests from the SoLSA MS. Carrier 2 and 3 are switched off.

b) The SoLSA MS is switched on.

c) The SS activates the carriers 2 and 3 (carrier 1 is still switched on) and monitors carriers 1, 2 and 3 for RA requests from the SoLSA MS.

d) The SS is reconfigured and carrier 2 becomes barred (CBA = 1).

20.24.3.6.4.4.2   void

20.24.3.6.4.4.3   Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s.

2) After step c), there shall be response from the SoLSA MS on carrier 2 after 60 s after carrier 2 and 3 were switched on (LSA with highest Priority (15)).

3) After step d), there shall be response from SoLSA MS on carrier 1 within 55 s after carrier 2 has become barred (Carrier 3 is an LSA exclusive access cell with no matching subscription).

20.24.3.6.4.5.1   Test Procedure

Using conditions from table a),e) and f).

a) The SS activates carriers 1 and 3 and monitors these for RA requests from the SoLSA MS.

b) The SoLSA MS is switched on.

c) The SS activates carrier 2 and carrier 3 becomes barred. (CBA = 1).

d) The SS is reconfigured and carrier 2 becomes barred. (CBA = 1).

20.24.3.6.4.5.2   void

20.24.3.6.4.5.3   Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 3 within 50 s (Carrier 1 is an LSA exclusive access cell with no matching subscription).

2) After step c), there shall be response from the SoLSA MS on carrier 2 within 55 s.

3) After step d), there shall be no paging response from SoLSA MS on any carrier (Carrier 2 and 3 are barred, carrier 1 is an exclusive access cell, the SoLSA MS is in the limited state) within 65 s.

NOTE: Any potential access is likely to occur quicker.

20.24.3.7 SoLSA Cell Reselection / roaming

20.24.3.7.1   Definition

While camped on a cell of the selected PLMN the SoLSA MS may need to select a different cell in order to fulfil the normal service state. This ensures that the SoLSA MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

Idle mode support for SoLSA on the SIM card is enabled (see General Remark 1. in subclause 20.24).

20.24.3.7.2   Conformance requirement

1. While camped on a cell of the selected PLMN ("camped normally"), the SoLSA MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

   - There is a better cell (in terms of the path loss criterion C2) in the same LA.

   - The SoLSA MS will then reselect a new cell in order to fulfil the process goal.

3GPP TS 03.22, subclause 4.5.

2. A SoLSA MS with SIM indicating LSA subscription shall always try to reselect the cell with highest LSA priority according to the information stored on the SIM. 3GPP TS 03.73, subclause 11.4.2.

20.24.3.7.3 Test Purpose

To verify that the SoLSA MS when idle mode support for SoLSA on the SIM card is enabled shall favour camping on those LSA cells with the highest LSA priority the SoLSA MS is subscribed to even if subscriber is outside of his HPLMN.

20.24.3.7.4 Method of test

20.24.3.7.4.1 Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24 General remark 2.).

b) Parameters changed from the default values in table 20.24.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/-70	53/-60	33/-80	63/-50
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90
MCC, MNC	VPLMN	VPLMN	VPLMN	VPLMN
C1	20	30	10	40
C2	20	30	10	40
C4	20	<0	10	40
LSA ID	9.000.000	-	9.000.001	54
LAC	5	5	5	5
CI	5000	5001	5002	5003

c) Further initial conditions (Carrier 1-3 are normal LSA cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	-	-	LSA8	LSA9
Escape PLMN	No	No	No	No

d) Further initial conditions (Carrier 1-3 are LSA exclusive access cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Matching LSA on SIM	-	-	LSA8	LSA9
Escape PLMN	Yes	Yes	Yes	Yes

Run the following test procedure twice by using two different sets of initial conditions:

- using initial conditions a), b) and c);

- using initial conditions a), b) and d).

20.24.3.7.4.2 Test Procedure

a) The SS activates carrier 1 and carrier 2, pages the MS on these carriers and monitors these for RA requests from the SoLSA MS. Carriers 3 and 4 are switched off.

b) The SoLSA MS is switched on.

c) After approx. 60 s the SS is reconfigured and level of carrier 2 decreases to 33 dBμV/-80dBm (C2 decreases to 10). The SS monitors carriers 1 and 2 for RA requests from the SoLSA MS.

d) The SS activates carriers 3 and 4. The SS pages the MS on carriers 3 and 4, and monitors these carriers for RA requests from the SoLSA MS.

e) The SS is reconfigured and carrier 3 becomes barred (CBA = 1). The SS pages the MS on carrier 4, and monitors this carrier for RA requests from the SoLSA MS.

20.24.3.7.4.3   void

20.24.3.7.4.4   Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 2 within 50 s.

2) After step c), there shall be response from the SoLSA MS on carrier 1 within 25 s after decreasing the level of carrier 2 (highest C2).

3) After step d), there shall be response from the SoLSA MS on carrier 3 within 55 s (highest priority on the SIM card for matching LSA subscription).

4) After step e), there shall be response from the SoLSA MS on carrier 4 within 55 s.

20.24.4   SoLSA Cell Reselection / idle mode support / any value

General Remark

Definition of "idle mode support" is given in subclause 20.24 General Remark 1.

"Idle mode support" is only controlling if 'favouring' shall be done at cell reselection. It does not disable the LSA subscription.

20.24.4.1   Definition

While camped on a cell of the selected PLMN a SoLSA MS may need to select a different cell in order to fulfil the normal service state. This ensures that the SoLSA MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink.

20.24.4.2   Conformance requirement

1. While camped on a cell of the selected PLMN ("camped normally"), the SoLSA MS may need to select a different cell ("normal cell reselection" state). The following events trigger a cell reselection:

   - The cell camped on (current serving cell) has become barred.

   - There is a better cell (in terms of the path loss criterion C2) in the same LA, or a much better cell in another LA of the selected PLMN (using the CRH parameter).

   - The SoLSA MS will then reselect a new cell in order to fulfil the process goal.

   3GPP TS 03.22, subclause 4.5.

20.24.4.3   Test purpose

To verify that the SoLSA MS shall not favour camping on the LSA for which support in idle mode is disabled.

20.24.4.4   Method of test

20.24.4.5   Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1.

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	63/ -50	53/-60	58/-55	31 / -82
CBA	0	0	0	0
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	-90
CRH (dB)	10			
C1	40	30	35	8
C2	40	30	35	8
C4	40	30	35	8
LSA ID	66.000	66.000	9.000.001	5
LAC	5	5	3	3
CI	5000	5001	5002	5003

c) Further initial conditions (Carrier 1-4 are normal LSA cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Idle mode support enabled	No	No	No	Yes
Matching LSA on SIM	LSA2	LSA2	LSA4	LSA6
Escape PLMN	No	No	No	No

d) Further initial conditions (Carrier 1-4 are LSA exclusive access cells).

Parameter	Carrier 1	Carrier 2	Carrier 3	Carrier 4
Idle mode support enabled	No	No	No	Yes
Matching LSA on SIM	LSA2	LSA2	LSA4	LSA6
Escape PLMN	Yes	Yes	Yes	Yes

Run the following test procedure twice by using two different sets of initial conditions:

- using initial conditions a), b) and c);

- using initial conditions a), b) and d).

20.24.4.6 Test Procedure

a) The SS activates carriers 1, 2 and 3 and monitors these carriers for RA requests from the SoLSA MS. Carrier 4 is switched off.

b) The SoLSA MS is switched on.

c) The SS is reconfigured and the level of carrier 1 is decreased to 33 dBµV emf() / -80 dBm (C2 of carrier 1 becomes 10).

d) The SS is reconfigured and the level of carrier 3 is increased to 63 dBµV emf() / -50 dBm (C2 of carrier 3 becomes 40).

e) Carrier 1 is switched off. Carrier 4 is switched on. The SS monitors carriers 2, 3 and 4.

20.24.4.7 void

20.24.4.8 Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s. There shall be no response from the SoLSA MS on any other carrier within 35 s after the first response on carrier 1.

NOTE 1: Any potential access is likely to occur within 25 s.

2) After step c), there shall be response from the SoLSA MS on carrier 2 within 25 s after carrier 1 has been reconfigured (Highest C2/C2-CRH).

3) After step d), there shall be response on carrier 3 within 25 s after carrier 3 has been reconfigured (Highest C2/C2-CRH).

4) After step e), there shall be response on carrier 4 within 60 s after the system has been reconfigured (idle mode support enabled for carrier 4).

NOTE 2: 5,5 s to notice new strongest carriers on top 6 (because the updating time for the 6 strongest is 5 s (±10%)), 33 s to read BCCH, 15 s for reselection, 5 s for search of a matching LSA on SIM. Allow 60 s.

20.24.5 SoLSA Cell Reselection / LSA indication for idle mode

General Remark

Definition of "LSA indication for idle mode" is given in subclause 20.24 General Remark 1.

"LSA indication for idle mode" is only controlling if indication of the LSA name shall be done. It has no influence on the LSA subscription.

20.24.5.1   General Definition

The SoLSA MS in idle mode may inform the user whether or not the serving cell belongs to the subscribed LSA.

- The indication is dependent on the setting of the idle mode indication bit on the SIM card for that LSA.

- The indication is independent from the setting of the LSA idle mode support bit on the SIM card for that LSA (see subclause 20.24 General Remark 1).

20.24.5.2   General conformance requirement

1. The service subscriber can define a name (alphanumeric name, icon, etc) for each of her allowed LSAs. The MS will, in idle mode and if required by the user, indicate to the user the current LSA. The indication may be the name of the current LSA, as set by the user. The form of display and indication are left to manufacturer's choice. 3GPP TS 03.73, subclause 4.3.2.

2. In addition to indicate the registered PLMN, an MS with subscription for an LSA in the registered PLMN shall indicate this LSA when it is available. The indication towards the user is optional and may be done by displaying the stored LSA name that corresponds to the ID of the current LSA. An MS with LSA only access subscription may also give an indication towards the user, when the no subscribed LSAs are available to the user. The indication is optional and may be done by displaying the LSA only access text stored in the SIM. 3GPP TS 03.73, subclause 11.8.1.

20.24.5.3   SoLSA Cell Reselection / LSA indication for idle mode / idle mode support enabled

20.24.5.3.1   Definition

See general Definition of this subclause.

20.24.5.3.2   Conformance requirement

1. When both idle mode support and idle mode indication are enabled on the SIM card, the SoLSA MS shall display the name (which was defined by the service subscriber) of the current LSA to the user.

2. When idle mode support is enabled and idle mode indication is disabled on the SIM card, it is expected that the SoLSA MS does not display the LSA name (which was defined by the service subscriber) of the current LSA to the user.

    3GPP TS 03.73, subclause 4.3.2; 3GPP TS 03.73, subclause 11.8.1; 3GPP TS 11.11, subclause 10.4.1.2.

20.24.5.3.3   Test Purpose

1. To verify that if idle mode indication bit on the SIM card is enabled for the LSA, the SoLSA MS supports the LSA indication. The LSA name (text/icon) shall be displayed on the SoLSA MS.

2. To verify that if idle mode indication bit on the SIM card is disabled for the LSA the SoLSA MS does not support the LSA indication.

20.24.5.3.4   Method of test

20.24.5.3.4.1   Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBμV emf() / dBm)	43/-70	53/-60	33/-80	OFF
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
C1	20	30	10	
C2	20	30	10	
LSA ID	-	66.001	9.000.000	
LAC	5	5	5	
CI	5000	5001	5002	
Matching LSA on SIM	-	LSA1	LSA3	
Escape PLMN	No	No	No	

20.24.5.3.4.2   Test Procedure

a) The SS activates carrier 1, pages the MS on this carrier and monitors it for RA requests from the SoLSA MS. Carrier 2 and 3 are switched off.

b) The SoLSA MS is switched on.

c) Carrier 2 and Carrier 3 are switched on. The SS pages the MS on carriers 1, 2 and 3, and monitors these carriers for RA requests from the SoLSA MS.

d) The SS is reconfigured and carrier 3 becomes barred (CBA = 1). The SS pages the MS on carriers 1, 2 and 3, and monitors these carriers for RA requests from the SoLSA MS.

e) The SS is reconfigured and sets CBA = 0 on carrier 3. The SS pages the MS on carriers 1, 2 and 3 and monitors these carriers for RA requests from the SoLSA MS.

20.24.5.3.4.3a   Specific PICS statements

-20.24.5.3.4.3b   PIXIT statements

- Interface to the human user (p1=Y/N).

- Way to indicate the identity of the current LSA to the human user (only applicable if the SoLSA MS has an interface to the human user).

- Way to indicate the change of the current LSA to the human user (only applicable if the SoLSA MS has an interface to the human user).

20.24.5.3.4.4   Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s. There shall be no LSA indication on the SoLSA MS (No LSA).

2) After step c), there shall be response from the SoLSA MS on carrier 3 within 25 s (highest LSA Priority (8) on the SIM card). An LSA indication is expected on the SoLSA MS.

3) After step d), there shall be response from the SoLSA MS on carrier 2 within 55 s. There shall be no indication on the SoLSA MS (highest LSA Priority on the SIM card, no indication on the SIM card).

4) After step e), there shall be response from the SoLSA MS on carrier 3 within 55 s (LSA carrier on the SIM card). An LSA indication is expected on the SoLSA MS (idle mode indication for that LSA is enabled).

20.24.5.4   SoLSA Cell Reselection / LSA indication for idle mode / idle mode support disabled

20.24.5.4.1 Definition

See general Definition of this subclause.

20.24.5.4.2 Conformance requirement

1. When idle mode support is disabled and idle mode indication is enabled on the SIM card, it is expected that the SoLSA MS displays the LSA name (which was defined by the service subscriber) of the current LSA to the user.

2. When idle mode support is disabled and idle mode indication is disabled on the SIM card, the SoLSA MS shall not display the LSA name (which was defined by the service subscriber) of the current LSA to the user.

   3GPP TS 03.73, subclause 4.3.2; 3GPP TS 03.73, subclause 11.8.1; 3GPP TS 11.11, 1subclause 0.4.1.2.

20.24.5.4.3 Test Purpose

To verify that when idle mode support is disabled, the SoLSA MS shall display the LSA name in dependence from the idle mode indication bit.

20.24.5.4.4 Method of test

20.24.5.4.4.1 Initial conditions

a) Identification of the LSA by means of LSA ID (see subclause 20.24. General remark 2).

b) Parameters changed from the default values in table 20.24.1; further initial conditions.

Parameter/condition	Carrier 1	Carrier 2	Carrier 3	Carrier 4
RF Signal Level (dBµV emf() / dBm)	43/-70	53/-60	33/-80	OFF
CBA	0	0	0	
RXLEV_ACCESS_MIN (dBm)	-90	-90	-90	
C1	20	30	10	
C2	20	30	10	
LSA ID	250	66.000	9.000.001	
LAC	5	5	5	
CI	5000	5001	5002	
Matching LSA on SIM	-	LSA2	LSA4	
Escape PLMN	No	No	No	

20.24.5.4.4.2 Test Procedure

a) The SS activates carrier 1, pages this carrier and monitors it for RA requests from the SoLSA MS. Carriers 2 and 3 are switched off.

b) The SoLSA MS is switched on.

c) Carrier 2 and carrier 3 are switched on. The SS pages the MS on carriers 1, 2 and 3, and monitors these carriers for RA requests from the SoLSA MS.

d) The SS is reconfigured and the level of carrier 3 increases to 63 dBµVemf / -50dBm (C2 increases to 40 dB).

e) The SS is reconfigured and the level of carrier 3 decreases to 33 dBµVemf0,1,0 / - 80dBm (C2 decreases to 10 dB).

20.24.5.4.4.3a Specific PICS statements

-

20.24.5.4.4.3b PIXIT statements

- Interface to the human user (p1=Y/N).

- Way to indicate the identity of the current LSA to the human user (only applicable if the SoLSA MS has an interface to the human user).

- Way to indicate the change of the current LSA to the human user (only applicable if the SoLSA MS has an interface to the human user).

20.24.5.4.4.4 Test Requirements

1) After step b), the first response from the SoLSA MS shall be received on carrier 1 within 50 s. There shall be no LSA indication on the SoLSA MS.

2) After step c), there shall be response from the SoLSA MS on carrier 2 within 25 s (highest C2). An LSA indication is expected on the SoLSA MS.

3) After step d), there shall be response from the SoLSA MS on carrier 3 within 25 s (highest C2). There shall be no LSA indication on the SoLSA MS.

4) After step e), there shall be response from the SoLSA MS on carrier 2 within 25 s (highest C2). An LSA indication is expected on the SoLSA MS.

20.25 Intersystem Cell Reselection

The default parameters for the GSM/GPRS cell, the accuracy of the MS signal measurements and tolerance of timers, are given in TS 51.010 section 20.22.

The default parameters and toleranseces of the UTRAN cells are specified in TS 34.108.

20.25.1 Definition of system information messages

SYSTEM INFORMATION TYPE 3 REST OCTETS

- SI2q indicated on BCCH Norm

SYSTEM INFORMATION TYPE 2QUATER

Information Element	Value/remark
< RR management Protocol Discriminator bit (4) >	'0110'B
< Skip Indicator : bit (4) >	'0000'B
< Message type : bit (8) >	'0000 0111'B
< SI2 quarter Rest Octets >	
< BA_IND : bit >	0
< 3G_BA_IND : bit >	0
< MP_CHANGE_MARK : bit >	0
< SI2quater _INDEX : bit (4) >	'0000'B
< SI2quater_COUNT : bit (4) >	'0000'B
0 | 1 < Measurement_Parameters Description >	0
0 | 1 < GPRS_Real Time Difference Description >	0
0 | 1 < GPSR_BSIC Description >	0
0 | 1 < GPRS_REPORT PRIORITY Description >	0
0 | 1 < GPRS_Measurement_Parameters Description >	0
0 | 1 < NC Measurement Parameters >	0
0 | 1 < extension length >	0
0 | 1 < 3G Neighbour Cell Description >	1
0 | 1 < Index_Start_3G : bit (7) >	0
0 | 1 < Absolute_Index_Start_EMR : bit (7) >	0
0 | 1 < UTRAN FDD Description >	1
0 | 1 < Bandwidth_FDD : bit (3) >	0
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	1
0 < FDD-ARFCN : bit (14) >	0 See TS 34.108, clause 6.1.5, table 6.1.1
< FDD_Indic0 : bit >	0
< NR_OF_FDD_CELLS : bit (5) >	'00001'B
< FDD_CELL_INFORMATION Field >	10 bits Scrambling code according to TS 34.108, clause 6.1.4, Default settings for cell No.1
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	0
0 | 1 < UTRAN TDD Description >	0
0 | 1 < 3G MEASUREMENT Parameters Description >	1
< Qsearch_I : bit (4) >	'0111'B (Always)
< Qsearch_C_Initial : bit (1) >	0
0 | 1 < FDD_Qoffset : bit (4) >	1 '0000'B (Always select a cell if acceptable)
< FDD_REP_QUANT : bit (1) >	0
< FDD_MULTIRAT_REPORTING : bit (2) >	'01'B
< FDD_Qmin : bit (3) >	'111'B (-12 dB)
0 | 1 < TDD_Qoffset : bit (4) >	0
0 | 1 < GPRS_3G_MEASUREMENT Parameters Description >	1
< Qsearch_P : bit (4) >	'0111'B (Always)
< 3G_SEARCH_PRIO : bit >	0
0 | 1 < FDD_REP_QUANT : bit >	0
0 | 1 < FDD_REPORTING_OFFSET : bit (3) >	0
0 | 1 < TDD_MULTIRAT_REPORTING : bit (2) >	0
0 | 1 < TDD_REPORTING_OFFSET : bit (3) >	0

SYSTEM INFORMATION TYPE 2QUATER Instance 1

Information Element	Value/remark
< RR management Protocol Discriminator bit (4) >	'0110'B
< Skip Indicator : bit (4) >	'0000'B
< Message type : bit (8) >	'0000 0111'B
< SI2 quarter Rest Octets >	
< BA_IND : bit >	0
< 3G_BA_IND : bit >	0
< MP_CHANGE_MARK : bit >	0
< SI2quater _INDEX : bit (4) >	'0000'B
< SI2quater_COUNT : bit (4) >	'0001'B
0 | 1 < Measurement_Parameters Description >	0
0 | 1 < GPRS_Real Time Difference Description >	0
0 | 1 < GPSR_BSIC Description >	0
0 | 1 < GPRS_REPORT PRIORITY Description >	0
0 | 1 < GPRS_Measurement_Parameters Description >	0
0 | 1 < NC Measurement Parameters >	0
0 | 1 < extension length >	0
0 | 1 < 3G Neighbour Cell Description >	1
0 | 1 < Index_Start_3G : bit (7) >	0
0 | 1 < Absolute_Index_Start_EMR : bit (7) >	0
0 | 1 < UTRAN FDD Description >	1
0 | 1 < Bandwidth_FDD : bit (3) >	0
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	1
0 < FDD-ARFCN : bit (14) >	0 See TS 34.108, clause 6.1.5, table 6.1.1
< FDD_Indic0 : bit >	0
< NR_OF_FDD_CELLS : bit (5) >	'00001'B
< FDD_CELL_INFORMATION Field >	10 bits Scrambling code according to TS 34.108, clause 6.1.4, Default settings for cell No.1
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	0
0 | 1 < UTRAN TDD Description >	0
0 | 1 < 3G MEASUREMENT Parameters Description >	1
< Qsearch_I : bit (4) >	'0111'B (Always)
< Qsearch_C_Initial : bit (1) >	0
0 | 1 < FDD_Qoffset : bit (4) >	1 '0000'B (Always select a cell if acceptable)
< FDD_REP_QUANT : bit (1) >	0
< FDD_MULTIRAT_REPORTING : bit (2) >	'01'B
< FDD_Qmin : bit (3) >	'111'B (-12 dB)
0 | 1 < TDD_Qoffset : bit (4) >	0
0 | 1 < GPRS_3G_MEASUREMENT Parameters Description >	1
< Qsearch_P : bit (4) >	'0111'B (Always)
< 3G_SEARCH_PRIO : bit >	0
0 | 1 < FDD_REP_QUANT : bit >	0
0 | 1 < FDD_REPORTING_OFFSET : bit (3) >	0
0 | 1 < TDD_MULTIRAT_REPORTING : bit (2) >	0
0 | 1 < TDD_REPORTING_OFFSET : bit (3) >	0
0 | 1 < 3G Additional Measurement Parameters Description >	1
0 | 1 < FDD_REPORTING_OFFSET : bit (3) >	'000'B (0 dB)
0 | 1 < FDD_RSCPmin : bit (4) >	'0000'B (-114 dBm)
0 | 1 <Additions in Rel-6	0
0 | 1 <Additions in Rel-7	0
0 | 1 <Additions in Rel-8	1
0 | 1 <Additions in Rel-8	1
0 | 1 < Priority and E-UTRAN Parameters Description >	1
0 | 1 < Serving Cell Priority Parameters Description >	1
< GERAN_PRIORITY : bit(3) >	'011'
< THRESH_Priority_Search : bit(4) >	'1111' (Always)
< THRESH_GSM_low : bit(4) >	'1110' (28dB)
< H_PRIO : bit(2) >	'00' (rule disabled)
< T_Reselection : bit(2) >;	'00' (5 sec)
0 | 1 < 3G Priority Parameters Description >	1
< UTRAN_Start : bit >	1
< UTRAN_Stop : bit >	0
1 < DEFAULT_UTRAN_PRIORITY : bit(3)	5
DEFAULT_THRESH_UTRAN: bit(5)	'01010'B (20dB)

Information Element	Value/remark
DEFAULT_UTRAN_QRXLEVMIN: bit(5) >	'00000'B (-119 dBm)
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	0
0	1 < E-UTRAN Parameters Description >	0
0	1 < 3G CSG Description >	0
0	1 < E-UTRAN CSG Description >	0

SYSTEM INFORMATION TYPE 2QUATER Instance 2

Information Element	Value/remark
< RR management Protocol Discriminator bit (4) >	'0110'B
< Skip Indicator : bit (4) >	'0000'B
< Message type : bit (8) >	'0000 0111'B
< SI2 quarter Rest Octets >	
< BA_IND : bit >	0
< 3G_BA_IND : bit >	0
< MP_CHANGE_MARK : bit >	0
< SI2quater _INDEX : bit (4) >	'0001'B
< SI2quater_COUNT : bit (4) >	'0001'B
0	1 < Measurement_Parameters Description >	0
0	1 < GPRS_Real Time Difference Description >	0
0	1 < GPSR_BSIC Description >	0
0	1 < GPRS_REPORT PRIORITY Description >	0
0	1 < GPRS_Measurement_Parameters Description >	0
0	1 < NC Measurement Parameters >	0
0	1 < extension length >	0
0	1 < 3G Neighbour Cell Description >	0
0	1 < 3G MEASUREMENT Parameters Description >	0
0	1 < GPRS_3G_MEASUREMENT Parameters Description >	0
0	1 <Additions in Rel-5	0
0	1 <Additions in Rel-6	0
0	1 <Additions in Rel-7	0
0	1 <Additions in Rel-8	1
0	1 < Priority and E-UTRAN Parameters Description >	1
0	1 < Serving Cell Priority Parameters Description >	0
0	1 < 3G Priority Parameters Description >	1
< UTRAN_Start : bit >	0
< UTRAN_Stop : bit >	1
{ 0	1 < DEFAULT_UTRAN_PRIORITY : bit(3) >	0
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	1
1 < UTRAN_FREQUENCY_INDEX > ** 0	1
< UTRAN_FREQUENCY_INDEX : bit (5) >	'0000'B
1 < UTRAN_FREQUENCY_INDEX > ** 0	0
0	1 < UTRAN_PRIORITY : bit(3) >	'101'B
< THRESH_UTRAN_high : bit(5) >	'01111'B (30dB)
0	1 < THRESH_UTRAN_low : bit(5) >	0 (Default value)
0	1 < UTRAN_QRXLEVMIN : bit(5) >	'00010'B (-115 dBm)
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	0
0	1 < E-UTRAN Parameters Description >	0
0	1 < 3G CSG Description >	0
0	1 < E-UTRAN CSG Description >	0

20.25.2 Intersystem Cell Reselection/Idle Mode/FDD_Qmin

20.25.2.1 Conformance requirement

If the 3G Cell Reselection list includes UTRAN frequencies, the MS shall, at least every 5 s update the value RLA_C for the serving cell and each of the at least 6 strongest non-serving GSM cells.

The MS shall then reselect a suitable (see TS 25.304) UTRAN cell if its measured RSCP value exceeds the value of RLA_C for the serving cell and all of the suitable (see 3GPP TS 03.22) non-serving GSM cells by the value XXX_Qoffset for a period of 5 seconds and, for FDD, the UTRAN cells measured Ec/No value is equal or greater than the value FDD_Qmin. In case of a cell reselection occurring within the previous 15 seconds, XXX_Qoffset is increased by 5 dB.

Table 1: Radio sub-system link control parameters

Parameter name	Description	Range	Bits	Channel
FDD_Qmin	A minimum threshold for Ec/No for UTRAN FDD cell re-selection, 0= -20dB, 1= -6dB, 2= -18dB, 3= -8dB, 4= -16dB, 5= -10dB, 6= -14dB, 7= -12dB. Default value= -12dB.	0-7	3	BCCH D/L

References:

3GPP TS 05.08, subclause 6.6.5 and 9

20.25.2.2 Test purpose

To verify that the MS uses the FDD_Qmin parameter at cell re-selection from GSM to UTRAN while in GSM Idle Mode.

20.25.2.3 Method of test

Initial conditions

Parameter	Cell 1 Carrier1	Cell 2 Carrier2
Channel Type carried	BCCH	BCH
Signal Level (dBm)	-50	Off to -48
Ec/No (dB)	-	-6>dB>-16

NOTE 1: MS is IMSI updated on Cell 1.

NOTE 2: Carrier 1 is the BCCH carrier, GPRS not present.

NOTE 3: Carrier 2 is the UTRAN FDD cell configured according to TS 34.108, clause 6.1.4, Default settings for cell No.1

NOTE 4: Serving Cell Parameters are coded and transmitted on the specified Channel Type

NOTE 5: Carriers should have a relative accuracy of ±2 dB.

NOTE 6: When executing the test in FDD band II or FDD band VIII carrier 2 shall use the high range UARFCN, defined in TS 3GPP 34.108 clause 5.1.1. This is to avoid the FDD band overlapping with the GSM band under test.

SYSTEM INFORMATION TYPE 3 REST OCTETS

- GPRS **not** indicated

SYSTEM INFORMATION TYPE 4 REST OCTETS

- GPRS **not** indicated

SYSTEM INFORMATION TYPE 2QUATER

Information Element	Value/remark
< MP_CHANGE_MARK : bit (1)>	0
< FDD_Qmin : bit (3) >	'001'B (-6 dB)

Test procedure

The MS is camping on the GSM cell and has received a 3G Neighbour Cell list is in the 3G_NEIGHBOUR CELL description in System Information Type 2quater. The FDD_Qmin in the 3G_MEASUREMENT_PARAMETERS description is set to –6 dB.

It is verified for 30 sec that no Cell Reselection to the UTRAN cell is performed.

System Information 2quater is updated with FDD_Qmin in the 3G_MEASUREMENT_PARAMETERS description set to -16 dB.

It is verified that a Cell Reselection to UTRAN is performed within 45 secs when UE receives and acts on revised SI2quater and the UTRAN cell Ec/No gets greater than FDD_Qmin. (45 secs = 30 secs period of SI reading + 5 secs for UE to receive and decode SI2quater + 2*5sec, where 5 sec is the maximum time between 2 consecutive UTRAN measurements.)

Maximum duration of the test

2 minutes

Expected sequence

Step	Direction	Message	Comments
1	SS		Carrier 2 is activated with -6>Ec/No>-16 (dB)
2	SS <->MS		Verify that no cell reselection is performed to Carrier 2 for 30 sec.
3	SS	SYSTEM INFORMATION TYPE 2QUATER	See specific contents below.
4	MS -> SS	RRC CONNECTION REQUEST	Verify that the MS reselects to Carrier 2 within 45 secs from Step 3. Establishment cause shall be "interRAT-CellReselection"

Specific message contents

SYSTEM INFORMATION TYPE 2QUATER in Step 3

Information Element	Value/remark
< MP_CHANGE_MARK : bit (1)>	1
< FDD_Qmin : bit (3) >	'100'B (-16 dB)

20.25.3   Intersystem Cell Reselection/Idle Mode/FDD_Qoffset

20.25.3.1   Conformance requirement

If the 3G Cell Reselection list includes UTRAN frequencies, the MS shall, at least every 5 s update the value RLA_C for the serving cell and each of the at least 6 strongest non-serving GSM cells.

The MS shall then reselect a suitable (see TS 25.304) UTRAN cell if its measured RSCP value exceeds the value of RLA_C for the serving cell and all of the suitable (see 3GPP TS 03.22) non-serving GSM cells by the value XXX_Qoffset for a period of 5 seconds and, for FDD, the UTRAN cells measured Ec/No value is equal or greater than the value FDD_Qmin. In case of a cell reselection occurring within the previous 15 seconds, XXX_Qoffset is increased by 5 dB.

Table 1: Radio sub-system link control parameters

Parameter name	Description	Range	Bits	Channel
FDD_Qoffset	Applies an offset to RLA_C for cell re-selection to access technology/mode FDD 0 = - ∞ (always select a cell if acceptable), 1 = -28 dB, 2 = -24 dB, … , 15 = 28 dB. Default value = 0 dB.	0-15	4	BCCH D/L

Power Spectral Density: The units of Power Spectral Density (PSD) are extensively used in this document. PSD is a function of power versus frequency and when integrated across a given bandwidth, the function represents the mean power in such a bandwidth.

References:

3GPP TS 05.08, subclause 6.6.5 and 9; TS 25.101 subclause 3.1.

20.25.3.2 Test purpose

To verify that the MS uses the FDD_Qoffset parameter at cell re-selection from GSM/GPRS to UTRAN while in Idle Mode.

20.25.3.3 Method of test

Initial conditions

Parameter	Unit	Cell 1 (GSM)
Test Channel		1
RF Signal Level	dBm	-75
RXLEV_ACCESS_MIN	dBm	-100
FDD_Qoffset	dB	20

Parameter	Unit	Cell 2 (UTRAN)
Test Channel		1
CPICH_Ec (FDD)	dBm / 3.84 MHz	OFF to -62 to -48

NOTE 1: MS is IMSI updated on Cell 1.

NOTE 2: Carrier 1 is the BCCH carrier, GPRS not present.

NOTE 3: Carrier 2 is the UTRAN FDD cell configured according to TS 34.108, clause 6.1.4, Default settings for cell No.1

NOTE 4: Serving Cell Parameters are coded and transmitted on the specified Channel Type.

NOTE 5: Carriers should have a relative accuracy of ±3 dB.

NOTE 6: When executing the test in FDD band II or FDD band VIII carrier 2 shall use the high range UARFCN, defined in TS 3GPP 34.108 clause 5.1.1. This is to avoid the FDD band overlapping with the GSM band under test.

SYSTEM INFORMATION TYPE 3 REST OCTETS

- SI2q indicated on BCCH extended

- GPRS **not** indicated

SYSTEM INFORMATION TYPE 4 REST OCTETS

- GPRS **not** indicated

SYSTEM INFORMATION TYPE 2QUATER

Information Element	Value/remark
0 | 1 < **FDD_Qoffset** : bit (4) >	1 '1101'B (20 dB)

Test procedure

The MS is camping on the GSM cell and has received a 3G Neighbour Cell list is in the 3G_NEIGHBOUR CELL description in System Information Type 2quater. The FDD_Qoffset in the 3G_MEASUREMENT_PARAMETERS description is set to 20 dB.

It is verified for 30 sec that no Cell Reselection to the UTRAN cell is performed.

The UTRAN cell CPICH Ec is increased to –50 dBm / 3.84 MHz and therefore, The mean power of the CPICH Ec integrated across 3.84 MHz bandwidth is –50dBm

It is verified that a Cell Reselection to UTRAN CPICH Ec is performed within 15.4 sec when the UTRAN cell mean power of the CPICH Ec integrated across 3.84 MHz gets greater than the GSM cell RLA_C + FDD_Qoffset. (15.4 sec = 2*5sec, where 5 sec is the maximum time between 2 consecutive UTRAN measurements, with 4 seconds to read the SIBs plus 10% tolerance overall)

Maximum duration of the test

2 minutes

Expected sequence

Step	Direction	Message	Comments
1	SS		Carrier 2 is activated
2	SS		Verify that the MS does not reselect to Carrier 2 for 30 sec.
3	SS		Increase power of Carrier 2 to –50 dBm.
4	MS -> SS	RRC CONNECTION REQUEST	Verify that the MS reselects to Carrier 2 within 15.4 sec from Step 3. Establishment cause shall be "interRAT-CellReselection"

Specific message contents

None

20.25.3a Intersystem Cell Reselection/Idle Mode/TDD_Qoffset (1.28Mcps TDD)

20.25.3a.1 Conformance requirement

If the 3G Cell Reselection list includes UTRAN frequencies, the MS shall, at least every 5 s update the value RLA_C for the serving cell and each of the at least 6 strongest non-serving GSM cells.

The MS shall then reselect a suitable (see TS 25.304) UTRAN cell if its measured RSCP value exceeds the value of TDD_Qoffset for a period of 5 seconds.

Table 1: Radio sub-system link control parameters

Parameter name	Description	Range	Bits	Channel
TDD_Qoffset	An absolute threshold of RSCP for UTRAN TDD cell re-selection, 0 = -105dBm, 1 = -102dBm, 2=-99dBm, 3 = -96dBm, 4 = -93dBm, 5 = -90dBm, 6 = -87dBm, 7 = -84dBm, 8 = -81dBm, 9 = -78dBm, 10 = -75dBm, 11 = -72dBm, 12 = -69dBm, 13 = -66dBm, 14 = -63dBm, 15 = -60dBm. Default value = -90dBm.	0-15	4	BCCH D/L

References:

3GPP TS 05.08, subclause 6.6.5 and 9; TS 25.101 subclause 3.1.

20.25.3a.2 Test purpose

To verify that the MS uses the TDD_Qoffset parameter at cell re-selection from GSM/GPRS to UTRAN while in Idle Mode.

20.25.3a.3 Method of test

Initial conditions

Parameter	Unit	Cell 1 (GSM)
Test Channel		1
RF Signal Level	dBm	-75
RXLEV_ACCESS_ MIN	dBm	-100
Qsearch_I	dBm	7 (always)
TDD_Qoffset	dBm	-90

Parameter	Unit	Cell 2 (UTRAN)
Test Channel		1
PCCPCH RSCP (TDD)	dBm / 1.28 MHz	OFF to -99 to -77

NOTE 1: MS is IMSI updated on Cell 1.

NOTE 2: Carrier 1 is the BCCH carrier, GPRS not present.

NOTE 3: Carrier 2 is the UTRAN TDD cell configured according to TS 34.108, clause 6.1.4, Default settings for cell No.1

NOTE 4: Serving Cell Parameters are coded and transmitted on the specified Channel Type.

NOTE 5: Carriers should have a relative accuracy of ±3 dB.

SYSTEM INFORMATION TYPE 3 REST OCTETS

- SI2q indicated on BCCH extended

- GPRS **not** indicated

SYSTEM INFORMATION TYPE 4 REST OCTETS

- GPRS **not** indicated

SYSTEM INFORMATION TYPE 2QUATER

Information Element	Value/remark
0	1 < **TDD_Qoffset** : bit (4) >	1 '0101'B (-90 dBm)

Test procedure

The MS is camping on the GSM cell and has received a 3G Neighbour Cell list is in the 3G_NEIGHBOUR CELL description in System Information Type 2quater. The TDD_Qoffset in the 3G_MEASUREMENT_PARAMETERS description is set to -90 dBm.

It is verified for 30 sec that no Cell Reselection to the UTRAN cell is performed.

The UTRAN cell PCCPCH RSCP is increased to −77 dBm / 1.28 MHz and therefore, The mean power of the PCCPCH RSCP integrated across 1.28 MHz bandwidth is −77dBm

It is verified that a Cell Reselection to UTRAN is performed within 15.4 sec when the UTRAN cell mean power of the PCCPCH RSCP integrated across 1.28 MHz gets greater than TDD_Qoffset. (15.4 sec = 2*5sec, where 5 sec is the

maximum time between 2 consecutive UTRAN measurements, with 4 seconds to read the SIBs plus 10% tolerance overall)

Maximum duration of the test

2 minutes

Expected sequence

Step	Direction	Message	Comments
1	SS		Carrier 2 is activated
2	SS		Verify that the MS does not reselect to Carrier 2 for 30 sec.
3	SS		Increase power of Carrier 2 to –77 dBm.
4	MS -> SS	RRC CONNECTION REQUEST	Verify that the MS reselects to Carrier 2 within 15.4 sec from Step 3. Establishment cause shall be "interRAT-CellReselection"

Specific message contents

None

20.25.4   Intersystem Cell Reselection/Idle Mode/Qsearch_I

20.25.4.1   Conformance requirement

If the 3G Cell Reselection list includes UTRAN frequencies, the MS shall, at least every 5 s update the value RLA_C for the serving cell and each of the at least 6 strongest non-serving GSM cells.

For FDD, the MS shall then reselect a suitable (see TS 25.304) UTRAN cell if its measured RSCP value exceeds the value of RLA_C for the serving cell and all of the suitable (see 3GPP TS 03.22) non-serving GSM cells by the value FDD_Qoffset for a period of 5 seconds and the UTRAN cells measured Ec/No value is equal or greater than the value FDD_Qmin. In case of a cell reselection occurring within the previous 15 seconds, FDD_Qoffset is increased by 5 dB.

For TDD, the MS shall then reselect a suitable (see TS 25.304) UTRAN cell if its measured RSCP value exceeds the value of TDD_ Qoffset for a period of 5 seconds.

Table 1a: Radio sub-system link control parameters for FDD

Parameter name	Description	Range	Bits	Channel
Qsearch_I	Search for 3G cells if signal level is below (0-7) or above (8-15) threshold 0 = - 98 dBm, 1 = - 94 dBm, … , 6 = - 74 dBm, 7 = ∞ (always) 8 = - 78 dBm, 9 = - 74 dBm, … , 14 = - 54 dBm, 15 = ∞ (never). Default value = ∞ (never).	0-15	4	BCCH D/L

Table 1b: Radio sub-system link control parameters for TDD

Parameter name	Description	Range	Bits	Channel
Qsearch_I	Search for 3G cells if signal level is below (0-7) or above (8-15) threshold 0 = - 98 dBm, 1 = - 94 dBm, … , 6 = - 74 dBm, 7 = ∞ (always) 8 = - 90 dBm, 9 = - 86 dBm, … , 14 = - 66 dBm, 15 = ∞ (never). Default value = ∞ (never).	0-15	4	BCCH D/L

References:

3GPP TS 05.08, subclause 6.6.5 and 9

20.25.4.2 Test purpose

To verify that the MS uses the Qsearch_I parameter at cell re-selection from GSM to UTRAN while in Idle Mode.

20.25.4.3 Method of test

Initial conditions

For MS supporting FDD:

Parameter	Unit	Cell 1 (GSM)
Test Channel		1
RF Signal Level	dBm	-60 to -77
RXLEV_ACCESS_MIN	dBm	-100
MP_CHANGE_MARK		0
Qsearch_I		15 to 6

Parameter	Unit	Cell 2 (UTRAN)
Test Channel		1
CPICH_Ec (FDD)	dBm / 3.84 MHz	OFF to -50

For MS supporting TDD:

Parameter	Unit	Cell 1 (GSM)
Test Channel		1
RF Signal Level	dBm	-77 to -71
RXLEV_ACCESS_MIN	dBm	-100
MP_CHANGE_MARK		0
Qsearch_I		15 (never) to 12 (-74dBm)

Parameter	Unit	Cell 2 (UTRAN)
Test Channel		1
PCCPCH_RSCP (TDD)	dBm / 1.28 MHz	OFF to -50

NOTE 1: MS is IMSI attached on Cell 1.
If MS supports GPRS, then MS is GPRS attached on cell 1.

NOTE 2: Carrier 1 is the BCCH carrier, PBCCH not present, NC0.

NOTE 3: Carrier 2 is either the UTRAN FDD cell or the UTRAN TDD cell configured according to TS 34.108, clause 6.1.4, Default settings for cell No.1

NOTE 4: Serving Cell Parameters are coded and transmitted on the specified Channel Type

NOTE 5: Carriers should have a relative accuracy of ±3 dB.

SYSTEM INFORMATION TYPE 2QUATER

Information Element	Value/remark
< **Qsearch_I** : bit (4) >	'1111'B (Never)
< **Qsearch_P** : bit (4) >	'0111'B (Always)

Specific PICS statements:

- Support of UTRAN FDD (TSPC_Type_UTRAN_FDD)

- Support of UTRAN TDD (TSPC_Type_UTRAN_TDD)

Test procedure

The MS is camping on the GSM cell and has received a 3G Neighbour Cell list is in the 3G_NEIGHBOUR CELL description in System Information Type 2quater. Qsearch_I in the 3G_MEASUREMENT_PARAMETERS description indicates that no 3G measurements shall be performed.

It is verified for 30 sec that no Cell Reselection to the UTRAN cell is performed.

For FDD, the SS broadcast a new System Information Type 2quater with an updated Qsearch_I indicating that 3G measurements shall be performed when the strongest GSM cell RLA_C is below –74 dBm.

For TDD, The SS broadcast a new System Information Type 2quater with an updated Qsearch_I indicating that 3G measurements shall be performed when the strongest GSM cell RLA_C is above –74 dBm.

It is verified for 65 sec that no Cell Reselection to the UTRAN cell is performed. (Maximum 30 sec for SI reading + 5 sec for System Information 2quater reading + 30 sec to find the UTRAN.)

For FDD, the GSM cell RLA_C is decreased to –77 dBm.

For TDD, the GSM cell RLA_C is increased to –71 dBm.

It is verified that a Cell Reselection to UTRAN is performed within 30 sec.

Maximum duration of the test

4 minutes

Expected sequence

This sequence is performed for each UTRAN mode the MS supports.

Step	Direction	Message	Comments
1	SS		Carrier 2 is activated on –50 dBm
2	SS		Verify that no cell reselection is performed to Carrier 2 for 30 sec.
3	SS	SYSTEM INFORMATION 2QUATER	
3a	SS	SYSTEM INFORMATION TYPE 13	See specific contents below.
4	SS		Verify that no cell reselection is performed to Carrier 2 for 65 sec.
5	SS		For FDD, reduce power of Carrier 1 to –77 dBm.
			For TDD, increase power of Carrier 1 to –71 dBm.
6	MS -> SS	RRC CONNECTION REQUEST	Verify that the MS reselects to Carrier 2 within 30 sec.
			Establishment cause shall be "interRAT-CellReselection"

Specific message contents

SYSTEM INFORMATION 2QUATER in Step 3

< **MP_CHANGE_MARK** : bit >	1
0 | 1 < **3G_MEASUREMENT Parameters Description** >	0
< **Qsearch_I :** bit (4) >	For FDD: '0110'B (-74 dBm) For TDD: '1100'B (above -74 dBm)
< **Qsearch_C_Initial :** bit (1) >	0
0 | 1 < **FDD_Qoffset** : bit (4) >	0
0 | 1 < **TDD_Qoffset** : bit (4) >	0

SYSTEM INFORMATION Type 13 in Step 3a

Information Element	Value/remark
< BCCH_CHANGE_MARK : bit (3) > < SI_CHANGE_FIELD : bit (4) >	'001'B '0010'B (Update of SI2, SI2 bis or SI2 ter message or any instance of SI2quater messages)

20.25.5 Intersystem Cell Reselection / Idle Mode / High Priority

20.25.5.1 Conformance requirement

If the 3G Cell Reselection list or the E-UTRAN Neighbour Cell list include frequencies of other radio access technologies, the MS shall, at least every 5 s update the value RLA_C for the serving cell and each of the at least 6 strongest non serving GSM cells.

The MS shall then reselect a suitable (see 3GPP TS 25.304 for UTRAN and 3GPP TS 36.304 for E-UTRAN) cell of another radio access technology if the criteria below are satisfied. S_non-serving_XXX is the measurement quantity of a non-serving inter-RAT cell and XXX indicates the other radio access technology/mode and is defined as follows:

- for a UTRAN cell, is the measured RSCP value for the cell minus UTRAN_QRXLEVMIN for the cell's frequency;

    …

Cell reselection to a cell of another inter-RAT frequency shall be performed if any of the conditions below (to be evaluated in the order shown) is satisfied:

- The S_non-serving_XXX of one or more cells of a higher priority inter-RAT frequency is greater than THRESH_XXX_high during a time interval T_reselection; in that case, the mobile station shall consider the cells for reselection in decreasing order of priority and, for cells of the same priority, in decreasing order of S_non-serving_XXX, and reselect the first cell that satisfies the conditions above;

    …

A UTRAN FDD cell shall only be reselected if, in addition to the criteria above, its measured Ec/No value is equal to or greater than FDD_Qmin - FDD_Qmin_Offset.

References:

3GPP TS 45.008, subclause 6.6.6

20.25.5.2 Test purpose

To verify that the MS uses the priority information and performs cell re-selection to High priority UTRAN cell while in Idle Mode.

20.25.5.3 Method of test

Initial conditions

Parameter	Cell 1 Carrier1	Cell 2 Carrier2
Channel Type carried	BCCH	BCH
Signal Level (dBm)	-50	Off to -60
Ec/No (dB)	-	-6dB

NOTE 1: MS is GPRS attached on Cell 1.

NOTE 2: Carrier 1 is the BCCH carrier, NC0.

NOTE 3: Carrier 2 is the UTRAN FDD cell configured according to TS 34.108, clause 6.1.4, Default settings for cell No.1

NOTE 4: Serving Cell Parameters are coded and transmitted on the specified Channel Type

NOTE 5: Carriers should have a relative accuracy of ±3 dB.

NOTE 6: SYSTEM INFORMATION TYPE 2QUATER Instance1 and Instance2 as per 20.25.1.

Test procedure

The MS is GPRS attached and has received a 3G Neighbour Cell description in System Information Type 2quater message, along with priority information.

Update the Carrier 2, power level as per the initial conditions

It is verified that a Cell Reselection to UTRAN is performed within 30 sec.

Maximum duration of the test

5 minutes

Expected sequence

Step	Direction	Message	Comments
1	SS		Carrier 2 is activated with Ec/No = -6 (dB) and power level -60(dBm)
2	MS -> SS	RRC CONNECTION REQUEST	Verify that the MS reselects to Carrier 2 within 30 secs from Step 1. Establishment cause shall be "interRAT-CellReselection"

20.25.6 Intersystem Cell Reselection / Idle Mode / Low Priority

20.25.6.1 Conformance requirement

If the 3G Cell Reselection list or the E-UTRAN Neighbour Cell list include frequencies of other radio access technologies, the MS shall, at least every 5 s update the value RLA_C for the serving cell and each of the at least 6 strongest non serving GSM cells.

The MS shall then reselect a suitable (see 3GPP TS 25.304 for UTRAN and 3GPP TS 36.304 for E-UTRAN) cell of another radio access technology if the criteria below are satisfied. S_non-serving_XXX is the measurement quantity of a non-serving inter-RAT cell and XXX indicates the other radio access technology/mode and is defined as follows:

- for a UTRAN cell, is the measured RSCP value for the cell minus UTRAN_QRXLEVMIN for the cell's frequency;

…

For a GSM cell, S_GSM is defined as the C1 value for the cell (see subclause 6.4);

Cell reselection to a cell of another inter-RAT frequency shall be performed if any of the conditions below (to be evaluated in the order shown) is satisfied:

- The S_non-serving_XXX of one or more cells of a higher priority inter-RAT frequency is greater than THRESH_XXX_high during a time interval T_reselection; in that case, the mobile station shall consider the cells for reselection in decreasing order of priority and, for cells of the same priority, in decreasing order of S_non-serving_XXX, and reselect the first cell that satisfies the conditions above;

- The value of S_GSM is lower than THRESH_GSM_low for the serving cell and all measured GSM cells during a time interval T_reselection; in this case, the mobile station shall consider for reselection the inter-RAT cells in the following order, and reselect the first one that satisfies the following criteria:

  - cells of a lower priority inter-RAT frequency whose S_non-serving_XXX is greater than THRESH_XXX_low during a time interval T_reselection; these cells shall be considered in decreasing order of priority and, for cells of the same priority, in decreasing order of S_non-serving_XXX;

…

A UTRAN FDD cell shall only be reselected if, in addition to the criteria above, its measured Ec/No value is equal to or greater than FDD_Qmin - FDD_Qmin_Offset.

References:

3GPP TS 45.008, subclause 6.6.6

20.25.6.2 Test purpose

To verify that the MS uses the priority information and performs cell re-selection to Low priority UTRAN cell while in Idle Mode.

20.25.6.3 Method of test

Initial conditions

Parameter	Cell 1 Carrier1	Cell 2 Carrier2
Channel Type carried	BCCH	BCH
Signal Level (dBm)	-50 to -90	Off to -60
Ec/No (dB)	-	-6dB

NOTE 1: MS is GPRS attached on Cell 1.

NOTE 2: Carrier 1 is the BCCH carrier, NC0.

NOTE 3: Carrier 2 is the UTRAN FDD cell configured according to TS 34.108, clause 6.1.4, Default settings for cell No.1

NOTE 4: Serving Cell Parameters are coded and transmitted on the specified Channel Type

NOTE 5: Carriers should have a relative accuracy of ±3 dB.

NOTE 6: SYSTEM INFORMATION TYPE 2QUATER Instance 1 and Instance 2 as per 20.25.1.

Test procedure

The MS is GPRS attached and has received a 3G Neighbour Cell description in System Information Type 2quater message, along with priority information.

Update the Carrier 1 and Carrier 2, power level as per the initial conditions.

It is verified that a Cell Reselection to UTRAN is performed within 30 sec.

Maximum duration of the test

5 minutes

Expected sequence

Step	Direction	Message	Comments
1	SS	SYSTEM INFORMATION TYPE 2QUATER	See specific contents below.
2	SS		Carrier 2 is activated with Ec/No = -6 (dB) and power level -60(dBm) Set GSM power level to -90dBm to satisfy S_GSM criteria for low priority reselection evaluation
3	MS -> SS	RRC CONNECTION REQUEST	Verify that the MS reselects to Carrier 2 within 30 secs from Step 2. Establishment cause shall be "interRAT-CellReselection"

Specific message contents

SYSTEM INFORMATION TYPE 2QUATER in Step 1

Information Element	Value/remark
< MP_CHANGE_MARK : bit (1)>	1
< UTRAN_PRIORITY : bit(3)>	'010'B

20.25.7 Intersystem Cell Reselection / Idle Mode / H_PRIO

20.25.7.1   Conformance requirement

If the 3G Cell Reselection list or the E-UTRAN Neighbour Cell list include frequencies of other radio access technologies, the MS shall, at least every 5 s update the value RLA_C for the serving cell and each of the at least 6 strongest non serving GSM cells.

The MS shall then reselect a suitable (see 3GPP TS 25.304 for UTRAN and 3GPP TS 36.304 for E-UTRAN) cell of another radio access technology if the criteria below are satisfied. S_non-serving_XXX is the measurement quantity of a non-serving inter-RAT cell and XXX indicates the other radio access technology/mode and is defined as follows:

- for a UTRAN cell, is the measured RSCP value for the cell minus UTRAN_QRXLEVMIN for the cell's frequency;

    …

For a GSM cell, S_GSM is defined as the C1 value for the cell (see subclause 6.4);

Cell reselection to a cell of another inter-RAT frequency shall be performed if any of the conditions below (to be evaluated in the order shown) is satisfied:

- The S_non-serving_XXX of one or more cells of a higher priority inter-RAT frequency is greater than THRESH_XXX_high during a time interval T_reselection; in that case, the mobile station shall consider the cells for reselection in decreasing order of priority and, for cells of the same priority, in decreasing order of S_non-serving_XXX, and reselect the first cell that satisfies the conditions above;

- The value of S_GSM is lower than THRESH_GSM_low for the serving cell and all measured GSM cells during a time interval T_reselection; in this case, the mobile station shall consider for reselection the inter-RAT cells in the following order, and reselect the first one that satisfies the following criteria:

    - cells of a lower priority inter-RAT frequency whose S_non-serving_XXX is greater than THRESH_XXX_low during a time interval T_reselection; these cells shall be considered in decreasing order of priority and, for cells of the same priority, in decreasing order of S_non-serving_XXX;

    - if no cells satisfy the criterion above, inter-RAT cells for which, during a time interval T_reselection, S_non-serving_XXX is higher than S_GSM for the serving cell by at least a specific hysteresis *H_PRIO*; these cells shall be considered in decreasing order of S_non-serving_XXX.

A UTRAN FDD cell shall only be reselected if, in addition to the criteria above, its measured Ec/No value is equal to or greater than FDD_Qmin - FDD_Qmin_Offset.

References:

3GPP TS 45.008, subclause 6.6.6

20.25.7.2   Test purpose

To verify that the MS uses the priority information and performs cell re-selection from GSM to UTRAN, according to hysteresis criteria while in Idle Mode.

20.25.7.3 Method of test

Initial conditions

Parameter	Cell 1	Cell 2
	Carrier1	Carrier2
Channel Type carried	BCCH	BCH
Signal Level (dBm)	-50 to -90	Off to -75
Ec/No (dB)	-	-6dB

NOTE 1: MS is GPRS attached on Cell 1.

NOTE 2: Carrier 1 is the BCCH carrier, NC0.

NOTE 3: Carrier 2 is the UTRAN FDD cell configured according to TS 34.108, clause 6.1.4, Default settings for cell No.1

NOTE 4: Serving Cell Parameters are coded and transmitted on the specified Channel Type

NOTE 5: Carriers should have a relative accuracy of ±3 dB.

NOTE 6: SYSTEM INFORMATION TYPE 2QUATER (REL-8) as per 20.25.1.

Test procedure

The MS is GPRS attached and has received a 3G Neighbour Cell description in System Information Type 2quater message, along with priority information.

Update the Carrier 1 and Carrier 2, power level as per the initial conditions.

It is verified that a Cell Reselection to UTRAN is performed within 30 sec.

Maximum duration of the test

5 minutes

Expected sequence

Step	Direction	Message	Comments
1	SS	SYSTEM INFORMATION TYPE 2QUATER	See specific contents below.
2	SS		Carrier 2 is activated with Ec/No = -6 (dB) and power level -75(dBm) Set GSM power level to -90dBm to satisfy S_GSM criteria for low priority reselection evaluation
3	MS -> SS	RRC CONNECTION REQUEST	Verify that the MS reselects to Carrier 2 within 30 secs from Step 2. Establishment cause shall be "interRAT-CellReselection"

Specific message contents

SYSTEM INFORMATION TYPE 2QUATER in Step 1

Information Element	Value/remark
< MP_CHANGE_MARK : bit (1)>	1
< H_PRIO : bit(2) >	'01'B (5dB)
< UTRAN_PRIORITY : bit(3)>	'010'B
< THRESH_UTRAN_high : bit(5)>	'11111'B (62dB)

20.26 Decoding of BCCH including information for UTRAN TDD cells

20.26.1 Conformance requirement

When a message is coded using CSN.1 notation, the definition of the CSN.1 syntax in CSN.1 Specification, Version 2.0, shall be used.

Where the description of information elements in this Technical Specification contains bits defined to be "spare bits", these bits shall set to the indicated value (0 or 1) by the sending side, and their value shall be ignored by the receiving side. With few exceptions, spare bits are indicated as being set to "0" in 3GPP TS 44.018.

The following rules apply for the coding of type 4 information elements:

a) The octet number of an octet (which is defined in the figure of a sub-clause) consists of a positive integer, possibly of an additional letter, and possibly of an additional asterisk, see sub-clause f). The positive integer identifies one octet or a group of octets.

b) Each octet group is a self contained entity. The internal structure of an octet group may be defined in alternative ways.

c) An octet group is formed by using some extension mechanism. The preferred extension mechanism is to extend an octet (N) through the next octet(s) (Na, Nb, etc.) by using bit 8 in each octet as an extension bit.

The bit value "0" indicates that the octet group continues through to the next octet. The bit value "1" indicates that this octet is the last octet of the group. If one octet (Nb) is present, the preceding octets (N and Na) shall also be present.

In the format descriptions appearing in sub-clause 10.5.1 to 10.5.4, bit 8 is marked "0/1 ext" if another octet follows. Bit 8 is marked "1 ext" if this is the last octet in the extension domain.

Additional octets may be defined in later versions of the protocols ("1 ext" changed to "0/1 ext") and equipments shall be prepared to receive such additional octets; the contents of these octets shall be ignored. However the length indicated in clauses 9 and 10 only takes into account this version of the protocols.

d) In addition to the extension mechanism defined above, an octet (N) may be extended through the next octet(s) (N+1, N+2 etc.) by indications in bits 7-1 (of octet N).

e) The mechanisms in c) and d) may be combined.

f) Optional octets are marked with asterisks (*).

References:

- 3GPP TS 44.018 sections 10.1, 10.5.

20.26.2 Test purpose

To verify that the MS performs correctly when BCCH of suitable cell includes information for UTRAN-TDD cells.

20.26.3   Method of test

20.26.3.1   Initial conditions

Parameters changed from the default values in table 20.1.

Parameter	Carrier 1	Carrier 2
RF Signal Level (dBμV emf() / dBm)	48 / -65	38 / -75
CBA	0	0
RXLEV_ACCESS_MIN (dBm)	-90	-67
MNC		
MCC		
C1	25	-8
C2	25	-8
ATT bit	1	1
MSCR	1	1

For an E-GSM MS carrier 2 is chosen in the E-GSM band, carrier 1 ARFCN in the P-GSM band.

Specific system information messages settings are configured on carriers 1 and 2 as specified in section Specific Message Contents.

> NOTE: UTRAN TDD cell needs not to be active.

20.26.3.2   Procedure

a) The SS activates the carriers with specific system information settings

b) The MS is switched on.

c) The MS is paged on carrier 1.

20.26.4   Test requirements

1) After step b), the MS shall perform location update procedure on carrier 1 within 60 seconds..

2) After step c), MS shall respond to paging.

20.26.5   Specific Message Contents

SYSTEM INFORMATION TYPE 3 REST OCTETS

-    SI2q indicated on BCCH Norm

SYSTEM INFORMATION TYPE 2QUATER

Information Element	Value/remark
< RR management Protocol Discriminator bit (4) >	'0110'B
< Skip Indicator : bit (4) >	'0000'B
< Message type : bit (8) >	'0000 0111'B
< SI2 quarter Rest Octets >	
< BA_IND : bit >	0
< 3G_BA_IND : bit >	0
< MP_CHANGE_MARK : bit >	0
< SI2quater _INDEX : bit (4) >	'0000'B
< SI2quater_COUNT : bit (4) >	'0000'B
0	1 < Measurement_Parameters Description >	0
0	1 < GPRS_Real Time Difference Description >	0
0	1 < GPSR_BSIC Description >	0
0	1 < GPRS_REPORT PRIORITY Description >	0
0	1 < GPRS_Measurement_Parameters Description >	0
0	1 < NC Measurement Parameters >	0
0	1 < extension length >	0
0	1 < 3G Neighbour Cell Description >	1
0	1 < Index_Start_3G : bit (7) >	0
0	1 < Absolute_Index_Start_EMR : bit (7) >	0
0	1 < UTRAN FDD Description >	0
0	1 < UTRAN TDD Description >	1
0	1 < Bandwidth_TDD : bit (3) >	1
1 < Repeated UTRAN TDD Neighbour Cells > ** 0	1
0 < TDD-ARFCN : bit (14) >	'2760'B
< TDD_Indic0 : bit >	0
< NR_OF_TDD_CELLS : bit (5) >	'0001'B
< TDD_CELL_INFORMATION Field >	9 bits
	Cell parameters ID according to TS 34.108, clause 6.1.4, Default settings for cell No.1
1 < Repeated UTRAN TDD Neighbour Cells > ** 0	0
0	1 < 3G MEASUREMENT Parameters Description >	1
< Qsearch_I : bit (4) >	'0111'B (Always)
< Qsearch_C_Initial : bit (1) >	0
0	1 < TDD_Qoffset : bit (4) >	1 '0000'B (Always select a cell if acceptable)
< TDD_MULTIRAT_REPORTING : bit (2) >	'01'B
< Qsearch_P : bit (4) >	'0111'B (Always)
< 3G_SEARCH_PRIO : bit >	0
0	1 < FDD_REP_QUANT : bit >	0
0	1 < FDD_REPORTING_OFFSET : bit (3) >	0
0	1 < TDD_MULTIRAT_REPORTING : bit (2) >	0
0	1 < TDD_REPORTING_OFFSET : bit (3) >	0