53 Test of EGPRS Radio Link Control (RLC) Protocol

Default conditions and messages

The default conditions, message contents and macros not specified in this subclause must be set as in subclause 50 for EGPRS system testing.

Initial conditions

Unless otherwise indicated, the initial conditions for all acknowledged mode tests, as a minimum, are as follows. Other initial conditions may apply. In the event of conflict between initial conditions stated here and those stated in a test case, the test case shall take precedence.

- The MS is EGPRS attached.

- A PDP context has been activated with RLC acknowledged mode operation.

53.1 Acknowledged Mode

53.1.1 Acknowledged Mode/ Uplink TBF

53.1.1.1 Acknowledged Mode/ Uplink TBF/ Send State Variable V(S)

53.1.1.1.1 Conformance requirements

1. The send state variable V(S), can take on the values 0 through 2 047. Each RLC data block contains a block sequence number (BSN) field that is 11 bits in length. At the time that an in-sequence RLC data block is designated for transmission, the value of BSN is set equal to the value of the send state variable.

2. V(S) shall be set to the value 0 at the beginning of each TBF in which the RLC endpoint is the transmitter.

3. The value of V(S) shall be incremented by 1 after transmission of the RLC data block with BSN = V(S).

References

3GPP TS 04.60, subclause 9.1.1.

53.1.1.1.2 Test purpose

1. To verify that the mobile station sets the V(S) to 0 at the beginning of each TBF.

2. To verify that the mobile station increases the V(S) by 1 after transmission of the RLC data block with BSN set to V(S).

3. To verify that the mobile station wraps the V(S) to 0 after 2047.

53.1.1.1.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode. The EGPRS Channel Coding Command IE indicates MCS-1 in the Packet Uplink Assignment message.

The SS checks that the BSN in the received RLC data blocks obeys the following rule:

1. BSN is set to the value 0 at the beginning of each TBF in which the mobile station is the transmitter;

2. BSN is incremented by 1 in each subsequent RLC data block in the TBF;

3. BSN takes on all values in the range 0 to 2047 and then back to 0.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 50, 000 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the BSN starts from 0, and the correct MCS is used.
4	SS -> MS	PACKET UPLINK ACK/NACK	SS acknowledges each RLC data block with RB set to 1, USF assigned to the MS
5	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the BSN is updated according to BSN(n) = (BSN(n-1) + 1) mod 2048.
6	-		Repeat steps 4 and 5 at least 2048 times
7		{Completion of uplink RLC data block transfer}	

53.1.1.2 Acknowledged Mode/ Uplink TBF/ Acknowledge State Variable V(A)

53.1.1.2.1 Conformance requirements

1. The Acknowledge state variable V(A) contains the BSN value of the oldest RLC data block that has not been positively acknowledged by its peer. V(A) can take on the values 0 through 2047.

2. V(A) shall be set to the value 0 at the beginning of each TBF in which the RLC endpoint is the transmitter.

3. The value of V(A) shall be updated from the values received from its peer in the received block bitmap (RB) of the Packet Ack/Nack message.

References

3GPP TS 04.60, subclauses 9.1.2 and 9.1.8.

53.1.1.2.2 Test purpose

1. To verify that the mobile station correctly decodes the RB and updates the values of V(A).

53.1.1.2.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode. The EGPRS Windows Size IE in the Packet Uplink Assignment message indicates the value in accordance with the number of timeslots allocated.

The MS transmits WS (window size) blocks without acknowledgement from the SS. The SS then acknowledges the first N blocks and verifies that the MS shall transmit N more RLC data blocks.

The test procedure is performed for the values of N = 10, 15 and 20.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	Totally 3, 000 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN starts from 0, and the correct MCS is used.
4	-		Repeat steps 2 and 3 until the still indication bit is set in the data block received in step 3.(on the retransmission of block with BSN=0). The SS does not acknowledge any of the data blocks with BSN from 0 to WS-1.
5	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
6	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN starts from 1, and the correct MCS is used.
7	-		Repeat steps 5 and 6 until unacknowledged data blocks (BSN = 0 ... 31) are retransmitted with SI field set to 1.
8	-		Wait for BS_CV_MAX block periods before sending next message.
9	SS -> MS	PACKET UPLINK ACK/NACK	SS acknowledges first N (=10) RLC data blocks with RB set to 1 and negatively acknowledges the rest with RB set to 0. USF not assigned to the MS.
10	-		Wait for 6 blocks with no USF
11	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A12 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may retransmit block BSN = 32 if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
A13 (optional step)	SS->MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, USF assigned to the MS.
12	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = N, SI = 0
13	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
14	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = N+1, SI = 0
15	-		Repeat steps 13 and 14 until all negatively acknowledged data blocks are retransmitted followed by new data blocks. The SS verifies that the negatively acknowledged data blocks are retransmitted before new data blocks are sent. The SS verifies that the RLC data block with BSN = N is received following the reception of the data block with BSN = WS-1 +N The SS verifies that the SI field is set on the retransmitted block with BSN=N
16		{Completion of uplink RLC data block transfer }	
17	-		The above test procedure is repeated for different values of N

53.1.1.3 Acknowledged Mode/ Uplink TBF/ Window Size/ Default Value

53.1.1.3.1 Conformance requirements

1. In case a PACKET TIMESLOT RECONFIGURE is sent to the MS without any window size for a specific TBF, then any previous value received for the specific TBF shall be used or, if no previous value has been received for the specific TBF, default window size shall be used.

References

3GPP TS 04.60, subclause 9.1.9.2.

53.1.1.3.2 Test purpose

1. To verify that when a PACKET TIMESLOT RECONFIGURE is sent to the MS without any window size indication, the previous value received for the specific TBF shall be used if there's any.

53.1.1.3.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- EGPRS Multislotclass (TSPC_Type_EGPRS_Multislot_ClassX where X = 1..45)

PIXIT Statements

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Test Procedure

The MS is made to establish an uplink EGPRS TBF to transmit RLC data blocks. EGPRS Window size is commanded to be WS=96.

The SS sends a PACKET UPLINK ACK/NACK message and set pre-emptive bit to be '1'.

The SS observes the BSN sequence to be 0, 1, 2, …, WS-1, 0, …

SS acknowledges all the daza blocks from BSN=0 till BSN=WS-1.

The SS sends a PACKET TIMESLOT RECONFIGURE message and does not include an Uplink Egprs Window Size field.

The SS verifies that the BSN sequence WS, WS+1, WS+2……2*WS-1, WS, WS+1….is observed.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 22*220 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1 EGPRS Window Size: 96
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that BSN=0.
4	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS negatively acknowledges the received RLC data block. Pre-emptive Bit: '1'B
5			Wait for 6 blocks with no USF
6	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A7 Optional Step	MS->SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B7 Optional Step	SS->MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
7	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH (BSN=0)
8	SS	-	Repeat steps 6 and 7 more than 96 times. The SS observes that the sequence of BSN in the following RLC data blocks is: If A7 was not performed 1, 2, …, 95, 0, … If A7 was performed : 2,3,…,95,0,1, …
9	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS positively acknowledges all the RLC Data Blocks. Pre-emptive Bit: '1'B USF not assigned to MS.
10	SS -> MS	PACKET TIMESLOT RECONFIGURE	Without EGPRS Window Size IE. Establishing a DL TBF Change UL TFI and Coding scheme. See specific message contents.
11	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the PDTCH of the PDCH assigned, containing USF assigned to the MS.
A12 Optional Step	MS->SS	EGPRS UPLINK RLC DATA BLOCK	MS may retransmit data block that was pending for acknowledgment if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B12 Optional Step	SS->MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
12	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
13	SS	-	Repeat steps 11 and 12 more than 96 times. The SS verifies that BSN sequence of the received RLC data blocks is: If A12 was not performed: 96, 97, 98….191, 96, 97, If A12 was performed: number of the next block in sequence sent after the last block in step 8, 96, 97, 98....191. 96, 97
14	SS -> MS	PACKET UPLINK ACK/NACK	SS positively acknowledges all the RLC Data Blocks. USF not assigned to MS.

| 15 | | {Completion of uplink RLC data block transfer}
{Completion of downlink RLC data block transfer} | |

Specific Message contents

PACKET TIMESLOT RECONFIGURE in Step 10

MESSAGE_TYPE	0 00111
PAGE_MODE	00 Normal Paging
GLOBAL_TFI	UL_TFI assigned in Step 1
COMPACT reduced MA	0 (Not present)
EGPRS Channel Coding Command	0001 (MCS-2)
<RESEGMENT	1
0|1 <DOWNLINK EGPRS Window Size >	1 (Present)
DOWNLINK EGPRS Window Size	192
0|1 <UPLINK EGPRS Window Size>	0 (Not present)
LINK_QUALITY_MEASUREMENT_MODE	00
Packet Timing Advance	
{ 0|1< TIMING_ADVANCE_VALUE >	1 (timing advance value)
- TIMING_ADVANCE_VALUE }	30 bit periods
{ 0|1< TIMING_ADVANCE_INDEX >	0 (no timing advance index)
<TIMING_ADVANCE_TIMESLOT_NUMBER > }	
0 | 1 <**Packet Extended Timing Advance**	0 (Extended TA for GSM 400 not present)
DOWNLINK_RLC_MODE	0 Acknowledged mode
CONTROL_ACK	0
{0|1<DOWNLINK_TFI_ASSIGNMENT>}	1 (assign downlink TFI)
- DOWNLINK_TFI_ASSIGNMENT	00001 (Binary)
{0|1< UPLINK_TFI_ASSIGNMENT >	1 (uplink TFI assignment)
- UPLINK_TFI_ASSIGNMENT }	Different from the TFI assigned in Step 1
DOWNLINK_TIMESLOT_ALLOCATION	Same as UL Timeslot used (Default TN 4)
{0|1<Frequency Parameters>}	0 (Frequency Parameters not present)
{ 01 < Dynamic Allocation >	Dynamic Allocation struct :
< Extended Dynamic Allocation >	0 (Dynamic allocation)
0|1< P0 >	0
< USF_GRANULARITY >	0 (one block)
{0|1< RLC_DATA_BLOCKS_GRANTED >}	0 (no RLC_DATA_BLOCKS_GRANTED, open-ended TBF)
{0|1< TBF_STARTING_TIME >}	0 (no starting time)
{0|1< Timeslot Allocation >	0 (Timeslot Allocation)
{0|1< USF_TN0>}	0 (timeslot 0 not assigned)
{0|1< USF_TN1>}	0 (timeslot 1 not assigned)
{0|1< USF_TN2>	0 (timeslot 2 not assigned)
{0|1< USF_TN3>}	0 (timeslot 3 not assigned)
{0|1< USF_TN4>}	1 (timeslot 4 assigned)
- USF_TN4	arbitrarily chosen (default 000)
{0|1< USF_TN5>}	0 (timeslot 5 not assigned)
{0|1< USF_TN6>}	0 (timeslot 6 not assigned)
{0|1< USF_TN7>}}	0 (timeslot 7 not assigned)

53.1.1.4   Acknowledged Mode/ Uplink TBF/ Window Size/ Assigned Value

53.1.1.4.1   Conformance requirements

1. For EGPRS the window size (WS) shall be set by the network according to the number of timeslots allocated in the direction of the TBF (uplink or downlink). MS shall support the maximum window size corresponding to its multi timeslot capability.

2. The selected WS shall be indicated within PACKET UPLINK/DOWNLINK ASSIGNMENT and PACKET TIMESLOT RECONFIGURE.

3. Once a window size is selected for a given MS, it may be changed to a larger size but not to a smaller size, in order to prevent dropping data blocks from the window.

References

3GPP TS 04.60, subclause 9.1.9.2.

53.1.1.4.2 Test purpose

1. To verify that the MS correctly recognise the window size indicated in Packet Uplink Assignment messages.

2. To verify that the MS operates correctly according to the window size indicated in PACKET TIMESLOT RECONFIGURE messages.

3. To verify that the MS supports the maximum window size corresponding to its multi timeslot capability.

53.1.1.4.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- EGPRS Multislotclass (TSPC_Type_EGPRS_Multislot_ClassX where X = 1..45)

PIXIT Statements

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Test Procedure

The MS is made to transmit uplink RLC data blocks in an acknowledged mode uplink EGPRS TBF to transmit an enough number of uplink RLC data blocks. In the PACKET UPLINK ASSIGNMENT message WS is commanded to be 64.

The SS assigns resources for the mobile station to transmit data blocks for WS1+1 times. Each time a radio block is assigned.

The SS observes the BSN and Stall Indicator values of the uplink RLC data blocks, SS verifies that BSN goes back to 0 after the block with BSN=63 is transmitted. SS also verifies that SI bit is set in the retransmitted block with BSN=0,1,2…..

The SS sends a in PACKET UPLINK ASSIGNMENT message and commands WS to be96.

The SS assigns resources for the mobile station to transmit data blocks for 35 times. Each time a radio block is assigned.

The SS observes the BSN and Stall Indicator values of the uplink RLC data blocks, and verifies that BSN=64, 65, …, 95 blocks are received, after which BSN goes back to 0 and SI is set for retransmitted block with BSN=0.

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	n = 2200 octets, USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1 EGPRS Window Size: 64. (Suppose MS multislot capability is 1)
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. Verify that BSN = 0
4	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS negatively acknowledges the received RLC data block. Pre-emptive Bit: '1'B USF not assigned to the MS.
5	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
5a optional	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH MS may transmit BSN=1 if already buffered
5b optional	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	(If BSN=1 was retransmitted in step 5a) Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
6	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
7	SS		Repeat steps 5 and 6 for 70 times. Verify that stall indicator is set for the retransmission of data block with BSN=0 Verify that the BSN sequence is If 5a is done: 0,2,3,…,63,0,1 If not: 0,1,2,..,63,0,1,..
8	SS -> MS	PACKET UPLINK ASSIGNMENT	Sent on the PACCH of the PDCH assigned. Window Size = 96.
9	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned on the third block after the PACKET UPLINK ASSIGNMENT of step 8, containing USF assigned to the MS.
9a optional	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH If optional step 5a was received MS may transmit BSN=8 if already buffered If optional step 5a was not received MS may transmit BSN=7 if already buffered
9b optional	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	(If BSN=8 or BSN=7 was retransmitted in step 9a) Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
10	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
11	SS	-	Repeat steps 9 and 10 for 35 times. Verify that stall indicator is not set in the received blocks. Verify that stall indicator is set in the next block after BSN=95 block is received. Verify that the BSN sequence is 64, 65, …, 95, 0, 1, …OR 64,65,…95.. N, N+1, ... where N is the next BSN not yet received in the end of step 7 or step 9a.
12		{Completion of uplink RLC data block transfer}	

Note: The SS shall schedule USF's often enough in step 11 to prevent T3182 from expiring.

53.1.1.5 Acknowledged mode/ Uplink TBF/ Invalid Negative Acknowledgement

53.1.1.5.1 Conformance requirements

1. The mobile station shall not modify the element in the acknowledge state array, V(B), corresponding to an RLC data block that cannot be validly negatively acknowledged (subclause 9.1.8 3GPP TS 04.60).

References

3GPP TS 04.60, subclauses 9.1.3 and 9.1.8.

53.1.1.5.2 Test purpose

1. To verify the correct response of the mobile station to an invalid negative acknowledgement.

53.1.1.5.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present, BS_CV_MAX = 15.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode.

The SS negatively acknowledges some RLC data blocks within BS_CV_MAX block periods.

The MS shall not retransmit the RLC data blocks that were negatively acknowledged.

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	n = 200 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN starts from 0, and the correct MCS is used.
4	-		Repeat steps 2 and 3 until received RLC data blocks BSN = 3
5	-		Wait until BS_CV_MAX block periods has elapsed from transmission of BSN 0.
6	SS -> MS	PACKET UPLINK ACK/NACK	SS negatively acknowledges data blocks BSN = 0 and BSN = 3 with RB set to 0 and acknowledges data blocks BSN = 1 and BSN = 2 with RB set to 1. USF not assigned to the MS.
7	-		Wait for 6 blocks with no USF
8	SS->MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A8 Optional Step	MS->SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B8 Optional Step	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
9	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH The SS verifies that data block BSN = 0 is retransmitted.
10	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
11	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH The SS verifies that data block BSN = 3 is not retransmitted
12		{Completion of uplink RLC data block transfer}	

53.1.1.6 Acknowledged Mode/ Uplink TBF/ Countdown Value

53.1.1.6.1 Conformance requirements

1. The mobile station shall send the Countdown Value (CV) in each uplink RLC data block to indicate to the network the absolute BSN (BSN') of the last RLC data block that will be sent in the uplink TBF.

2. When a radio block for EGPRS data transfer consists of two RLC data blocks, the CV value of the RLC/MAC header refers to the second RLC data block.

References

3GPP TS 04.60, subclause 9.3.1.

53.1.1.6.2 Test purpose

1. To verify that when a radio block for EGPRS data transfer consists of two RLC data blocks, the CV value is calculated based on BSN of the second RLC data block.

53.1.1.6.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present, BS_CV_MAX = 15.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The MS is made to transmit uplink RLC data blocks in an acknowledged mode uplink EGPRS TBF to transmit N octets to calculate TBC value. Uplink RLC data block transfer is completed.

The MS is made to transmit uplink RLC data blocks in an acknowledged mode uplink EGPRS TBF to transmit TBC uplink RLC data blocks. EGPRS Channel Coding Command is MCS-7. N is less than Window Size.

The SS assigns resources for the mobile station to transmit data blocks. Each time one radio block is assigned.

The SS observes the CV value in the uplink blocks. BSN' = Absolute BSN of the second RLC data block is calculated upon each radio block is received.

The SS verifies that when $x=\text{round}((TBC-BSN'-1)/NTS*2)$ is greater than BS_CV_MAX, CV equals to 15, otherwise, CV=x.

MCS-8 and MCS-9 shall be applied.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 56*60 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-7 (Suppose timeslot capability is 1)
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4	SS	-	Repeat steps 2 and 3 until CV=14 When CV=14, Calculate BSN' = BSN of the second RLC block, Calculate TBC= CV * NTS*K+BSN'
5		{Completion of uplink RLC data block transfer}	
6		{Uplink dynamic allocation two phase access}	N = 56*60 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-7 (Suppose timeslot capability is 1)
7	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
8	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
9	SS	-	Repeat steps 7 and 8 for TBC/2 times. Calculate BSN' = BSN of the second RLC bock. Calculate x=round((TBC-BSN'-1)/NTS*2). Verify that when x is greater than BS_CV_MAX: CV = 15. Otherwise: CV=x
10		{Completion of uplink RLC data block transfer}	
11			Repeat the procedure from step 1 to 10 for: MCS-8, N=68*60 octets MCS-9, N=74*60 octets

53.1.1.7 Acknowledged Mode/ Uplink TBF/ Interpretation of Receive Block Bitmap

53.1.1.7.1 Conformance requirements

1. In an uplink EGPRS TBF, if a compressed Reported Bitmap is received by the mobile station, the bitmap shall first be decompressed.

2. The uncompressed bitmap shall then be treated as follows:

   1) Firstly, if the BOW bit is set in the Reported Bitmap, then this bitmap acknowledges all blocks between V(A) and (SSN- 2) modulo SNS, and the corresponding elements in V(B) shall be set to the value ACKED. Also a bitmap value of '0' is assumed at the bit position corresponding to (SSN-1) modulo SNS which corresponds to V(Q).

   2) Then, for each bit in the uncompressed bitmap whose corresponding BSN value is within the transmit window, if the bit contains the value '1', the corresponding element in V(B) indexed relative to SSN shall be set to the value ACKED. If the bit contains the value '0', the element in V(B) shall be set to the value NACKED. A bit within the uncompressed bitmap whose corresponding BSN is not within the transmit window, shall be ignored.

   3) If the EOW bit is set, assume a bitmap value of '0' for all RLC blocks with a BSN value higher than the last entry in the bitmap but less than V(S) (i.e. [V(R) - 1 < BSN < V(S)] modulo SNS).

   4) If the RLC transmitter is on the mobile station side, the bit contains the value '0' and the RLC data block was recently (re)transmitted and thus can not be validly negatively acknowledged in this particular Packet Ack/Nack message, the element in V(B) shall not modified.

References

3GPP TS 04.60, subclauses 9.1.8.2.4 and 9.1.10.

53.1.1.7.2   Test purpose

1. To verify that the mobile station retransmits the blocks corresponds to the '0' bits in the uncompressed bitmap.

2. To verify that if the BOW bit is set in the Reported Bitmap, then this bitmap acknowledges all blocks between V(A) and (SSN- 2) modulo SNS.

3. To verify a bitmap value of '0' is assumed at the bit position corresponding to (SSN-1) modulo SNS.

4. To verify if the EOW bit is set, then a bitmap value of '0' is assumed for all RLC blocks with a BSN value higher than the last entry in the bitmap but less than V(S).

53.1.1.7.3   Method of test

Initial Conditions

System Simulator:

   1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

   The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The MS is made to establish an uplink EGPRS TBF to transmit N RLC data blocks.

The SS assigns resources for the mobiles station to transmit N1 (N1<N) data blocks.

The SS wait for BS_CV_MAX block periods, then sends a Packet Uplink Ack/Nack message to negatively acknowledge all the received blocks.

The SS observes the uplink packet channel. The MS shall retransmit the negatively acknowledged RLC data blocks immediately in the order of age.

The SS assigns resources for the mobile station to transmit the following blocks.

The SS wait for BS_CV_MAX block periods, then sends a Packet Uplink Ack/Nack message, the EGPRS Ack/Nack Description IE contains: SSN=N1+n1(n1>0 and N1+n1<N), BOW=1, EOW=1, and the last entry in the RB correspond to the BSN=N-n2 block.

The SS assigns resources for the mobile station to transmit the following blocks.

The SS verifies that:

1. Blocks with BSN=N1, N1+1, … , N1+n1-2 are not retransmitted.

2. Block with BSN=N1+n1-1 are retransmitted.

3. Blocks with BSN=N-n2+1 to N-1 are retransmitted.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	n = 22*100 octets, USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1 EGPRS Window Size: 160.
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4	SS	-	Repeat steps 2 and 3 for 5 times.
5	SS	-	Wait BS_CV_MAX periods without granting USF.
6	SS -> MS	PACKET UPLINK ACK/NACK	SS negatively acknowledges all received RLC data blocks. Pre-emptive Bit: '0'B
7	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
8	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
9	SS	-	Repeat steps 7 and 8 for 99 times.
	SS		Wait BS_CV_MAX periods without granting USF.
10	SS -> MS	PACKET UPLINK ACK/NACK	Pre-emptive Bit = '0'B. SSN = 12. BOW = 1. EOW = 1. The last entry in the RB correspond to the BSN=90 RLC data block.
11	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
12	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH The MS may either resend the block with BSN=11 or send an already queued block.
13	SS	-	Repeat steps 11 and 12, and verify that 1. Blocks are not received with BSN = 0 - 10 (SSN-2). 2. Blocks are received with BSN = 11 (SSN-1). If not received in step 12 • Blocks are received with BSN = 91--99.
14		{Completion of uplink RLC data block transfer}	

53.1.1.8   Acknowledged Mode/ Uplink TBF/ Pre-emptive Transmission/ Default Mode

53.1.1.8.1   Conformance requirements

1. If $[V(S) < V(A) + WS]$ modulo SNS and no RLC data blocks have a corresponding element in V(B) with the value NACKED, the RLC data block with BSN = V(S) shall be transmitted and the corresponding element in V(B) shall be set to the value PENDING_ACK. If the transmitter is the mobile station, the pre-emptive transmission bit is set to '1'in the PACKET UPLINK ACK/NACK message and there are no further RLC data blocks available for transmission (i.e. the RLC data block with BSN= V(S) does not exist), the sending side shall transmit the oldest RLC data block whose corresponding element in V(B) has the value PENDING_ACK, then the next oldest block whose corresponding element in V(B) has the value PENDING_ACK, etc. If all RLC data blocks whose corresponding element in V(B) has the value PENDING_ACK have been transmitted once, the process shall be repeated beginning with the oldest RLC data block.

2. If the transmitter is the mobile station and the pre-emptive transmission bit is set to '0'in the PACKET UPLINK ACK/NACK message the transmitter shall not transmit the oldest RLC data block whose corresponding element in V(B) has the value PENDING_ACK (and the next continuing indefinitely). When a PACKET UPLINK ACK/NACK message is received the MS shall retransmit the RLC blocks which are set to NACKED in V(B) and new RLC data blocks as far as the transmit window (if advanced) allows.

3. The default for the mobile side is that the transmitter shall use pre-emptive transmission.

References

3GPP TS 04.60, subclauses 9.1.3.2 and 11.2.28.

53.1.1.8.2   Test purpose

1. To verify that the MS shall use pre-emptive transmission as default mode before PACKET UPLINK
   ACK/NACK messages are received.

53.1.1.8.3   Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2
activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The MS is made to establish an uplink EGPRS TBF and to transmit N RLC data blocks.

1. The SS does not send any PACKET UPLINK ACK/NACK message.

2. The SS observes the uplink packet channel.

3. The MS shall retransmit the transmitted RLC data blocks in the original order after all the N data blocks are
   transmitted or after the transmission window is stalled.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	n = 1000 octets (Chosen so that number of RLC data blocks doesn't exceed Window Size) USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1 EGPRS Window Size: 64.
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4	SS	-	Repeat step 2,3 until CV=0 The SS verifies that the BSN sequence in the received RLC data blocks is: 0, 1, 2, ..., till BSN_MAX (CV=0 for BSN=BSN_MAX)
5	SS	-	Repeat steps 2 and 3 The SS verifies that the BSN sequence in step 4 is repeated.
6		{Completion of uplink RLC data block transfer}	

53.1.1.9 Acknowledged Mode/ Uplink TBF/ Pre-emptive Transmission Bit Set to '1'

53.1.1.9.1 Conformance requirements

1. If $[V(S) < V(A) + WS]$ modulo SNS and no RLC data blocks have a corresponding element in V(B) with the value NACKED, the RLC data block with BSN = V(S) shall be transmitted and the corresponding element in V(B) shall be set to the value PENDING_ACK.

2. If the transmitter is the mobile station, the pre-emptive transmission bit is set to '1'in the PACKET UPLINK ACK/NACK message and there are no further RLC data blocks available for transmission (i.e. the RLC data block with BSN= V(S) does not exist), the sending side shall transmit the oldest RLC data block whose corresponding element in V(B) has the value PENDING_ACK, then the next oldest block whose corresponding element in V(B) has the value PENDING_ACK, etc. If all RLC data blocks whose corresponding element in V(B) has the value PENDING_ACK have been transmitted once, the process shall be repeated beginning with the oldest RLC data block.

References

3GPP TS 04.60, subclauses 9.1.3.2 and 11.2.28.

53.1.1.9.2 Test purpose

1. To verify when pre-emptive bit is set to '1' and there are no further data to be transmitted, the MS shall transmit the PENDING_ACK data blocks repeatedly.

2. To verify when pre-emptive bit is set to '1' and the transmission widow is stalled, the MS shall transmit the PENDING_ACK data blocks repeatedly.

53.1.1.9.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to establish an acknowledged mode uplink EGPRS TBF using coding scheme MCS-7 and begin to transmit N0+N1 uplink RLC data blocks where N0 and N1 are even integers, N0+N1>WS (Window Size) and N0<WS, N1<WS.

The SS sends a PACKET UPLINK ACK/NACK message with Preemptive Bit set to '1' after several RLC data blocks are received. No RLC data block is acknowledged.

The SS verifies that the BSN sequence in the uplink RLC data blocks is: 0,1,...,WS-1.

The SS receives RLC data blocks which are set to PENDING_ACK in V(B) and verifies that the BSN sequence before is repeated.

The SS then sends a PACKET UPLINK ACK/NACK message with Preemptive Bit set to '1' All blocks with BSN=0 to N0-1 are acknowledged.

The SS verifies that the BSN sequence in the received uplink RLC data blocks is: N0, N0+1, …, N0+N1-1, N0, N0+1, ...

The SS receives RLC data blocks which are set to PENDING_ACK in V(B) and verifies that the BSN sequence before is repeated.

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	n = 56*(N0+N1) octets, USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-7 EGPRS Window Size: 64.
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS negatively acknowledges all received RLC data blocks. Pre-emptive Bit: '1'B
5	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
6	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH MS may transmit BSN=2,3 if already queued. Otherwise, it transmits the negatively acknowledged block with BSN = 0,1
7	SS	-	Repeat steps 5 and 6 until Block with BSN = 63 is received. The SS verifies that the BSN sequence in the uplink RLC data blocks is: If BSN=0,1 received in step 6: 2,3 ...,63. If BSN=2,3 received in step 6: 0,1,4,5...,63.
8	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
9	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
10	SS	-	Repeat steps 8 and 9 until BSN's 0, ..., 63 are received. This verifies that pending ack blocks in V(B) are retransmitted repeatedly.
11	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges RLC data blocks from BSN 0 to N0-1 with RBB set to 1 and negatively acknowledges rest RLC data blocks with RBB set to 0, Pre-emptive Bit: '1'B Wait for 6 blocks with no USF
12	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
12A(optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	The MS may send blocks BSN1=0 and BSN2=1, if already buffered. Received on the assigned PDTCH
12B(optional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
13	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
14	SS	-	Repeat steps 12 & 13 until CV=0 and verify that negatively acknowledged blocks with BSN=N0, N0+1 , …, 63 are retransmitted and new blocks with BSN=64, 65,…, till BSN_MAX (CV=0 for BSN=BSN_MAX) are transmitted.
15			Repeat steps 12 & 13 and verify that blocks which are set to pending ack in V(B) whith BSN=N0, N0+1, …, 63, 64, 65,…, till BSN_MAX are repeatedly retransmitted.
16		{Completion of uplink RLC data block transfer}	

53.1.1.10 Acknowledged Mode/ Uplink TBF/ Pre-emptive Transmission Bit Set to '0'/ PENDING_ACK Blocks

53.1.1.10.1 Conformance requirements

1. If the transmitter is the mobile station and the pre-emptive transmission bit is set to '0' in the PACKET UPLINK ACK/NACK message the transmitter shall not transmit the oldest RLC data block whose corresponding element in V(B) has the value PENDING_ACK (and the next continuing indefinitely). When a PACKET UPLINK ACK/NACK message is received the MS shall retransmit the RLC blocks which are set to NACKED in V(B) and new RLC data blocks as far as the transmit window (if advanced) allows.

2. However if the RLC data block is the last in the TBF it shall be retransmitted even if its state is PENDING_ACK.

References

3GPP TS 04.60, subclauses 9.1.3.2 and 11.2.28.

53.1.1.10.2 Test purpose

1. To verify that the MS shall not retransmit the PENDING_ACK blocks when pre-emptive bit is set to '0' and the block is not the last block in the TBF.

2. To verify that the MS shall retransmit the PENDING_ACK blocks when pre-emptive bit is set to '0' and the block is the last block in the TBF.

53.1.1.10.3 Method of test

Initial Conditions

System Simulator:

   1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

   The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The MS is made to transmit WS+2 uplink RLC data blocks in an acknowledged mode uplink EGPRS TBF. WS is the window size value.

1. The SS does not acknowledge any uplink RLC data block.

2. The SS sends a Packet Uplink Ack/Nack message with Preemptive Bit = 0, and no blocks are acknowledged.

3. The SS verifies that the stall indicator is set in the latest received RLC data block.

4. The SS checks that the transmitted blocks are not retransmitted.

5. The SS sends a PACKET UPLINK ACK/NACK message to acknowledge all the received data blocks. Pre-emptive Bit is set to '0'.

6. The SS checks that new blocks are transmitted once, and the last block with BSN=WS+1 is retransmitted repeatedly.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	n = 2000 octets (Chosen so that number of data blocks is greater than WS and less than 2*WS) USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1 EGPRS Window Size: 64.
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS negatively acknowledges the received RLC data block (BSN=0). Pre-emptive Bit: '0'B SSN=1, no bitmap.
5	SS	-	Repeat steps 2 and 3 until block with BSN=63 (WS-1) is received.
6	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
7	MS -> SS	PACKET UPLINK DUMMY CONTROL BLOCK	
8	SS -> MS	PACKET UPLINK ACK/NACK	The SS acknowledges all RLC data blocks. USF not assigned to the MS. Pre-emptive Bit: '0'B
9	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A10 (optional step)	MS -> SS	PACKET UPLINK DUMMY CONTROL BLOCK	MS may transmit PACKET UPLINK DUMMY CONTROL BLOCK if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B10 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
10	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
11	SS	-	Repeat steps 9 and 10 until CV=0 and verify that BSN_MAX are transmitted and BSN value increase sequentially. CV = 0 for BSN = BSN_MAX. Optional steps A10 and B10 are not permitted in the repeated loop.
12	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
13	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH Verify that the data block with BSN=BSN_MAX sent with CV=0 is retransmitted
14	SS	-	Repeat steps 12 and 13 several times The SS verifies that the received RLC data blocks have the same BSN as in Step 13.
15		{Completion of uplink RLC data block transfer}	

53.1.1.11 Acknowledged Mode/ Uplink TBF/ Pre-emptive Transmission Bit Set to '0'/ Negative Acknowledgement

53.1.1.11.1 Conformance requirements

1. If the transmitter is the mobile station and the pre-emptive transmission bit is set to '0' in the PACKET UPLINK ACK/NACK message the transmitter shall not transmit the oldest RLC data block whose corresponding element

in V(B) has the value PENDING_ACK (and the next continuing indefinitely). When a PACKET UPLINK ACK/NACK message is received the MS shall retransmit the RLC blocks which are set to NACKED in V(B) and new RLC data blocks as far as the transmit window (if advanced) allows.

2. If a compressed reported bitmap is received, the bitmap shall first be decompressed according to Subclause 9.1.10. The uncompressed bitmap shall then be treated as follows:

3. Firstly, if the BOW bit is set in the Reported Bitmap, then this bitmap acknowledges all blocks between V(A) and (SSN- 2) modulo SNS, and the corresponding elements in V(B) shall be set to the value ACKED. Also a bitmap value of '0' is assumed at the bit position corresponding to (SSN-1) modulo SNS which corresponds to V(Q).

4. Then, for each bit in the uncompressed bitmap whose corresponding BSN value is within the transmit window, if the bit contains the value '1', the corresponding element in V(B) indexed relative to SSN shall be set to the value ACKED. If the bit contains the value '0', the element in V(B) shall be set to the value NACKED. A bit within the uncompressed bitmap whose corresponding BSN is not within the transmit window, shall be ignored. If the EOW bit is set, assume a bitmap value of '0' for all RLC blocks with a BSN value higher than the last entry in the bitmap but less than V(S) (i.e. [V(R) - 1 < BSN < V(S)] modulo SNS). If the RLC transmitter is on the mobile station side, the bit contains the value '0' and the RLC data block was recently (re)transmitted and thus can not be validly negatively acknowledged in this particular Packet Ack/Nack message, the element in V(B) shall not modified. Similarly, if the RLC transmitter is on the network side and the RLC data block cannot be validly negatively acknowledged in this particular Packet Ack/Nack message the element in V(B) shall not be modified.

References

3GPP TS 04.60, subclauses 9.1.3.2, 9.1.8.2.4 and 11.2.28.

53.1.1.11.2 Test purpose

1. To verify that the MS shall transmit the NACKED blocks when pre-emptive bit is set to '0'.

53.1.1.11.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The MS is made to transmit N uplink RLC data blocks in an acknowledged mode uplink EGPRS TBF. Number N is greater than the window size.

1. The SS receives uplink RLC data blocks with BSN=0, 1, 2, 3……63.

3. The SS wait for BS_CV_MAX block periods.

4. The SS transmits a PACKET UPLINK ACK/NACK message to acknowledge blocks 0,1,2, and 3 and negatively acknowledge all the other received data blocks, Pre-emptive Bit is set to '0'B in the message.

5. The SS checks that BSN=4 block is retransmitted immediately. The MS may send a new EGPRS Data block which might have been queued in the transmit buffer before sending the Datablock with BSN=4

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 22*74 octets, USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1 EGPRS Window Size: 64
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4	SS	-	Repeat steps 2 and 3 until stall indicator is set in the received data block. SS verifies that RLC data blocks BSN=0, 1, 2, 3…63, 0are received.
5	SS	-	Wait for BS_CV_MAX block periods after the last received RLC data block.
6	SS -> MS	PACKET UPLINK ACK/NACK	SS acknowledges the RLC data blocks BSN=0..3 with RB set to 1 and negatively acknowledges the rest with RB set to 0. USF not assigned to the MS. Pre-emptive Bit: '0'B.
7			Wait for 6 blocks with no USF
8	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
8A (optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	The MS may send a Data Block with BSN=1 if already buffered
8B (optional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
9	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH The SS verifies that received RLC data block BSN = 4.
10			Repeat Steps 8 and 9. Verify that all the Nacked blocks from BSN 4 to BSN 63 are sent once and new blocks with BSN 64 till BSN 67 are sent once. Also verify that no further data blocks are sent by the mobile in response to PACKET DOWNLINK DUMMY CONTROL BLOCKS. Note: The MS may transmit a PACKET UPLINK DUMMY CONTROL BLOCK after the last EGPRS RLC DATA BLOCK (i.e. BSN=67).
11	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges all received RLC data blocks. USF assigned to the MS.
11A (optional step)	MS -> SS	PACKET UPLINK DUMMY CONTROL BLOCK	MS may transmit PACKET UPLINK DUMMY CONTROL BLOCK if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
11B (conditional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	(If optional step 11A was received) USF assigned to the MS.
12	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH.
13		{Completion of uplink RLC data block transfer}	

53.1.1.12 Acknowledged Mode/ Uplink TBF/ Retransmission/ Split RLC Data Block

53.1.1.12.1 Conformance requirements

1. In RLC acknowledged mode, each RLC endpoint transmitter shall have an associated acknowledge state array (V(B)).

2. The transmitter shall transmit the oldest RLC data block whose corresponding element in V(B) indexed relative to V(A) has the value NACKED. As each RLC data block is transmitted the corresponding element in V(B) is set to the value PENDING_ACK.

3. Depending on the modulation and coding scheme, one or two RLC data blocks are contained in one RLC/MAC block. For MCS-7, MCS-8, MCS-9 there are two RLC data blocks in one RLC/MAC block.

4. A re-segment bit is included within each PACKET UPLINK ACK/NACK, PACKET UPLINK ASSIGNMENT and PACKET TIMESLOT RECONFIGURE message. For initial transmissions of new RLC blocks the channel coding commanded is applied. The re-segment bit is used to set the ARQ mode to type I or type II (incremental redundancy) for uplink TBFs.

5. For retransmissions, setting the re-segment bit to 1 (type I ARQ) requires the mobile station to use an MCS within the same family as the initial transmission and the payload may be split.

6. If the RLC data block to be transmitted is split over two radio blocks, both radio blocks shall be transmitted

7. RLC data blocks initially transmitted with MCS4, MCS-5, MCS-6, MCS-7, MCS-8 or MCS-9, can optionally be retransmitted with MCS-1, MCS-2 and MCS-3 respectively, using two radio blocks. In this case, the split block field in the header shall be set to indicate that the RLC data block is split, and the order of the two parts.

References

3GPP TS 04.60, subclauses 9.1.8, 9.1.3.2, 9.3.2.1, 10.0a.2, 10.3a.4 and 10.4.8b.

3GPP TS 04.04.

3GPP TS 05.03.

53.1.1.12.2 Test purpose

1. To verify that if the RLC data block to be transmitted is split over two radio blocks, both radio blocks shall be transmitted.

2. To verify the correct setting of the Split Block field in the block header.

3. To verify that the order of the retransmitted two parts of the data block is correct.

53.1.1.12.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode. The EGPRS Channel Coding Command IE indicates MCS-4 in the Packet Uplink Assignment message.

After BS_CV_MAX block periods the SS sends a Packet Uplink Ack/Nack message to negatively acknowledge some RLC data blocks. In the message EGPRS Channel Coding Command IE is set to MCS-1 and Re-segment IE should be set to '1'B.

The MS shall retransmit the NACKED RLC data blocks using MSC-1 in splitted radio blocks. Observe the uplink RLC data block header. Both of split blocks shall be received, the first one shall contain a SPB field equals to '10'B while the second shall be '11'B.

Maximum Duration of Test

30 minutes

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 1500 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-4
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the BSN starts from 0, and verifies the correct MCS is used.
4	-		Repeat steps 2 and 3 until the RLC data Block with BSN=8 is received.
5	-		Wait for BS_CV_MAX block periods.
6	SS -> MS	PACKET UPLINK ACK/NACK	SS acknowledges RLC data blocks from BSN 0 to 7 and negatively acknowledges last RLC data block (BSN = 8). USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-1. Resegment IE is set to '1'B.
7	-		Wait for 1 block period with no USF
8	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A9 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B9 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
9	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 8, SPB = '10'B. SS verifies that the NACKED RLC data blocks are received and that the correct MCS is used.
10	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
11	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 8, SPB = '11'B. SS verifies that the NACKED RLC data blocks are received and that the correct MCS is used.
12		{Completion of uplink RLC data block transfer}	

53.1.1.13 Acknowledged Mode/ Uplink TBF/ Calculation of BSN2

53.1.1.13.1 Conformance requirements

1. Each RLC data block contains a block sequence number (BSN) field that is 11 bits in length. At the time that an in-sequence RLC data block is designated for transmission, the value of BSN is set equal to the value of the send state variable V(S).

2. The transfer of RLC data blocks in the RLC acknowledged mode uses retransmissions of RLC data blocks. The transmitting side numbers the RLC data blocks via the block sequence number (BSN). The BSN is used for retransmission and for reassembly. The receiving side sends PACKET Ack/Nack messages in order to request retransmission of RLC data blocks.

3. In case two RLC data blocks are sent within a RLC/MAC block, BSN2 is relative to BSN1, provided the difference between the second block number and the first block modulo SNS is less than Window Size (WS).

4. Second block sequence number = [BSN1 + BSN2] modulo SNS.

References

3GPP TS 04.60, subclauses 9.1.4.2, 9.3.1 and 10.4.12 and table 8.1.1.1.

53.1.1.13.2 Test purpose

1. To verify that the mobile station correctly calculate the value of BSN 2.

53.1.1.13.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode. The Window Size is assigned to be 160.

The MS is made to transmit SNS-N RLC Data Blocks, where N<WS. SS acknowledges all the data blocks. The MS sends SNS-N+1 to SNS-N+WS data blocks. SS acknowledges all but two of these data blocks and negatively acknowledges these two data blocks with BSN=BSN_1 and BSN=BSN_2.

The MS is made to transmit another one Radio Block which contains two RLC data blocks.

The SS verifies that the Radio block (MCS-7 or MCS-9) contains the retransmission of the previously negatively acknowledged RLC data Blocks BSN_1 and BSN_2.

SS verifies that:

BSN1=BSN_1;

BSN2 = [BSN_2 - BSN_1] modulo SNS.

The test procedure is performed for various values of BSN_1 and BSN_2.

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	n = (74*2200 + 2000) octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-6 EGPRS Window size: 160
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN is correct (starts from 0), and the correct MCS is used.
4	SS -> MS	PACKET UPLINK ACK/NACK	SS Acknowledges the UL RLC Data Block USF assigned to the MS.
5	-		Repeat steps 3 and 4 until all blocks till BSN=SNS -N are received by SS.
6	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
7	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDCH. SS verifies the BSN and MCS used are correct.
8	-		Repeat steps 6 and 7 until Stall Indicator bit is set. SS verifies that all blocks from BSN=SNS-N+1 till BSN=SNS-N+WS mod SNS are received.
9	-		Wait for BS_CV_MAX block periods.
10	SS -> MS	PACKET UPLINK ACK/NACK	SS acknowledges all RLC Data Blocks except the two blocks with BSN=BSN_1 and BSN=BSN_2 and negatively acknowledges these data blocks. (BSN_1 or BSN_2 not equal to SNS-N+2) EGPRS CHANNEL CODING COMMAND:MCS-9 USF not assigned to the MS.
11	-		Wait for BS_CV_MAX Block periods with no USF
12	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
13a (optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH MS may retransmit the first in step 10 not acknowledged BSN using MCS-6 if already queued.
13b (optional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
13	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that BSN1=BSN_1 and BSN2=(BSN_2-BSN_1)modSNS in the received RLC data block header.
14		{Completion of RLC Data block transfer}	
			The above test procedure is repeated for various values of BSN_1 and BSN_2 and also for MCS-5 for initial transmission and MCS-7 for retransmission.

53.1.1.14   Acknowledged Mode/ Uplink TBF/ Verification of Coding Schemes

53.1.1.14.1   Conformance requirements

1. In EGPRS TBF mode, RLC data blocks that are transmitted for the first time shall be transmitted with the MCS commanded, except if the commanded mode is MCS-5-7, in which case the data block shall be transmitted with MCS-5, or if the commanded mode is MCS-6-9, in which case the data block shall be transmitted with MCS-6.

2. A re-segment bit is included within each PACKET UPLINK ACK/NACK, PACKET UPLINK ASSIGNMENT and PACKET TIMESLOT RECONFIGURE messages.

3. For retransmissions, setting the resegment bit to '1' (type I ARQ) requires the mobile station to use an MCS within the same family as the initial transmission and the payload may be split.

References

3GPP TS 04.60, subclause 8.1.1.

53.1.1.14.2 Test purpose

1. To verify that the mobile station uses the correct channel coding commanded by the Network for initial transmission.

2. To verify that correct channel coding command is used for retransmission.

53.1.1.14.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- Support of PSK in uplink (TSPC_Type_EGPRS_8PSK_uplink)

PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode. The EGPRS Channel Coding Command IE is commanded in the Packet Uplink Assignment message. The resegment IE is set to 1.

The SS checks that the Uplink RLC Data Blocks are transmitted by the mobile using the channel coding scheme commanded by the SS.

The SS negatively acknowledges the received data blocks. The Coding scheme to be used by the mobile is commanded in the EGPRS Channel Coding Command IE.

The SS checks that the Uplink RLC data blocks are retransmitted using the channel coding scheme commanded by the SS.

Maximum Duration of Test

5 minutes.

Expected Sequence

MS supporting 'EGPRS capable of 8PSK in Uplink, of all Multislot classes' should run the test for k=0, k=1 and k=2 for steps 1-16 and k=3 for step 1-9 and step 16.

Otherwise (MS NOT supporting 8PSK in Uplink) should run only the test with k=3 (steps 1-9 and step 16)

Expected Sequence

Step	Direction	Message	Comments
			For K=0 MCS-A = MCS-9 MCS-B = MCS-6 MCS-C = MCS-3 For K=1 MCS-A = MCS-8 MCS-B = MCS-6 MCS-C = MCS-3 For K=2 MCS-A = MCS-7 MCS-B = MCS-5 MCS-C = MCS-2 For K=3 MCS-A = MCS-4 MCS-B = MCS-1
1		{Uplink dynamic allocation two phase access}	N = 1000 octets USF_GRANULARITY = 1 block Resegment IE=1 EGPRS Channel Coding Command: MCS-A
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the correct MCS MCS-A is used.
4	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
5	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the correct MCS MCS-A is used.
6	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges first RLC data block, and negatively acknowledges second RLC data block. USF not assigned to the MS Resegment IE=1 EGPRS Channel Coding Command: MCS-B
7			Wait for 6 blocks with no USF
8	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
9a (optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The MS may send a new data block already in the transmit buffer using MCS-A
9b (optional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	If optional step 9a was received. Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
9	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the correct MCS MCS-B is used.
10	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
11	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the correct MCS MCS-B is used.
12	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS negatively acknowledges the retransmitted RLC data block. EGPRS Channel Coding Command: MCS-C USF not assigned to the MS Resegment IE=1 Wait for 6 blocks with no USF
13	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
14a (optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The MS may send a new data block already in the transmit buffer using MCS-B

Step	Direction	Message	Comments
14b (optional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	If optional step 14a was received. Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
15	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the correct MCS MCS-C is used.
16		{Completion of uplink RLC data block transfer}	

53.1.1.15 Acknowledged Mode/ Uplink TBF/ Recalculation of CV on MCS change

53.1.1.15.1 Conformance requirements

1. The mobile station shall send the Countdown Value (CV) in each uplink RLC data block to indicate to the network the absolute BSN (BSN') of the last RLC data block that will be sent in the uplink TBF. The CV shall be calculated as follows.

$$\text{Let integer } x = round\left(\frac{TBC - BSN' - 1}{NTS \times K}\right).$$

$$\text{then, } CV = \begin{cases} x, & \text{if } x \le BS\_CV\_MAX, \\ 15, & \text{otherwise.} \end{cases}$$

where:

- TBC = total number of RLC data blocks that will be transmitted in the TBF;

- BSN' = absolute block sequence number of the RLC data block, with range from 0 to (TBC - 1);

- NTS = number of timeslots assigned to the uplink TBF in the assignment message, with range 1 to 8;

- the function round() rounds upwards to the nearest integer;

- BS_CV_MAX is a parameter broadcast in the system information;

- the division operation is non-integer and results in zero only for (TBC - BSN' - 1) = 0;

- K = 2 when commanded MCS is MCS-7, MCS-8 or MCS-9, otherwise K=1.

2. If the mobile station receives a change in the Channel Coding Command in a PACKET UPLINK ACK/NACK message during the countdown procedure, the mobile station shall act upon the new Channel Coding Command. The mobile station shall then recalculate the CV values for any untransmitted RLC data blocks using the new RLC data block size.

In EGPRS TBF mode, a MS may choose an alternate MCS than the one commanded, for the initial transmission of the last RLC data blocks of the TBF under the following conditions:

- The alternate MCS is more robust than the commanded MCS;

- The alternate MCS has already been commanded by the network during the TBF or was available for selection by the MS during the TBF according to the MCS selection rules for retransmissions; and

- The TBF requires no more radio blocks for initial transmission of the RLC data blocks using the alternate MCS than would be required when using the commanded MCS.

References

3GPP TS 04.60, subclause 8.1.1, 9.3.1 and clause F.3.

53.1.1.15.2 Test purpose

To verify that the mobile station correctly recalculates the CV values when the MCS is changed during countdown procedure.

53.1.1.15.2 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present, BS_CV_MAX = 15.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode. MCS-9 is commanded. Total number of Data Blocks is taken to be a minimum of 20 blocks.

SS acknowledges all the Data Blocks upon reception.

SS monitors the CV of the data blocks sent.

SS sends a PACKET UL ACK/NACK message acknowledging the RLC data block with CV = 14 or CV = 13 and ordering a change of MCS to MCS-6.

The Mobile might send a new Data Block with MCS-9 which could have been stored in the Transmit buffer.

SS notes the BSN of the last data block, received with MCS9 as BSN2SS verifies that CV=15 till BSN=BSN2+2*CV1-15 or BSN=BSN2+2*CV1-16 (MS can select alternate MCS)

where CV1 = CV in the last radio block received with MCS9

SS verifies that CV decreases progressively in further blocks.

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N chosen to transmit minimum 20 blocks USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-9
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN starts from 0, and the correct MCS is used.
4	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS Acknowledges the UL RLC Data Block USF assigned to the MS.
5	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN values are in sequence, and the correct MCS is used.
6	-		Repeat steps 4 and 5 until CV = 14 or CV = 13
7	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS Acknowledges the UL RLC Data Block EGPRS CHANNEL CODING COMMAND: MCS-6
8	-		Wait for 6 blocks with no USF
9	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
Optional Step 10a	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	The MS may send a data block already in the buffer using coding scheme MCS-9. If received, the value of CV and BSN2 of the radio block shall be taken for further calculation.
Optional Step 10b	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
10	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that coding scheme MCS-6 is used; BSN=BSN2+1 and CV = 15.
11	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS Acknowledges the UL RLC Data Block USF assigned to the MS.
12	-		Repeat steps 10 and 11 until BSN= BSN2+ 2*CV1 – 15; SS verifies that CV remains 15 until BSN= BSN2+ 2*CV1 – 16 CV may be 14 for BSN= BSN2+ 2*CV1 – 15 in case MS choose to use an alternate coding scheme to transmit the last block of the TBF. Else CV=15 for BSN= BSN2+ 2*CV1 – 15
13	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDCH. SS verifies that the BSN = BSN2+ 2*CV1 – 14 In case CV=14 was received for BSN= BSN2+ 2*CV1 – 15, CV=13 in the received Data block. else CV=14 in the received Data Block.
14	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS Acknowledges the UL RLC Data Block USF assigned to the MS.
15	MS->SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDCH. SS verifies that BSN is incremented by 1 and CV is decremented by 1
16		[Completion of RLC Data Block Transfer]	

53.1.1.16 Acknowledged Mode/ Uplink TBF/ Retransmission/ Padding in the Data Field

53.1.1.16.1 Conformance requirements

1. According to the link quality, an initial Modulation and Coding Scheme (MCS) is selected for an RLC block. For the retransmissions, the same or another MCS from the same family of MCSs can be selected.

2. For blocks initially transmitted with MCS-8 which are retransmitted using MCS-6 or MCS-3, padding of the first six octets in the data field shall be applied, and the CPS field shall be set to indicate that this has been done.

References

3GPP TS 04.60, subclauses 9.3.2.1 and 10.4.8a.

53.1.1.16.2 Test purpose

1. To verify the padding of the first six octets in the data field for blocks initially transmitted with MCS-8 and retransmitted using MCS-6 or MCS-3.

2. To verify that the CPS field is set to indicate padding in the retransmitted blocks.

53.1.1.16.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode. The EGPRS Channel Coding Command IE indicates MCS-8 in the Packet Uplink Assignment message.

After BS_CV_MAX block periods the SS sends a Packet Uplink Ack/Nack message to negatively acknowledge some RLC data blocks. In the message EGPRS Channel Coding Command IE is set to MCS-6 or MCS-3 and Resegment IE should be set to '1'.

The MS shall then retransmit the NACKED RLC data blocks using MCS-6 or MCS-3. The SS verifies that the first 6 octets in the retransmitted RLC data blocks are padding octets and the CPS field in the RLC/MAC header indicates padding.

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 1500 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-8 BS_CV_MAX = Default value as specified in section 50. Execution counter K = 0
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the BSN1 value is 2*K and BSN2 value is 2*K+1, and verifies the correct MCS is used.
4			Increment counter K
5	-		Repeat steps 2 to 4 until execution counter K reaches 3 (8 RLC data blocks received with BSN 0 .. 7).
6	-		Wait BS_CV_MAX block periods after the last received RLC data block.
7	SS -> MS	PACKET UPLINK ACK/NACK	SS acknowledges RLC data blocks from BSN 0 to 5 with the corresponding bits in RBB set to 1 and negatively acknowledges last RLC data blocks (BSN = 6, 7) with bits in RBB set to 0, USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-6. Resegment IE is set to '1'.
8	-		Wait for 6 blocks with no USF
9	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
10a (optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may send an RLC data block stored in its transmit buffer. If received execute optional step 10b
10b (optional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
10	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The SS verifies that the first 6 octets in the retransmitted RLC data blocks are padding octets and the CPS field in the RLC/MAC header indicates padding. BSN = 6, CPS = '010'B SS verifies that the NACKED RLC data blocks are received with the correct MCS.
11	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
12	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The SS verifies that the first 6 octets in the retransmitted RLC data blocks are padding octets and the CPS field in the RLC/MAC header indicates padding. BSN = 7, CPS = '010'B SS verifies that the NACKED RLC data blocks are received with the correct MCS.
13		{ Completion of uplink RLC data block transfer }	
14	-		Repeat step 1 to 13 with the following modifications: 1. EGPRS Channel Coding Command set to MCS-3 at step 7; 2. Use step 15-22 as the replacement of step 10-13 due re-segmentation.
15	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The SS verifies that the first 6 octets in the retransmitted RLC data blocks are padding octets and the CPS field in the RLC/MAC header indicates padding. BSN = 6, SPB = '10'B, CPS = '0110'B SS verifies that the NACKED RLC data blocks are received with the correct MCS.
16	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.

Step	Direction	Message	Comments
17	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 6, SPB = '11'B, CPS = '0011'B or '0110'B SS verifies that the NACKED RLC data blocks are received with the correct MCS.
18	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
19	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The SS verifies that the first 6 octets in the retransmitted RLC data blocks are padding octets and the CPS field in the RLC/MAC header indicates padding. BSN = 7, SPB = '10'B, CPS = '0110'B SS verifies that the NACKED RLC data blocks are received with the correct MCS.
20	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
21	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 7, SPB = '11'B, CPS = '0011"B or '0110'B SS verifies that the NACKED RLC data blocks are received with the correct MCS.
22		{Completion of uplink RLC data block transfer}	

53.1.1.17 Acknowledged Mode/ Uplink TBF/ Retransmission/ Puncturing Scheme Cycle

53.1.1.17.1 Conformance requirements

1. On initial transmission the RLC data blocks are sent with one of the initial code rates (the rate 1/3 encoded data is punctured with Puncturing Scheme (PS) 1 of the selected Modulation and Coding Scheme MCS) and if the RLC data block is required to be retransmitted it is sent with PS 2 of the selected MCS.

2. If the RLC Data Blocks are to be retransmitted, additional coded bits (i.e., the output of the rate 1/3 encoded data which is punctured with PS 2 of the prevailing MCS) shall be sent.

3. If all the code words (different punctured versions of the encoded data block) have been sent, the procedure shall start over and the first code word (which is punctured with PS 1) shall be sent followed by PS 2 etc.

References

3GPP TS 04.60, subclauses 9.3.2.1 and 10.4.8a.

3GPP TS 05.05.

3GPP TS 05.09.

53.1.1.17.2 Test purpose

1. To verify that if the RLC data block is required to be retransmitted it is sent with PS 2 of the selected MCS for the first retransmission.

2. On subsequent retransmissions the RLC data block is transmitted with PS in a cyclic way.

53.1.1.17.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- Support of PSK in uplink (TSPC_Type_EGPRS_8PSK_uplink)

PIXIT Statements

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Test Procedure

The MS is made to transmit uplink RLC data blocks in an acknowledged mode uplink EGPRS TBF.

The SS NACK BSN=3 block for MCS-1, MCS-2, MCS-3, MCS-4 and MCS-5.

The SS NACK BSN=3 and BSN=4 blocks for MCS-7, MCS-8 and MCS-9.

The Puncture Scheme of the re-transmitted RLC data blocks (BSN=3, 4) is observed. The PS used for the retransmissions shall be PS2, then PS3, then back to PS1....

Maximum Duration of Test

5 minutes.

Expected Sequence

MSC5-9 in step 1 is used only if MS supports 'EGPRS capable of 8PSK in Uplink'

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 1000 octets, USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-3
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4	SS	-	Repeat steps 2-3 until BSN=5 RLC data block is received.
5	SS	-	Wait for BS_CV_MAX block periods.
6	SS -> MS	PACKET UPLINK ACK/NACK	SS negatively acknowledges the BSN=3 RLC data block and acknowledge all other blocks. USF not assigned to the MS. Wait for 6 blocks with no USF
7	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A8(optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block with BSN=6 if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B8 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
8	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that a block with BSN=3, Puncture Scheme PS2 is received.
9	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS negatively acknowledges the BSN=3 RLC data block and acknowledge all other blocks. SSN=4. USF not assigned to the MS. Wait for 6 blocks with no USF.
10	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
A11(optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block with subsequent BSN if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B11 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
11	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that a block with BSN=3, Puncture Scheme PS3 is received.
12	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS negatively acknowledges the BSN=3 RLC data block and acknowledge all other blocks. SSN=4. USF not assigned to the MS. Wait for 6 blocks with no USF.
13	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
A14(optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block with subsequent BSN if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B14 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
14	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that a block with BSN=3, Puncture Scheme PS1 is received.
15		{Completion of uplink RLC data block transfer}	

16	-		The above steps are repeated for EGPRS Channel Coding Command set to MCS-4. If the MS supports 'EGPRS capable of 8PSK in Uplink', the above steps are repeated for EGPRS Channel Coding Command set to MCS-7, MCS-8 and MCS 9 in step 1. In steps 6, 9 and 12 the SS negatively acknowledges the BSN=3 and BSN=4 RLC data blocks and acknowledge all other blocks. In steps 8, 11 and 14 the SS verifies that the blocks with BSN=3 and BSN=4 are received. The coding command is set to MCS 1, MCS 2, and if the MS supports 'EGPRS capable of 8PSK in Uplink' MCS-5 and MCS-6 in Step 1. Verify that Steps 1-8 and Steps 12 to 14 are repeated. Reason: Since there is no PS3 for MCS-1, MCS2, MCS-5 and MCS-6.

53.1.1.18 EGPRS Acknowledged mode / Uplink TBF / Link Adaptation Procedure for retransmission

53.1.1.18.1 Conformance requirements

1. In EGPRS TBF mode, RLC data blocks that are transmitted for the first time shall be transmitted with the MCS commanded, except if the commanded mode is MCS-5-7, in which case the data block shall be transmitted with MCS-5, or if the commanded mode is MCS-6-9, in which case the data block shall be transmitted with MCS-6. In EGPRS TBF mode, a MS may choose an alternate MCS than the one commanded, for the initial transmission of the last RLC data blocks of the TBF under the following conditions:

   - the alternate MCS is more robust than the commanded MCS;

   - the alternate MCS has already been commanded by the network during the TBF or was available for selection by the MS during the TBF according to the MCS selection rules for retransmissions; and

   - the TBF requires no more radio blocks for initial transmission of the RLC data blocks using the alternate MCS than would be required when using the commanded MCS.

   A re-segment bit is included within each PACKET UPLINK ACK/NACK, PACKET UPLINK ASSIGNMENT and PACKET TIMESLOT RECONFIGURE messages. For initial transmissions of new RLC blocks the channel coding commanded is applied. The resegment bit is used to set the ARQ mode to type I or type II (incremental redundancy) for uplink TBFs. For retransmissions, setting the resegment bit to '1' (type I ARQ) requires the mobile station to use an MCS within the same family as the initial transmission and the payload may be split (refer to table 1).

Table 1: Choice of MCS for retransmissions with re-segmentation

Scheme used for initial transmission	Scheme to use for retransmissions after switching to a different MCS										
	MCS-9 Commanded	MCS-8 Commanded	MCS-7 Commanded	MCS-6-9 Commanded	MCS-6 Commanded	MCS-5-7 Commanded	MCS-5 Commanded	MCS-4 Commanded	MCS-3 Commanded	MCS-2 Commanded	MCS-1 Commanded
MCS-9	MCS-9	MCS-6	MCS-6	MCS-6	MCS-6	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3
MCS-8	MCS-8	MCS-8	MCS-6 (pad)	MCS-6 (pad)	MCS-6 (pad)	MCS-3 (pad)	MCS-3 (pad)	MCS-3 (pad)	MCS-3 (pad)	MCS-3 pad)	MCS-3 (pad)
MCS-7	MCS-7	MCS-7	MCS-7	MCS-5	MCS-5	MCS-5	MCS-5	MCS-2	MCS-2	MCS-2	MCS-2
MCS-6	MCS-9	MCS-6	MCS-6	MCS-9	MCS-6	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3
MCS-5	MCS-7	MCS-7	MCS-7	MCS-5	MCS-5	MCS-7	MCS-5	MCS-2	MCS-2	MCS-2	MCS-2
MCS-4	MCS-4	MCS-4	MCS-4	MCS-4	MCS-4	MCS-4	MCS-4	MCS-4	MCS-1	MCS-1	MCS-1
MCS-3	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3	MCS-3
MCS-2	MCS-2	MCS-2	MCS-2	MCS-2	MCS-2	MCS-2	MCS-2	MCS-2	MCS-2	MCS-2	MCS-2
MCS-1	MCS-1	MCS-1	MCS-1	MCS-1	MCS-1	MCS-1	MCS-1	MCS-1	MCS-1	MCS-1	MCS-1

NOTE: MCS to use for retransmissions when re-segmentation (resegment bit set to '1') is carried out (specified as a function of the scheme used for the initial transmission).

References

3GPP TS 04.60, subclause 8.1.1.

3GPP TS 04.60, subclause 9.3.2.1.

3GPP TS 05.10, subclause 6.11.1.

53.1.1.18.2 Test purpose

1. To verify that the mobile station retransmits Nacked data blocks with the MCS commanded and according to table 1 (see above).

53.1.1.18.3 Method of test

Initial Conditions

System Simulator:

1 cell, default setting, , PBCCH not present.

Mobile Station:

The MS is GPRS attached with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP Context 2 activated.

Specific PICS Statements

- Support of PSK in uplink (TSPC_Type_EGPRS_8PSK_uplink)

PIXIT Statements

-

Test Procedure

The MS is made to transmit RLC data blocks. The SS negatively acknowledges RLC data blocks and commands the MS to use a different MCS (EGPRS Channel Coding Command). The MS retransmits the negatively acknowledged RLC data blocks and uses the commanded MCS by taking into acount the scheme specified in table 1 (see above).

Test Procedure is repeated for k = 1 to 9 with:

k=1: MCS-9 to be used at step 1,

k=2: MCS-8 to be used at step 1,

k=3: MCS-7 to be used at step 1,

k=4: MCS-6 to be used at step 1,

k=5: MCS-5 to be used at step 1,

k=6: MCS-4 to be used at step 1,

k=7: MCS-3 to be used at step 1,

k=8: MCS-2 to be used at step 1,

k=9: MCS-1 to be used at step 1.

MS NOT capable of 8PSK in Uplink should run only k=6 to 9 for step1-4 then step 30-51 with in step 30 SS acknowledging blocks BSN 0 to BSN 4 instead of only BSN 4

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{ Uplink dynamic allocation two phase access}	n = 5000 octets USF_GRANULARITY = 1 block Resegment bit =1 EGPRS CHANNEL_CODING_COMMAND: according to execution counter k (e.g. k=1: MCS-9)
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, USF assigned to the MS.
3	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4			Repeat steps 2 and 3 until received data block BSN = 30
5	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges RLC data blocks with BSN 10 to 30 (k>3), BSN 10 to 31 (k<=3) RBB set to 1 and negatively acknowledges the rest with RBB set to 0 USF not assigned to the MS EGPRS CHANNEL_CODING_COMMAND: MCS-9
6			Wait for 6 blocks with no USF
7	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, USF assigned to the MS.
A8(optional step)	MS -> SS	UPLINK RLC DATA BLOCK	MS may transmit new in-sequence data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B8 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
8	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = 0..9 (see note below)
9	SS		Repeat steps 7 & 8 nine times (see note below) SS verifies that the Nacked data blocks are received and that the correct MCS is used (see table 1)
10	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges retransmitted RLC data blocks with BSN 0 , RBB set to 1 and negatively acknowledges the rest with RBB set to 0 USF not assigned to the MS EGPRS CHANNEL_CODING_COMMAND: MCS-8
11			Wait for 6 blocks with no USF
12	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH, containing USF assigned to the MS.
A13(optional step)	MS -> SS	UPLINK RLC DATA BLOCK	MS may transmit new in-sequence data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B13 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
13	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = 1.. 9 (see note below). Note: If MCS>=7, BSN=9 may be sent with MCS<7.
14			Repeat steps 12 & 13 eight times (see note below) SS verifies that the Nacked data blocks are received and that the correct MCS is used (see table 1)
15	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges retransmitted RLC data blocks with BSN 1, RBB set to 1 and negatively acknowledges the rest with RBB set to 0 USF not assigned to the MS EGPRS CHANNEL_CODING_COMMAND: MCS-7
16			Wait for 6 blocks with no USF

Step	Direction	Message	Comments
17	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH, containing USF assigned to the MS.
A18(optional step)	MS -> SS	UPLINK RLC DATA BLOCK	MS may transmit new in-sequence data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B18 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
18	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = 2.. 9 (see note below)
19			Repeat steps 17 & 18 seven times (see note below) SS verifies that the Nacked data blocks are received and that the correct MCS is used (see table 1)
20	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges retransmitted RLC data blocks with BSN 2, RBB set to 1 and negatively acknowledges the rest with RBB set to 0 USF not assigned to the MS EGPRS CHANNEL_CODING_COMMAND: MCS-6
21			Wait for 6 blocks with no USF
22	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH, containing USF assigned to the MS.
A23(optional step)	MS -> SS	UPLINK RLC DATA BLOCK	MS may transmit new in-sequence data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B23 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
23	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = 3.. 9 (see note below)
24			Repeat steps 22 & 23 six times (see note below) SS verifies that the Nacked data blocks are received and that the correct MCS is used (see table 1)
25	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges retransmitted RLC data blocks with BSN 3, RBB set to 1 and negatively acknowledges the rest with RBB set to 0 USF not assigned to the MS EGPRS CHANNEL_CODING_COMMAND: MCS-5
26			Wait for 6 blocks with no USF
27	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH, containing USF assigned to the MS.
A28(optional step)	MS -> SS	UPLINK RLC DATA BLOCK	MS may transmit new in-sequence data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B28 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
28	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = 4.. 9 (see note below). Note: Data blocks can be sent as split blocks.
29			Repeat steps 27 & 28 five times (see note below) SS verifies that the Nacked data blocks are received and that the correct MCS is used (see table 1)
30	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges retransmitted RLC data blocks with BSN 4, RBB set to 1 and negatively acknowledges the rest with RBB set to 0 USF not assigned to the MS EGPRS CHANNEL_CODING_COMMAND: MCS-4

Step	Direction	Message	Comments
31			Wait for 6 blocks with no USF
32	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH, containing USF assigned to the MS.
A33(optional step)	MS -> SS	UPLINK RLC DATA BLOCK	MS may transmit new in-sequence data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B33 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
33	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = 5.. 9 (see note below). Note: Data blocks can be sent as split blocks.
34			Repeat steps 32 & 33 four times (see note below) SS verifies that the Nacked data blocks are received and that the correct MCS is used (see table 1)
35	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges retransmitted RLC data blocks with BSN 5, RBB set to 1 and negatively acknowledges the rest with RBB set to 0 USF not assigned to the MS EGPRS CHANNEL_CODING_COMMAND: MCS-3
36			Wait for 6 blocks with no USF
37	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH, containing USF assigned to the MS.
A38(optional step)	MS -> SS	UPLINK RLC DATA BLOCK	MS may transmit new in-sequence data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B38 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
38	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = 6.. 9 (see note below). Note: Data blocks can be sent as split blocks.
39			Repeat steps 37 & 38 three times (see note below) SS verifies that the Nacked data blocks are received and that the correct MCS is used (see table 1)
40	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges retransmitted RLC data blocks with BSN 6, RBB set to 1 and negatively acknowledges the rest with RBB set to 0 USF not assigned to the MS EGPRS CHANNEL_CODING_COMMAND: MCS-2
41			Wait for 6 blocks with no USF
42	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH, containing USF assigned to the MS.
A43(optional step)	MS -> SS	UPLINK RLC DATA BLOCK	MS may transmit new in-sequence data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B43 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
43	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = 7.. 9 (see note below). Note: Data blocks can be sent as split blocks.
44			Repeat steps 42 & 43 two times (see note below) SS verifies that the Nacked data blocks are received and that the correct MCS is used (see table 1)

Step	Direction	Message	Comments
45	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges retransmitted RLC data blocks with BSN 7, RBB set to 1 and negatively acknowledges the rest with RBB set to 0 USF not assigned to the MS EGPRS CHANNEL_CODING_COMMAND: MCS-1
46			Wait for 6 blocks with no USF
47	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH, containing USF assigned to the MS.
A48(optional step)	MS -> SS	UPLINK RLC DATA BLOCK	MS may transmit new in-sequence data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B48 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
48	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH BSN = 8.. 9 (see note below). Note: Data blocks can be sent as split blocks.
49			Repeat steps 47 & 48 once (see note below) SS verifies that the Nacked data blocks are received and that the correct MCS is used (see table 1)
50	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges retransmitted RLC data blocks with BSN 8..9, RBB set to 1
51		{ Completion of uplink RLC data block transfer}	

NOTE: The MS may send one further RLC data block during waiting for retransmission of Nacked data blocks to SS. This has to be taken into account for verifying the correct BSN's (see for example step 8) and for calculating the numbers of repetitions (see for example step 9).

53.1.1.19 EGPRS Acknowledged mode / Uplink TBF / Link Adaptation Procedure for initial transmission

53.1.1.19.1 Conformance requirements

1. In EGPRS TBF mode, RLC data blocks that are transmitted for the first time shall be transmitted with the MCS commanded, except if the commanded mode is MCS-5-7, in which case the data block shall be transmitted with MCS-5, or if the commanded mode is MCS-6-9, in which case the data block shall be transmitted with MCS-6.

2. If these rules require a transmission (either original transmission or retransmission) in in a) MCS-7 or b) MCS-8 or MCS-9, but there is only one RLC block that can be transmitted in that MCS, the MS shall send that block in either MCS-5 for case a) or MCS-6 for case b).

References

3GPP TS 04.60, subclause 8.1.1.

3GPP TS 04.60, subclause 9.3.2.1.

3GPP TS 05.10, subclause 6.11.1.

53.1.1.19.2 Test purpose

1. To verify that the mobile station transmits data blocks with the correct MCS in initial transmission.

53.1.1.19.3 Method of test

Initial Conditions

System Simulator:

1 cell, default setting, , PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP Context 2 activated.

Specific PICS Statements

- Support of PSK in uplink (TSPC_Type_EGPRS_8PSK_uplink)

PIXIT Statements

-

Test Procedure

The MS is made to transmit RLC data blocks. The SS acknowledges RLC data blocks and verify if the MS is using the correct MCS as mentioned above.

Execution counter k	Number of octets n	Commanded MCS to be used in step 1	Expected MCS to be used in step 4 (see note)
1	1500	MCS-9	MCS-9
2	1500	MCS-8	MCS-8
3	1500	MCS-7	MCS-7
4	1500	MCS-6-9	MCS-6
5	1500	MCS-6	MCS-6
6	1500	MCS-5-7	MCS-5
7	1500	MCS-5	MCS-5
8	1500	MCS-4	MCS-4
9	1500	MCS-3	MCS-3
10	1500	MCS-2	MCS-2
11	1500	MCS-1	MCS-1
12	5 (max 74)	MCS-9	One data block using MCS-6 or two data blocks using MCS-9
13	5 (max 68)	MCS-8	One data block using MCS-6 or or two data blocks using MCS-8
14	5 (max 56)	MCS-7	One data block using MCS-5 or or two data blocks using MCS-7
NOTE: For k = 12,13,14 the amount of data on RLC layer must not exceed the given max values			

Test Procedure is repeated for k = 1 to 14.

MS NOT supporting 'EGPRS capable of 8PSK in Uplink, of all Multislot classes' should run only k=8 to 11

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{ Uplink dynamic allocation two phase access}	n = number of octets according to execution counter k (e.g. k=1: n=1500) USF_GRANULARITY = 1 block Resegment bit =1 EGPRS CHANNEL_CODING_COMMAND: according to execution counter k (e.g. k=1: MCS-9) Window size=96
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, USF assigned to the MS.
3	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges the first RLC data block, RBB set to 1. SS verifies that the expected MCS is used according to execution counter k (e.g. k=1: MCS-9) (Skip step 5-8 for k=12,13,14)
5	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, USF assigned to the MS.
6	MS -> SS	UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
7			Repeat steps 5 and 6 until all data blocks has been received
8	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS acknowledges all RLC data blocks, RBB set to 1.
9		{Completion of uplink RLC data block transfer}	

53.1.1.20 Acknowledged Mode/ Uplink TBF/ Retransmission/ MCS Selection without Re-segmentation

53.1.1.20.1 Conformance requirements

1. If the transmitter side is the mobile station and the re-segment bit is not set, the mobile station shall use an MCS within the same family as the initial MCS without splitting the payload (refer to subclause 8.1.1 table 8.1.1.2, 3GPP TS 04.60) for retransmission.

References

3GPP TS 04.60, subclause 8.1.1.

53.1.1.20.2 Test purpose

1. To verify that if the re-segment bit is not set, the mobile station shall use an MCS within the same family as the initial MCS without splitting the payload for retransmission in accordance with subclause 8.1.1 table 8.1.1.2, 3GPP TS 04.60.

53.1.1.20.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

-   Support of PSK in uplink (TSPC_Type_EGPRS_8PSK_uplink)

PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode. The EGPRS Channel Coding Command IE in the Packet Uplink Assignment message is set according to the execution counter K described as below.

After BS_CV_MAX block periods the SS sends a Packet Uplink Ack/Nack message to negatively acknowledge some RLC data blocks. In the message EGPRS Channel Coding Command IE is set to a different MCS and Resegment IE should be set to '0'.

The MS shall then retransmit the negatively acknowledged RLC data blocks using the MCS specified in table 8.1.1.2, 3GPP TS 04.60.

Test procedure is repeated for K = 1 to 9 with:

   K=1: MCS-9 to be used at step 1,

   K=2: MCS-8 to be used at step 1,

   K=3: MCS-7 to be used at step 1,

   K=4: MCS-6 to be used at step 1,

   K=5: MCS-5 to be used at step 1,

   K=6: MCS-4 to be used at step 1,

   K=7: MCS-3 to be used at step 1,

   K=8: MCS-2 to be used at step 1,

   K=9: MCS-1 to be used at step 1.

MS NOT capable of 8PSK in Uplink should run only k=6 to 9 for step1-4 then step 31-52 with in step 31 SS acknowledging blocks BSN 0 to BSN 4 instead of only BSN 4

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = for K=1: 3500 octets. (K=2: 3000, K=3: 2500, K=4: 3500, K=5: 2500, K=6: 2100, K=7: 2000, K=8 1600, K=9: 1400 octets.) USF_GRANULARITY = 1 block EGPRS Channel Coding Command is set according to execution counter K (e.g., K=1: MCS-9)
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH The SS verifies that the BSN starts from 0, and verifies the correct MCS is used.
4	-		Repeat steps 2 and 3 until RLC data block BSN = 31.
5	-		Wait for BS_CV_MAX block periods relative to the last received RLC data block.
6	SS -> MS	PACKET UPLINK ACK/NACK	The SS acknowledges RLC data blocks from BSN 10 to 31 with RBB set to 1 and negatively acknowledges RLC data blocks from BSN 1 to 9 with RBB set to 0, SSN=1 (Note: This is NACK for BSN=0), USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-9. Resegment IE is set to '0'.
7	-		Wait for 6 blocks with no USF
8	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A9 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B9 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
9	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 0 The SS verifies that the NACKED data blocks are received using the correct MCS according to table 8.1.1.2, 3GPP TS 04.60. If k≤5 then RLC data block with BSN=1 is received in the same radio block.
10	-		Repeat steps 8 & 9 nine times if k>5 and 4 times otherwise. BSN shall be 0-9 in sequence.
11	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges RLC data block BSN=0 with SSN=2 and negatively acknowledges RLC data blocks from BSN 2 to 9 with RBB set to 0. For BSN>9 RBB is set to 1. USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-8. Resegment IE is set to '0'.
12	-		Wait for 6 blocks with no USF
13	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A14 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B14 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
14	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 1 The SS verifies that the NACKED data blocks are received using the correct MCS according to table 8.1.1.2, 3GPP TS 04.60. Also BSN=2 is received in the same radio block if k=2,3 or 5.

Step	Direction	Message	Comments
15	-		Repeat steps 13 & 14 3 times if k=2,3 or 5 and eight times otherwise. BSN shall be 1-8 (if k=2,3 or 5) or 1-9 in sequence.
16	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges RLC data block BSN 1 with SSN=3 and negatively acknowledges RLC data blocks from BSN 3 to 9 with RBB set to 0. For BSN>9 RBB is set to 1. USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-7. Resegment IE is set to '0'.
17	-		Wait for 6 blocks with no USF
18	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A19 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	For K=2, K=3 and K=5 the MS may retransmit a RLC data block with BSN=9. Else: MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B19 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
19	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 2..7 (if k=3 or 5), BSN = 2..8 (if k=2), otherwise BSN= 2 .. 9. The SS verifies that the NACKED data blocks are received using the correct MCS according to table 8.1.1.2, 3GPP TS 04.60.
20	-		Repeat steps 18 & 19 2 times if k=3 or k=5, 6 times if k=2 and seven times otherwise.
21	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges RLC data block BSN 2 with SSN=4 and negatively acknowledges RLC data blocks from BSN 3 to 9 with RBB set to 0. For BSN>9 RBB is set to 1. USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-6. Resegment IE is set to '0'.
22	-		Wait for 6 blocks with no USF
23	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A24 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	For k=3, 5 the MS may retransmit a data block with BSN=8. MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B24 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
24	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. If k=3 or 5 and step A24 was performed, BSN =3 ..7 and 9 will be received. Otherwise BSN = 3 .. 9 will be received. The SS verifies that the NACKED data blocks are received using the correct MCS according to table 8.1.1.2, 3GPP TS 04.60.
25	-		Repeat steps 23 & 24 six times.

Step	Direction	Message	Comments
26	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges RLC data block BSN 3 with SSN=5 and negatively acknowledges RLC data blocks from BSN 4 to 9 with RBB set to 0. For BSN>9 RBB is set to 1. USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-5. Resegment IE is set to '0'.
27	-		Wait for 6 blocks with no USF
28	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A29 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B29 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
29	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 4 .. 9 The SS verifies that the NACKED data blocks are received using the correct MCS according to table 8.1.1.2, 3GPP TS 04.60.
30	-		Repeat steps 28 & 29 five times.
31	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges RLC data block BSN 4 with SSN=6 and negatively acknowledges RLC data blocks from BSN 5 to 9 with RBB set to 0. For BSN>9 RBB is set to 1. USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-4. Resegment IE is set to '0'.
32	-		Wait for 6 blocks with no USF
33	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A34 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B34 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
34	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 5 .. 9 The SS verifies that the NACKED data blocks are received using the correct MCS according to table 8.1.1.2, 3GPP TS 04.60.
35	-		Repeat steps 33 & 34 four times.
36	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges RLC data block BSN 5 with SSN=7 and negatively acknowledges RLC data blocks from BSN 6 to 9 with RBB set to 0. For BSN>9 RBB is set to 1. USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-3. Resegment IE is set to '0'.
37	-		Wait for 6 blocks with no USF
38	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A39 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B39 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,

Step	Direction	Message	Comments
39	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 6 .. 9 The SS verifies that the NACKED data blocks are received using the correct MCS according to table 8.1.1.2, 3GPP TS 04.60.
40	-		Repeat steps 38 & 39 three times.
41	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges RLC data block BSN 6 with SSN=8 and negatively acknowledges RLC data blocks from BSN 7 to 9 with RBB set to 0. For BSN>9 RBB is set to 1. USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-2. Resegment IE is set to '0'.
42	-		Wait for 6 blocks with no USF
43	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A44 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B44 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
44	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 7 .. 9 The SS verifies that the NACKED data blocks are received using the correct MCS according to table 8.1.1.2, 3GPP TS 04.60.
45	-		Repeat steps 43 & 44 twice.
46	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges RLC data block BSN 7 SSN=9 and negatively acknowledges RLC data blocks from BSN 8 to 9 with RBB set to 0. For BSN>9 RBB is set to 1. USF not assigned to the MS EGPRS Channel Coding Command is set to MCS-1. Resegment IE is set to '0'.
47	-		Wait for 6 blocks with no USF
48	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A49 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B49 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
49	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. BSN = 8 .. 9 The SS verifies that the NACKED data blocks are received using the correct MCS according to table 8.1.1.2, 3GPP TS 04.60.
50	-		Repeat steps 48 & 49 once.
51	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. The SS acknowledges all RLC data blocks with SSN set to highest received BSN +2 and empty RBB. USF not assigned to the MS
52		{Completion of uplink RLC data block transfer}	
	-		Repeat the above procedure with K=2-9.

53.1.1.21 Acknowledged Mode/ Uplink TBF/ Initial Puncturing Scheme After MCS Switching

53.1.1.21.1 Conformance requirements

1. RLC data blocks which are retransmitted using a new MCS shall at the first transmission after the MCS switch be sent with the puncturing scheme indicated in table 9.3.2.1.1, 3GPP TS 04.60 subclause 9.3.2.1.

References

3GPP TS 04.60, subclause 9.3.2.1.

3GPP TS 05.05.

3GPP TS 05.09.

53.1.1.21.2 Test purpose

1. To verify the correct selection of initial PS scheme after MCS switch.

53.1.1.21.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The MS is made to transmit uplink RLC data blocks in an acknowledged mode uplink EGPRS TBF. EGPRS Coding Command is set to indicate MCS-9.

The SS sends a PACKET UPLINK ACK/NACK message and NACK all blocks received. MCS- 6 is commanded in the message.

The SS checks that the retransmitted blocks are received in MCS-6, PS1.

Repeat the above steps with different allowed MCS and PS combinations.

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	n = 2000 octets, USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-9
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that Puncturing Scheme PS1 is received.
4	SS	-	Repeat steps 2-3 until RLC data block with BSN=5 is received.
5	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS negatively acknowledges all RLC data blocks. MCS Command is MCS-6, USF not assigned to the MS. Wait for 6 blocks with no USF
6	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
A7 (optional step)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	MS may transmit new data block if it has already been scheduled while Packet Uplink Ack/Nack is being processed.
B7 (optional step)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	USF assigned to the MS,
7	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that modulation and coding scheme is MCS-6 and Puncturing Scheme is PS1 is received. BSN=0
8	SS		Repeat steps 9-10 until RLC data block with BSN=5 is received.
9	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
10	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that modulation and coding scheme is MCS-6 and Puncturing Scheme is PS1 is received.
11		{Completion of uplink RLC data block transfer}	
12	-		The above steps 1-11 are repeated for different MCS and PS combinations as per table 9.3.2.1.1 of Subclause 9.3, 3GPP TS 04.60, i.e. MCS 6 switching to MCS 9, MCS 7 switching to MCS 5, MCS 5 switching to MCS 7.

53.1.1.22 Acknowledged Mode/ Uplink TBF/ Recalculation of CV on TBC change

53.1.1.22.1 Conformance requirements

1. The mobile station shall send the Countdown Value (CV) in each uplink RLC data block to indicate to the network the absolute BSN (BSN') of the last RLC data block that will be sent in the uplink TBF. The CV shall be calculated as follows.

$$\text{Let integer } x = round\left(\frac{TBC - BSN' - 1}{NTS \times K}\right).$$

$$\text{then, } CV = \begin{cases} x, & \text{if } x \leq BS\_CV\_MAX, \\ 15, & \text{otherwise.} \end{cases}$$

where:

- TBC = total number of RLC data blocks that will be transmitted in the TBF;

- BSN' = absolute block sequence number of the RLC data block, with range from 0 to (TBC - 1);

- NTS = number of timeslots assigned to the uplink TBF in the assignment message, with range 1 to 8;

- K = 2 when commanded MCS is MCS-7, MCS-8 or MCS-9 otherwise K=1

- the function round() rounds upwards to the nearest integer;

- BS_CV_MAX is a parameter broadcast in the system information;

- the division operation is non-integer and results in zero only for (TBC - BSN' - 1) = 0.

2. If the mobile station receives a change in the Channel Coding Command in a PACKET UPLINK ACK/NACK message during the countdown procedure, the mobile station shall act upon the new Channel Coding Command. The mobile station shall then recalculate the CV values for any untransmitted RLC data blocks using the new RLC data block size.

References

3GPP TS 04.60, subclause 9.3.1 and clause F.3.

53.1.1.22.2 Test purpose

To verify that the mobile station correctly recalculates the CV values when the TBC change due to an MCS change during countdown procedure.

53.1.1.22.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present, BS_CV_MAX = 15.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit uplink RLC data blocks in EGPRS TBF RLC acknowledged mode. MCS-6 is commanded. Total number of Data Blocks is taken to be a minimum of 20 blocks.

SS acknowledges all the Data Blocks upon reception.

SS monitors the CV of the data blocks sent.

SS sends a PACKET UL ACK/NACK message acknowledging the RLC data block with CV =14

The Mobile might send a new Data Block with MCS-6 with CV=13 which could have been stored in the Transmit buffer.

SS notes the BSN of the last data block, received with MCS6 as BSN_A and the CV as CV_A.

SS verifies that

TBC is recalculated upon MCS change by checking that CV=15 till BSN=BSN_A+2*CV_A-15 or BSN=BSN_A+2*CV_A-16 for further data blocks received after the Coding scheme change.

SS verifies that CV decreases progressively in further blocks.

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N chosen to transmit minimum 20 blocks USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-6
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN starts from 0, and the correct MCS is used.
4	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS Acknowledges the UL RLC Data Block USF assigned to the MS.
5	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN values are in sequence, and the correct MCS is used.
6	-		Repeat steps 4 and 5 until CV = 14 SS notes BSN and CV values of the received Data Block as BSN_A and CV_A
7	SS -> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS Acknowledges the UL RLC Data Block EGPRS CHANNEL CODING COMMAND: MCS-3
8	-		Wait for 6 blocks with no USF
9	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
Step 10a (Optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	The MS may send a data block already in the buffer using coding scheme MCS-6. If received, the value of CV and BSN of the radio block shall be taken for further calculation.(BSN_A and CV_A)
Step 10b (Optional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
10	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that coding scheme MCS-3 is used; BSN is increased by 1 and CV = 15.
11	SS-> MS	PACKET UPLINK ACK/NACK	Wait for BS_CV_MAX block periods before sending this message. SS Acknowledges the UL RLC Data Block USF assigned to the MS.
12	-		Repeat steps 10 and 11 until CV changes to 14. Check that for CV=14: BSN= BSN_A+ 2*CV_A – 14 or BSN= BSN_A+ 2*CV_A – 15;
13	MS->SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDCH. SS verifies that BSN is incremented by 1 and CV is decremented by 1
14		[Completion of RLC Data Block Transfer]	

53.1.1.23 Acknowledged Mode/ Uplink TBF/ Interpretation of Compressed Bitmap

53.1.1.23.1 Conformance requirements

If the window size is larger than the number of bits available for the bitmap, then one-dimensional run length coding (based on ITU-T T.4) is carried out starting at SSN.

If a compressed reported bitmap is received, the bitmap shall first be decompressed

Firstly, if the BOW bit in PACKET UPLINK/DOWNLINK ACK/NACK has the value "1", then the bitmap acknowledges all blocks between V(A) and (SSN- 2) (modulo SNS), and the corresponding elements in V(B) shall be set to the value ACKED. Also a bitmap value of '0' is assumed at the bit position corresponding to (SSN-1) modulo SNS which corresponds to V(Q).

Then, for each bit in the uncompressed bitmap whose corresponding BSN value is within the transmit window, if the bit contains the value '1', the corresponding element in V(B) indexed relative to SSN shall be set to the value ACKED. If the bit contains the value '0', the element in V(B) shall be set to the value NACKED. A bit within the uncompressed bitmap whose corresponding BSN is not within the transmit window, shall be ignored.

If the EOW bit in the PACKET UPLINK/DOWNLINK ACK/NACK has the value "1", , then bimap value '0' shall be assumed for all RLC blocks with a BSN value higher than the last entry in the bitmap but less than V(S) (ie. [V(R) - 1 < BSN < V(S)] modulo SNS).

References

3GPP TS 04.60, subclause 9.1.8.2.4, 9.1.10

53.1.1.23.2 Test purpose

To verify that the MS correctly decodes the Compressed bitmap.

53.1.1.23.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present, BS_CV_MAX = 15.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit more than 192 EGPRS RLC Data Blocks in RLC acknowledged mode. Coding Scheme MCS-1 and Window Size 192 is commanded.

For K=1

After receiving the block with BSN=191, SS wait for BS_CV_MAX Block periods and send PACKET UPLINK ACK/NACK acknowledging first N blocks and negatively acknowledging the rest of the blocks using a compressed bitmap.

The SS verifies that the MS decode the compressed bitmap correctly by checking that the negatively acknowledged blocks are retransmitted correctly.

For K=2

After receiving the block with BSN=191, SS wait for BS_CV_MAX Block periods and send PACKET UPLINK ACK/NACK negatively acknowledging first N blocks and positively acknowledging the rest of the blocks using a compressed bitmap.

The SS verifies that the MS decode the compressed bitmap correctly by checking that the negatively acknowledged blocks are retransmitted correctly.

The test procedure is repeated for the following set of values of N = 10, 90, 190.

Maximum Duration of Test

5 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	Number of Data Blocks >192 USF_GRANULARITY= 1 block EGPRS Channel Coding Command: MCS-1
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN starts from 0, and the correct MCS is used.
4	-		Repeat Steps 2 and 3 until Data Block with BSN=191 is received.
5	SS		Wait BS_CV_MAX block periods
6	SS -> MS	PACKET UPLINK ACK/NACK	For K=1 SS acknowledges first N data blocks and negatively acknowledges the rest of the data blocks using a Compressed bitmap.

For K=2 SS negatively acknowledges first N data blocks and positively acknowledges the rest of the data blocks using a Compressed bitmap. Wait for 6 blocks with no USF |
7	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
7a (optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The MS may retransmit Data Block with BSN=0 already queued in the transmit buffer.
7b (optional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
8	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. For K=1 SS verifies that the BSN of the Data block is N, and the correct MCS is used. For K=2 SS verifies that the BSN of the Data block is 0, and the correct MCS is used.
9	-		Repeat Steps 7 and 8 and verify that For K=1 Data Blocks with BSN=N till BSN=191 are retransmitted. For K=2 Data Blocks with BSN=0 till BSN=N-1 are retransmitted
10		[Completion of RLC Data Block Transfer]	

53.1.1.24 Acknowledged Mode/ Uplink TBF/ Interpretation of PBSN.

53.1.1.24.1 Conformance requirements

For EGPRS uplink TBFs, the network may select any composition of the Packet Ack/Nack message to send to the MS. SSN is determined by the receiver as a function of ES/P, V(Q) and PBSN.

If the receiving side is the network, the network may select any SSN within the receive window.

The BOW (begin of window) bit shall be set if SSN = [V(Q) + 1] modulo SNS, the EOW (end of window) bit shall be set if [V(R) -1] modulo SNS is explicitly included in the bitmap.

For uplink TBFs, the reported bitmap is sent using the PACKET UPLINK ACK/NACK message corresponding to the used RB size.

Firstly, if the BOW bit in PACKET UPLINK/DOWNLINK ACK/NACK has the value "1", then the bitmap acknowledges all blocks between V(A) and (SSN- 2) (modulo SNS), and the corresponding elements in V(B) shall be set to the value ACKED. Also a bitmap value of '0' is assumed at the bit position corresponding to (SSN-1) modulo SNS which corresponds to V(Q).

If the EOW bit in the PACKET UPLINK/DOWNLINK ACK/NACK has the value "1", , then bimap value '0' shall be assumed for all RLC blocks with a BSN value higher than the last entry in the bitmap but less than V(S) (ie. [V(R) - 1 < BSN < V(S)] modulo SNS).

References

3GPP TS 04.60, subclause 9.1.8.2

53.1.1.24.2   Test purpose

To verify that the MS is correctly able to interpret a received bitmap by taking into consideration BOW, EOW and SSN fields.

53.1.1.24.3   Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present, BS_CV_MAX = 15.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The EGPRS capable MS is made to transmit EGPRS RLC Data Blocks in RLC acknowledged mode. Coding Scheme MCS-2 and Window Size 192 is commanded. PRE_EMPTIVE_TX is set to 1.

After receiving RLC Data block with BSN=150, SS wait for BS_CV_MAX Block periods and send PACKET UPLINK ACK/NACK with BOW=0 and EOW=0. SSN is 81 and the bitmap negatively acknowledges all blocks from BSN 81 till BSN 90 and positively acknowledges data blocks with BSN 91 till BSN 139.

SS verifies that the MS retransmit BSN 81 till BSN 90 and then transmit new data blocks. After receiving data block with BSN=160, SS wait for BS_CV_MAX Block periods and send PACKET UPLINK ACK/NACK with BOW=1 and EOW=0. SSN is set to 11 and the bitmap acknowledges data blocks with BSN 11 till BSN 75 and negatively acknowledging BSN 10, and 76 till 80.

SS verifies that MS retransmits data block with BSN 10, and BSN 76 till 80 and then continue transmitting new data blocks.

After receiving data block with BSN=170, SS wait for BS_CV_MAX Block periods and send PACKET UPLINK ACK/NACK with BOW=0 and EOW=1. SSN is 140 and the bitmap negatively acknowledges all blocks from BSN 140 till 150 and the bitmap acknowledges data blocks from BSN=151 till 170.

SS verifies that MS retransmits data blocks from BSN =140 till 150 and then continue with transmission of new data blocks.

SS verifies after sending RLC data block with BSN=201, the MS retransmits data block with BSN=10.

SS acknowledges all the received data blocks.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 6000 octets (Number of Data Blocks >203) USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-2 EGPRS Window Size: 192
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. SS verifies that the BSN starts from 0, and the correct MCS is used.
4	-		Repeat Steps 2 and 3 until Data Block with BSN=150 is received.
5	SS		Wait BS_CV_MAX block periods
6	SS -> MS	PACKET UPLINK ACK/NACK	BOW=0; EOW=0; SSN=81; Bitmap negatively acknowledging BSN=81 till BSN=90, and positively acknowledging BSN=91 till BSN=139 Pre_Emptive_Tx=1
7	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
8a (optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The MS may transmit RLC data block with BSN=151, already queued in the transmit buffer.
8b (conditional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	If optional step 8a was received. Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
8	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. Verify that that MS retransmits data block with BSN=81.
9	-		Repeat Step 7&8 9 times. Verify that MS retransmits data blocks with BSN=82 till BSN=90
10	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
11	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. In case step 8b was received Verify that that MS transmits new data block with BSN=152. Else Verify that that MS transmits new data block with BSN=151.
12	-		If step 8b was received Repeat Steps 10&11 8 times. Verify that MS sends data blocks with BSN=153 till BSN=160 Else Repeat Steps 10&11 9 times. Verify that MS sends data blocks with BSN=152 till BSN=160
13	SS		Wait BS_CV_MAX block periods
14	SS -> MS	PACKET UPLINK ACK/NACK	BOW=1; EOW=0; SSN=11; Bitmap acknowledging BSN=11 till BSN=75 and negatively acknowledging BSN 10 and 76 to 80. Pre_Emptive_Tx=1
15	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
16a (optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The MS may transmit RLC data block with BSN=161, already queued in the transmit buffer.
16b (conditional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	If optional step 16a was received. Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
16	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. Verify that that MS retransmits data block with BSN=10.
17	-		Repeat Step 15&16 5 times. Verify that MS retransmits data blocks with BSN=76 till BSN=80
18	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.

Step	Direction	Message	Comments
19	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. In case step 16b was received Verify that that MS transmits new data block with BSN=162. Else Verify that that MS transmits new data block with BSN=161.
20	-		Repeat Steps 18 and 19 until Data block with BSN=170 is received
21	SS		Wait BS_CV_MAX block periods
22	SS -> MS	PACKET UPLINK ACK/NACK	BOW=0; EOW=1; SSN=140; Bitmap negatively acknowledging BSN=140 till BSN=150, and positively acknowledging BSN=151 till BSN=170 Sent on PACCH. Pre_Emptive_Tx=1
23	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
24a (optional)	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. The MS may transmit RLC data block with BSN=171, already queued in the transmit buffer.
24b (conditional)	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	If optional step 24a was received. Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
24	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. Verify that MS retransmits RLC data block with BSN=140.
25	-		Repeat Steps 23&24 10 times. Verify that MS retransmits Data Blocks with BSN=141 till BSN=150.
26	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
27	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. If Step 24b was received Verify that MS transmit new data block with BSN=172. Else Verify that MS transmit new data block with BSN=171.
28	-		Repeat Steps 26 and 27 until data block BSN=201 is received.
29	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
30	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH. Verify that MS retransmits Data block with BSN=10. Verify that SI is set in the data block.
31	SS -> MS	PACKET UPLINK ACK/NACK	Acknowledging all blocks. Sent on PACCH. Pre_Emptive_Tx=1
32		{Completion of Uplink RLC Data Block Transfer}	

53.1.1.25 Acknowledged Mode/ Uplink TBF/ TBF Reallocation/Window Size

53.1.1.25.1 Conformance requirement

For EGPRS the window size (WS) shall be set by the network according to the number of timeslots allocated in the direction of the TBF (uplink or downlink). The allowed window sizes are given in Table 9.1.9.2.1.

MS shall support the maximum window size corresponding to its multislot capability. The selected WS shall be indicated within PACKET UL/DL ASSIGNMENT and PACKET TIMESLOT RECONFIGURE using the coding defined in Table 9.1.9.2.1.

Once a window size is selected for a given MS, it may be changed to a larger size but not to a smaller size, in order to prevent dropping data blocks from the window.

NOTE: If a TBF is reallocated so that the number of allocated timeslots is reduced, the RLC window size may become larger than the maximum window size for the new resources.

References

3GPP TS 04.60, subclause 9.1.9.2

53.1.1.25.2   Test purpose

To verify that if an uplink TBF is reallocated reducing the number of timeslots so that the RLC window size becomes larger than the maximum window size for the new resources, the MS retains the old window size.

53.1.1.25.3   Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

An uplink TBF allocating two timeslots is established. EGPRS Window Size is commanded to be 256 (the maximum according to the number of timeslots allocated to the TBF).

SS allocates uplink resources to the MS for transferring data in the uplink. After receiving RLC data block with BSN=191, SS sends a Packet Timeslot Reconfigure message to the MS reallocating the number of timeslots for the uplink TBF to 1.

SS allocates resources to the MS to transmit in the uplink. SS verifies that MS sends new data block with BSN=192. SS verify that MS continue to respect the initial Window Size commanded in Step 1 by checking that MS transmits new data blocks till BSN=255 and then retransmit data block with BSN=0

Maximum Duration of Test

10 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 6000 octets (greater than 256 data blocks) See specific message contents
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the TN2, containing the USF_TN2 assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH in TN2. SS verifies that the BSN of the received data block is 0, and the correct MCS is used.
4	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the TN3, containing the USF_TN3 assigned to the MS.
5	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH in TN3. SS verifies that the BSN of the data block is 1, and the correct MCS is used.
6	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCKs	Sent on the PACCH of the TN2 containing the USF_TN2 assigned to the MS and on the PACCH of the TN3 containing the USF_TN3 assigned to the MS
7	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH block of TN2 and TN3.
8	-		Repeat Steps 6 and 7 until Data Block with BSN=191 is received.
9	SS -> MS	PACKET TIMESLOT RECONFIGURE	See specific message contents.
10	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the assigned downlink PDTCH, at least 3 block periods after step 9, FBI set to 1, ES/P = '01'B, RRBP = '00'B
11	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. Check that the Final_Ack_Indicator is set.
12	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the TN4, containing the USF_ TN4 assigned to the MS in Step 9.
13	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH in TN4. SS verifies that the BSN of the received data block is 192.
14	-		Repeat Steps 12 and 13 until Data Block with BSN=255 is received.
15	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the TN4, containing the USF_ TN4 assigned to the MS in Step 9.
16	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH in TN4. SS verifies that the BSN of the received data block is 0 and that SI bit is set in the received data block.
17	SS -> MS	PACKET UPLINK ACK/NACK	Acknowledging all blocks. Sent on PACCH of PDCH assigned in TN4.
18		{Completion of Uplink RLC Data Block Transfer}	

Specific Message Contents

PACKET UPLINK ASSIGNMENT message in step 1 (in macro):

Information Element	value/ remark
EGPRS CHANNEL CODING COMMAND	MCS-1
\<EGPRS window size>	00110 (256 blocks)
Dynamic allocation	01
EXTENDED_DYNAMIC_ALLOCATION	0 dynamic allocation only
{ 0 | 1 < P0 >}	0 downlink power control is not used
USF_GRANULARITY	0 MS shall transmit only one RLC/MAC block
{ 0 | 1 < UPLINK_TFI_ASSIGNMENT >}	1 assign uplink TFI
- UPLINK_TFI_ASSIGNMENT	00000
{ 0 | 1 < RLC_DATA_BLOCKS_GRANTED > }	0 open-ended TBF
{ 0 | 1 < TBF Starting Time > }	0 No starting time present
Timeslot Allocation	1 Timeslot Allocation with Power Control Parameters
- ALPHA	0,5
- { 0 | 1 < USF_TN0 ><GAMMA_TN0> }	0 USF not assigned
- { 0 | 1 < USF_TN1 ><GAMMA_TN1> }	0 USF not assigned

- { 0 | 1 < USF_TN2 ><GAMMA_TN2> }
   - USF_TN2
   - GAMMA_TN2
	1 USF assigned
	000
	For GSM 700, T-GSM 810, GSM 850 and GSM 900: +8 dBm
	For DCS 1 800 and PCS 1 900: +6 dBm

- { 0 | 1 < USF_TN3 ><GAMMA_TN3> }
   - USF_TN3
   - GAMMA_TN3
	1 USF assigned
	010
	For GSM 700, T-GSM 810, GSM 850 and GSM 900: +8 dBm
	For DCS 1 800 and PCS 1 900: +6 dBm

- { 0 | 1 < USF_TN4 ><GAMMA_TN4> }	0 USF not assigned
- { 0 | 1 < USF_TN5 ><GAMMA_TN5> }	0 USF not assigned
- { 0 | 1 < USF_TN6 ><GAMMA_TN6> }	0 USF not assigned
- { 0 | 1 < USF_TN7 ><GAMMA_TN7> }	0 USF not assigned
spare padding	Spare Padding

PACKET TIMESLOT RECONFIGURE in Step 9

MESSAGE_TYPE	0 00111
PAGE_MODE	00 Normal Paging
GLOBAL_TFI	UL_TFI assigned in Step 1
COMPACT reduced MA	0 (Not present)
EGPRS Channel Coding Command	0000 (MCS-1)
<RESEGMENT	1
0|1 <DOWNLINK EGPRS Window Size >	1 (Present)
DOWNLINK EGPRS Window Size	192
0|1 <UPLINK EGPRS Window Size>	0 (Not present)
LINK_QUALITY_MEASUREMENT_MODE	00
Packet Timing Advance	
{ 0|1< TIMING_ADVANCE_VALUE >	1 (timing advance value)
- TIMING_ADVANCE_VALUE }	30 bit periods
- {0|1<UPLINK_TIMING_ADVANCE_INDEX>	0 (no uplink timing advance index)
<UPLINK_TIMING_ADVANCE_TIMESLOT_NUMBER>}	
- {0|1<DOWNLINK_TIMING_ADVANCE_INDEX>	0 (no downlink timing advance index)
<DOWNLINK_TIMING_ADVANCE_TIMESLOT_NUMBER>}	
0	1 <Packet Extended Timing Advance	0 (Extended TA for GSM 400 not present)
DOWNLINK_RLC_MODE	0 Acknowledged mode
CONTROL_ACK	0
{0|1<DOWNLINK_TFI_ASSIGNMENT>}	1 (assign downlink TFI)
- DOWNLINK_TFI_ASSIGNMENT	00001 (Binary)
{0|1< UPLINK_TFI_ASSIGNMENT >	0 (Not present)
DOWNLINK_TIMESLOT_ALLOCATION	TN 4
{0|1<Frequency Parameters>}	0 (Frequency Parameters not present)
{ 01 < Dynamic Allocation >	Dynamic Allocation struct :
< Extended Dynamic Allocation >	0 (Dynamic allocation)
0|1< P0 >	0
< USF_GRANULARITY >	0 (one block)
{0|1< RLC_DATA_BLOCKS_GRANTED >}	0 (no RLC_DATA_BLOCKS_GRANTED, open-ended TBF)
{0|1< TBF_STARTING_TIME >}	0 (no starting time)
{0|1< Timeslot Allocation >	1 (Timeslot Allocation with Power Control Parameters)
ALPHA	0,5
{0|1< USF_TN0><GAMMA_TN0> }	0 (timeslot 0 not assigned)
{0|1< USF_TN1><GAMMA_TN1> }	0 (timeslot 1 not assigned)
{0|1< USF_TN2><GAMMA_TN2> }	0 (timeslot 2 not assigned)
{0|1< USF_TN3><GAMMA_TN3> }	0 (timeslot 3 not assigned)
{0|1< USF_TN4><GAMMA_TN4> }	1 (timeslot 4 assigned)
- USF_TN4	011
- GAMMA_TN4	For GSM 700, T-GSM 810, GSM 850 and GSM 900: +8 dBm
	For DCS 1 800 and PCS 1 900: +6 dBm
{0|1< USF_TN5><GAMMA_TN5> }	0 (timeslot 5 not assigned)
{0|1< USF_TN6><GAMMA_TN6> }	0 (timeslot 6 not assigned)
{0|1< USF_TN7><GAMMA_TN7> }	0 (timeslot 7 not assigned)
spare padding	Spare Padding

53.1.2   Acknowledged Mode/ Downlink TBF

53.1.2.1   Acknowledged Mode/ Downlink TBF/ Receive State Variable V(R)

53.1.2.1.1   Conformance requirements

1. In RLC acknowledged mode, each RLC endpoint receiver shall have an associated receive state variable V(R). The receive state variable denotes the BSN of the next in-sequence RLC data block expected to be received.

2. The BOW bit shall be set if $SSN = [V(Q) + 1]$ modulo SNS, the EOW bit shall be set if $[V(R) -1]$ modulo SNS is explicitly included in the bitmap.

References

3GPP TS 04.60, subclause 9.1.5.

53.1.2.1.2   Test purpose

1. To verify the receive state variable, V(R) is set to the next in-sequence RLC data block expected to be received.

53.1.2.1.3   Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS initiates the establishment of a downlink EGPRS TBF, setting window size value to the maximum possible.

The SS sends 5 EGPRS RLC data blocks with BSN = 1, 3, 5, 7, 9, and polls the MS. The MS shall send an EGPRS PACKET DOWNLINK ACK/NACK message to the SS with EOW set in the EGPRS Ack/Nack Description IE.

The SS then sends more EGPRS RLC data blocks with BSN = 11, 13, …, and polls the MS in the last block with ES/P='01'B. The MS shall send an EGPRS PACKET DOWNLINK ACK/NACK message to the SS with EOW not set.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: 192
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent 5 blocks on the assigned PDTCH, with BSN = 1, 3, 5, 7, 9. In the last block ES/P = '01' , RRBP = '00'.
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. EOW =1
4	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent more blocks on the assigned PDTCH, BSN = 11, 13, …, 189 In the last block ES/P = '01'B, RRBP = '00'B.
5	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. EOW = 0

53.1.2.2   Acknowledged Mode/ Downlink TBF/ Receive Window State Variable V(Q)

53.1.2.2.1   Conformance requirements

1. In RLC acknowledged mode, each RLC endpoint receiver shall have an associated receive window state variable, V(Q). The mobile station shall set V(Q) to the value 0 at the beginning of each TBF in which the RLC endpoint is the receiver.

2. The value of V(Q) shall be updated when the RLC receiver receives the RLC data block whose BSN is equal to V(Q).

3. The EGPRS Packet Ack/Nack message contains a starting sequence number (SSN) and a reported bitmap (RB). The EGPRS Packet Ack/Nack message is sent by the RLC receiver and is received by the RLC transmitter.

References

3GPP TS 04.60, subclause 9.1.6.

53.1.2.2.2 Test purpose

1. To verify the correct initialisation of the receive state variable V(Q).

2. To verify that V(Q) is not updated when data blocks with BSN not equal to V(Q) are received.

53.1.2.2.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS initiates the establishment of a downlink EGPRS TBF.

The SS sends an EGPRS RLC data block with BSN = 1 to the MS and polls the MS. The SS verifies that the MS shall send an EGPRS PACKET DOWNLINK ACK/NACK message with SSN = 1.

The SS sends a sequence of EGPRS RLC data blocks with BSN = 2,3,4,5,6 in sequence and polls the MS each time with ES/P = '01'. The SS verifies that the MS shall send an EGPRS PACKET DOWNLINK ACK/NACK message to the SS each time with SSN = 1 not changed.

The SS sends an RLC data blocks with BSN = 0 and polls the MS with ES/P = '01'. The SS verifies that the MS shall send an EGPRS PACKET DOWNLINK ACK/NACK message to the SS with SSN = 8.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: 192
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent a block on the assigned PDTCH, with BSN = 1. In the last block ES/P = '01'B, RRBP = '00'B.
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SSN = 1
4	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent a sequence of blocks on the assigned PDTCH, BSN = 2, 3, …, 6 In the last block ES/P = '01' , RRBP = '00'.
5	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SSN = 1
6	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent a block on the assigned PDTCH, with BSN = 0. In the last block ES/P = '01'B, RRBP = '00'B.
7	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SSN = 8

53.1.2.3 Acknowledged Mode/ Downlink TBF/ Window Size/ Default Value

53.1.2.3.1 Conformance requirements

In case a PACKET TIMESLOT RECONFIGURE is sent to the MS without any window size for a specific TBF, then any previous value received for the specific TBF shall be used or, if no previous value has been received for the specific TBF, default window size shall be used.

References

3GPP TS 04.60, subclause 9.1.9.2.

53.1.2.3.2 Test purpose

1. To verify that MS use a default WS value when a PACKET TIMESLOT RECONFIGURE is sent to the MS without downlink window size indication to establish a downlink TBF.

2. To verify that MS use the previous WS value received for the Downlink TBF when a PACKET TIMESLOT RECONFIGURE without downlink window size indication is sent to the MS reconfiguring an existing Downlink TBF.

53.1.2.3.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS establishes an Uplink TBF. Uplink EGPRS Window size is commanded to be 192. When Uplink TBF is in progress, SS sends a PACKET TIMESLOT RECONFIGURE message to the MS, establishing a downlink TBF. Downlink Window Size IE is omitted from the message.

SS sends an EGPRS Downlink Data block with BSN=1 and polls the MS for acknowledgement. SS verifies that MS correctly acknowledges BSN=1.

SS sends another data block with BSN=64 and polls the MS for acknowledgement. SS verifies that MS acknowledges the data block with BSN=1 and that MS includes bitmap information only for BSN=1

SS sends a Downlink Assignment to the MS reconfiguring the Downlink Window Size to 96. SS sends some data to the MS.

SS sends a a PACKET TIMESLOT RECONFIGURE message to the MS, reconfiguring the PDCH.

Downlink Window Size IE is not included in the message.

SS sends a data block with BSN=95 and polls the MS for acknowledgement. SS verifies that MS correctly acknowledges reception of BSN=95 and that the bitmap includes information of data blocks from BSN=1 till BSN=95.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N=500 octets Acknowledged Mode EGPRS Window Size: 192
2	SS -> MS	DOWNLINK DUMMY CONTROL BLOCK	Sent on the assigned PDTCH, USF assigned to the MS
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
4	SS -> MS	PACKET UPLINK ACK/NACK	Sent on the PACCH of the assigned PDTCH acknowledging the block received in Step3. Wait for BS_CV_MAX block periods after Step 3 before sending this message.
5	SS -> MS	PACKET TIMESLOT RECONFIGURE	Sent on PACCH of the assigned PDTCH. Establishing a Downlink TBF. Without Downlink EGPRS WINDOW SIZE
6	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the PDTCH assigned in Step 5, BSN = 1, ES/P = '01'B, RRBP = '00'B. Wait at least 6 block periods after Step 5 before sending this message.
7	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH the PDTCH assigned in Step 5. SS verifies that SSN=1 and BSN = 1 is positively acknowledged.
8	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the PDTCH assigned in Step 5, BSN = 64, ES/P = '01'B, RRBP = '00'B.
9	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH the PDTCH assigned in Step 5. SS verifies that SSN=1 and BSN = 1 is positively acknowledged. SS verifies that the bitmap contains only the acknowledgement for BSN=1 (Bitmap size is 1)
10	SS -> MS	PACKET DOWNLINK ASSIGNMENT	Sent on PACCH of the PDTCH assigned in Step 5. Addressing the MS using the DL TFI assigned in Step 5. EGPRS Window Size = 96
11	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the PDTCH assigned in Step 10, BSN = 2, USF assigned to the MS. Wait at least 6 block periods after Step 10 before sending this message.
12	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH
13	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the PDTCH assigned in Step 10, BSN = 3, ES/P = '01'B, RRBP = '00'B.
14	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SS verifies that SSN=1 and BSN = 1,2 and 3 are positively acknowledged. SS verifies that the bitmap contains only the acknowledgement for BSN=1,2 and 3 (Bitmap size is 3)
15	SS -> MS	PACKET TIMESLOT RECONFIGURE	Sent on PACCH of the assigned downlink PDTCH. Without Downlink EGPRS WINDOW SIZE
16	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the PDTCH assigned in Step 10, BSN = 95, ES/P = '01'B, RRBP = '00'B. Wait at least 6 block periods after Step 15 before sending this message.
17	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SS verifies that SSN=1 and bitmap positively acknowledges BSN = 1,2,3 and 95.
18	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCKS	SS sends all missing data blocks to the MS, with block BSN=94 having ES/P = '01'B, RRBP = '00'B
19	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH, indicating that all blocks from BSN=0 to BSN=95 are positively acknowledged
20	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the PDTCH assigned in Step 10, BSN = 96, FBI is set to '1' ES/P = '01'B, RRBP = '00'B.
21	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SS verifies that FAI bit is set to '1'
22	SS	{Completion of uplink RLC data block transfer}	

Specific Message contents

PACKET TIMESLOT RECONFIGURE in Step 5

MESSAGE_TYPE	0 00111
PAGE_MODE	00 Normal Paging
GLOBAL_TFI	UL_TFI assigned in Step 1
COMPACT reduced MA	0 (Not present)
EGPRS Channel Coding Command	0001 (MCS-2)
<RESEGMENT	1
0|1 <DOWNLINK EGPRS Window Size >	0 (Not Present)
0|1 <UPLINK EGPRS Window Size>	0 (Not present)
LINK_QUALITY_MEASUREMENT_MODE	00
Packet Timing Advance	
{ 0|1< TIMING_ADVANCE_VALUE >	1 (timing advance value)
- TIMING_ADVANCE_VALUE }	30 bit periods
{ 0|1< TIMING_ADVANCE_INDEX >	0 (no timing advance index)
<TIMING_ADVANCE_TIMESLOT_NUMBER > }	
0 | 1 <**Packet Extended Timing Advance**	0 (Extended TA for GSM 400 not present)
DOWNLINK_RLC_MODE	0 Acknowledged mode
CONTROL_ACK	0
{0|1<DOWNLINK_TFI_ASSIGNMENT>}	1 (assign downlink TFI)
- DOWNLINK_TFI_ASSIGNMENT	00001(Binary)
{0|1< UPLINK_TFI_ASSIGNMENT >	0 (Not present)
DOWNLINK_TIMESLOT_ALLOCATION	Same as UL Timeslot used (Default TN 4)
{0|1<Frequency Parameters>}	0 (Frequency Parameters not present)
{ 01 < Dynamic Allocation >	Dynamic Allocation struct :
< Extended Dynamic Allocation >	0 (Dynamic allocation)
0|1< P0 >	0
< USF_GRANULARITY >	0 (one block)
{0|1< RLC_DATA_BLOCKS_GRANTED >}	0 (no RLC_DATA_BLOCKS_GRANTED, open-ended TBF)
{0|1< TBF_STARTING_TIME >}	0 (no starting time)
{0|1< Timeslot Allocation >	0 (Timeslot Allocation)
{0|1< USF_TN0>}	0 (timeslot 0 not assigned)
{0|1< USF_TN1>}	0 (timeslot 1 not assigned)
{0|1< USF_TN2>	0 (timeslot 2 not assigned)
{0|1< USF_TN3>}	0 (timeslot 3 not assigned)
{0|1< USF_TN4>}	1 (timeslot 4 assigned)
- USF_TN4	Same USF as assigned in Step 1
{0|1< USF_TN5>}	0 (timeslot 5 not assigned)
{0|1< USF_TN6>}	0 (timeslot 6 not assigned)
{0|1< USF_TN7>}}	0 (timeslot 7 not assigned)

PACKET TIMESLOT RECONFIGURE in Step 15

MESSAGE_TYPE	0 00111
PAGE_MODE	00 Normal Paging
GLOBAL_TFI	DL_TFI assigned in Step 5
COMPACT reduced MA	0 (Not present)
EGPRS Channel Coding Command	0010 (MCS-3)
<RESEGMENT	1
0|1 <DOWNLINK EGPRS Window Size >	0 (Not Present)
0|1 <UPLINK EGPRS Window Size>	0 (Not present)
LINK_QUALITY_MEASUREMENT_MODE	00
Packet Timing Advance	
{ 0|1< TIMING_ADVANCE_VALUE >	1 (timing advance value)
- TIMING_ADVANCE_VALUE }	30 bit periods
{ 0|1< TIMING_ADVANCE_INDEX >	0 (no timing advance index)
<TIMING_ADVANCE_TIMESLOT_NUMBER > }	
0 | 1 <**Packet Extended Timing Advance**	0 (Extended TA for GSM 400 not present)
DOWNLINK_RLC_MODE	0 Acknowledged mode
CONTROL_ACK	0
{0|1<DOWNLINK_TFI_ASSIGNMENT>}	0 (Not present)
{0|1< UPLINK_TFI_ASSIGNMENT >	0 (Not present)
DOWNLINK_TIMESLOT_ALLOCATION	Same as UL Timeslot used (Default TN 4)
{0|1<Frequency Parameters>}	0 (Frequency Parameters not present)
{ 01 < Dynamic Allocation >	Dynamic Allocation struct :
< Extended Dynamic Allocation >	0 (Dynamic allocation)
0|1< P0 >	0
< USF_GRANULARITY >	0 (one block)
{0|1< RLC_DATA_BLOCKS_GRANTED >}	0 (no RLC_DATA_BLOCKS_GRANTED, open-ended TBF)
{0|1< TBF_STARTING_TIME >}	0 (no starting time)
{0|1< Timeslot Allocation >	0 (Timeslot Allocation)
{0|1< USF_TN0>}	0 (timeslot 0 not assigned)
{0|1< USF_TN1>}	0 (timeslot 1 not assigned)
{0|1< USF_TN2>	0 (timeslot 2 not assigned)
{0|1< USF_TN3>}	0 (timeslot 3 not assigned)
{0|1< USF_TN4>}	1 (timeslot 4 assigned)
- USF_TN4	Same USF as assigned in Step 1
{0|1< USF_TN5>}	0 (timeslot 5 not assigned)
{0|1< USF_TN6>}	0 (timeslot 6 not assigned)
{0|1< USF_TN7>}}	0 (timeslot 7 not assigned)

53.1.2.4   Acknowledged Mode/ Downlink TBF/ Window Size/ Assigned Value

53.1.2.4.1   Conformance requirements

1. For EGPRS the window size (WS) shall be set by the network according to the number of timeslots allocated in the direction of the TBF (uplink or downlink).

2. MS shall support the maximum window size corresponding to its multi timeslot capability.

3. The selected WS shall be indicated within PACKET UL/DL ASSIGNMENT and PACKET TIMESLOT RECONFIGURE.

References

3GPP TS 04.60, subclause 9.1.9.2.

53.1.2.4.2   Test purpose

1. To verify that the MS correctly interprets the window size indication in PACKET DOWNLINK ASSIGNMENT.

2. To verify that the MS correctly interprets the window size indication in PACKET TIMESLOT RECONFIGURE during downlink TBF.

3. To verify that the MS supports the maximum window size corresponding to its multi timeslot capability for downlink TBF.

53.1.2.4.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS initiates the establishment of a downlink EGPRS TBF, setting WS = N < N' (the maximum possible legal WS value) in the PACKET DOWNLINK ASSIGNMENT message. The SS sends a RLC data block with BSN = N and polls for acknowledgement. MS shall send a Packet Downlink Ack/Nack message acknowledging no block. The MS is then triggered to transfer 440 octets of user data. The SS assigns an uplink TBF by sending a PACKET UPLINK ASSIGNMENT. The SS sends an RLC data block with BSN = N-1 and polls for acknowledgement. The MS shall send a Packet Downlink Ack/Nack message acknowledging the BSN = N - 1 block.

During the downlink and uplink TBF's, The SS sends a PACKET TIMESLOT RECONFIGURE message with WS = N'. The SS sends an RLC data block with BSN = N' and polls for acknowledgement. The MS shall send a Packet Downlink Ack/Nack message without acknowledging the BSN = N' block. The SS sends a RLC data block with BSN = N'-1 and poll for acknowledgement. The MS shall send a Packet Downlink Ack/Nack message acknowledging the BSN = N'-1 block.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: N
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the assigned PDTCH, with BSN = N, ES/P = '01'B, RRBP = '00'B
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH without the acknowledgement for the block of BSN = N.
4	MS		The MS is triggered to send 440 octets of user data.
5	SS		Steps 2 and 3 are repeated until reception of EGPRS PACKET DOWNLINK ACK/NACK with Channel request Description IE included
6	SS -> MS	PACKET UPLINK ASSIGNMENT	USF_GRANULARITY = 1 block, RLC_DATA_BLOCKS_GRANTED = open-end TLLI_BLOCK_CHANNEL_CODING: arbitrarily chosen CHANNEL_CODING_COMMAND: arbitrarily chosen. The uplink TBF is assigned on the same timeslot as the downlink TBF.
7	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the assigned PDTCH, with BSN = N - 1, ES/P = '01'B RRBP = '00'B
8	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH with the acknowledgement for the block of BSN = N - 1.
9	SS -> MS	PACKET TIMESLOT RECONFIGURE	Sent on PACCH, containing the same Downlink Timeslot Allocation as before and Window Size of value N'.
10	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the assigned PDTCH, with BSN = N', ES/P = '01'B RRBP = '00'B
11	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH without the acknowledgement for the block of BSN = N'.
12	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the assigned PDTCH, with BSN = N' - 1, ES/P = '01'B RRBP = '00'B
13	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH with the acknowledgement for the block of BSN = N' - 1.
14	SS	{Completion of uplink RLC data block transfer}	

53.1.2.5 Acknowledged Mode/ Downlink TBF/ BOW

53.1.2.5.1 Conformance requirements

1. For downlink TBF, the reported bitmap is sent using the EGPRS PACKET DOWNLINK ACK/NACK message corresponding to the used RB size.

2. The BOW bit shall be set if SSN = [V(Q) + 1] modulo SNS is explicitly included in the bit map.

References

3GPP TS 04.60, subclause 9.1.8.2.4.

53.1.2.5.2 Test purpose

1. To verify the BOW bit is set to '1' when SSN = [V(Q) + 1] modulo SNS is explicitly included in the bitmap.

2. To verify the BOW bit is set to '0' when SSN = [V(Q) + 1] modulo SNS is not explicitly included in the bitmap.

53.1.2.5.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- EGPRS Multislotclass (TSPC_Type_EGPRS_Multislot_ClassX where X = 1..45)

PIXIT Statements

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Test Procedure

The SS establishes an acknowledge mode downlink EGPRS TBF with the MS:

1. Set the window size to the maximum value according to the number of timeslots assigned to TBF.

2. Make the FRB length shorter than the possible RB size, set the BSN sequence for transmit like 0, 2, 4, 6, 8, …, (max value of windows size), all with even values.

3. The SS sends those RLC data blocks with expected BSNs and polls the MS for the First Partial Bitmap in the last block.

4. Check the BOW bit of EGPRS PACKET DOWNLINK ACK/NACK should be '1' and the Report Bitmap should be a correct Report Bitmap.

5. The SS polls the MS for the Next Partial Bitmap.

6. Check the BOW bit of EGPRS PACKET DOWNLINK ACK/NACK should be '0' and the Report Bitmap should be a correct Report Bitmap.

7. The SS sends all of missed RLC data blocks to the MS.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: Maximum value according to the number of Timeslots assigned for the TBF.
2	SS -> MS	EGPRS RLC DOWNLINK DATA BLOCK	The BSN sequence of RLC data block is 0, 2, 4, …, WS-2, all have even number MS was polled for FPB
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The BOW bit of EGPRS PACKET DOWNLIN ACK/NACK is '1' B, The RB is a correct RB
4	SS -> MS	EGPRS RLC DOWNLINK DATA BLOCK	SS send one missed RLC data blocks to MS MS was polled for NPB
5	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The BOW bit of EGPRS PACKET DOWNLIN ACK/NACK is '0'B, The RB is a correct RB
6	SS -> MS	EGPRS RLC DOWNLINK DATA BLOCK	SS send all missed RLC data blocks to MS

53.1.2.6 Acknowledged Mode/ Downlink TBF/ EOW

53.1.2.6.1 Conformance requirements

1. For downlink TBFs, the reported bitmap is sent using the EGPRS PACKET DOWNLINK ACK/NACK message corresponding to the used RB size.

2. The EOW bit shall be set if [V(R) -1] modulo SNS is explicitly included in the bitmap.

References

3GPP TS 04.60, subclause 9.1.8.2.4.

53.1.2.6.2 Test purpose

1. To verify the EOW bit is set to '0' when [V(R) - 1] modulo SNS is not explicitly included in the bitmap.

2. To verify the EOW bit is set to '1' when [V(R) - 1] modulo SNS is explicitly included in the bitmap.

53.1.2.6.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- EGPRS Multislotclass (TSPC_Type_EGPRS_Multislot_ClassX where X = 1..45)

PIXIT Statements

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Test Procedure

The SS establishes an acknowledge mode downlink EGPRS TBF with the MS:

1. Set the window size to the maximum value according to the number of timeslots assigned to TBF..

2. Make the FRB length shorter than the possible RB size, set the BSN sequence for transmit like 0, 2, 4, 6, 8, all with even value.

3. The SS sends those RLC data blocks with the expected BSN sequence and polls the MS for the First Partial Bitmap.

4. Check the EOW bit of EGPRS PACKET DOWNLINK ACK/NACK should be '1' and the Report Bitmap should be a correct Report Bitmap.

5. The SS transmits the RLC data blocks with BSN sequence 10, 12, …, WS and polls for the First Partial Bitmap in the last block.

6. Check the EOW bit of EGPRS PACKET DOWNLINK ACK/NACK should be '0' and the Report Bitmap should be a correct Report Bitmap.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: Maximum value according to the number of Timeslots assigned for the TBF.
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	The BSN sequence of RLC data block is 0, 2, 4, 6, 8, all have even number MS is polled for FPB in the last block.
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The EOW bit of EGPRS PACKET DOWNLIN ACK/NACK is '1'B, The RB is a correct RB
4	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	The BSN sequence of RLC data block is 10, 12, … WS-2 MS was polled for FPB in the last block.
5	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The EOW bit of EGPRS PACKET DOWNLIN ACK/NACK is '0'B The RB is a correct RB
6	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	SS send all missed RLC data blocks to MS

53.1.2.7 Acknowledged Mode/ Downlink TBF/ Measurement Report

53.1.2.7.1 Conformance requirements

1. In PACKET DOWNLINK ACK/NACK message, if the reported bitmap is shorter than the requested bitmap size, the MS shall include a measurement report if there is room enough.

References

3GPP TS 04.60, subclause 9.1.8.2.3.

53.1.2.7.2 Test purpose

1. To verify that if the reported bitmap is shorter than the requested bitmap size, the MS shall include a measurement report if there is room enough.

53.1.2.7.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS establishes an acknowledge mode downlink EGPRS TBF with the MS:

1. Set the window size to the Maximum value according to the number of Timeslots assigned for the TBF.

2. The SS sends a small number of RLC data blocks that will correspond to a small RB size and polling for the First Partial Bitmap from the MS.

3. The SS checks the EGPRS PACKET DOWNLINK ACK/NACK from MS include a Channel Quality Report IE.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: Maximum value according to the number of Timeslots assigned for the TBF.
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	The BSN sequence of RLC data block is 0, 1, 2, 3 MS was polled for NPB, ES/P='11'B in the last block.
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The EGPRS PACKET DOWNLINK ACK/NACK includes a Channel Quality Report IE.

53.1.2.8 Acknowledged Mode/ Downlink TBF/ Generation of Bitmap

53.1.2.8.1 Conformance requirements

1. For uplink TBFs, the reported bitmap is sent using the PACKET UPLINK ACK/NACK message corresponding to the used RB size.

2. First, a Full Received Bitmap (FRB) is built from the receive state array V(N) by extracting the part between V(Q) and V(R) similar to the GPRS case: it is assigned the elements whose indices in the receive state array V(N) at the receiver range from [V(Q)+ 1] modulo SNS to [V(R) -1] modulo SNS. This global number of elements is less than WS. For each bit in the bitmap, the bit is assigned the value '1' if the corresponding element in V(N) indexed relative to SSN has the value RECEIVED. The bit is assigned the value '0' if the element in V(N) has the value INVALID.

3. The BOW bit shall be set if SSN = [V(Q) + 1] modulo SNS, the EOW bit shall be set if [V(R) -1] modulo SNS is explicitly included in the bitmap.

4. If V(Q) equals V(R), then SSN shall be set to the value SSN = [V(Q) + 1] modulo SNS, BOW bit shall be set to the value '1', EOW shall be set to the value '1' and the reported bitmap size shall equal 0 bits.

References

3GPP TS 04.60, subclause 9.1.8.2.3.

53.1.2.8.2 Test purpose

1. To verify that the mobile station correctly formulates the EGPRS DL Ack/Nack message when the condition of V(Q) = V(R) is met.

53.1.2.8.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS transmits N RLC data blocks from BSN=0 in sequence and polls the MS for acknowledgement.

The MS acknowledges all theRLC data blocks in EGPRS DL Ack/Nack.

The SS verifies that BOW and EOW bits are set and the reported bitmap size is zero.

The above procedure is performed with different values of N.

Maximum Duration of Test

10 minutes.

Expected Sequence

N=10 assumed for the test case.

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: Maximum value according to the number of Timeslots assigned for the TBF.
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-1 BSN = 0, SPB = '00'B, ES/P = '00'B
			Repeat Step 2 with BSN=1,2,…,N-2
3	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-1 BSN = N-1, SPB = '00'B, ES/P = '01'B, RRBP = '00'B
4	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The SS verifies that the EGPRS Ack/Nack description IE contains BOW=1, EOW=1, SSN=N+1. and the reported bitmap size is zero bits.
5		{Completion of DL TBF}	
			The above steps are repeated for different length of block sequence N in steps 1,2.

53.1.2.9 Acknowledged Mode/ Downlink TBF/ Interpretation of BSN2

53.1.2.9.1 Conformance requirements

1. Each RLC data block contains a block sequence number (BSN) field that is 11 bits in length. At the time that an in-sequence RLC data block is designated for transmission, the value of BSN is set equal to the value of the send state variable V(S).

2. The transfer of RLC data blocks in the RLC acknowledged mode uses retransmissions of RLC data blocks. The transmitting side numbers the RLC data blocks via the block sequence number (BSN). The BSN is used for retransmission and for reassembly. The receiving side sends PACKET Ack/Nack messages in order to request retransmission of RLC data blocks.

3. In case two RLC data blocks are sent within a RLC/MAC block, BSN2 is relative to BSN1, provided the difference between the second block number and the first block modulo SNS is less than Window Size (WS).

4. Second block sequence number = [BSN1 + BSN2] modulo SNS.

References

3GPP TS 04.60, subclauses 9.1.4.2, 9.3.1 and 10.4.12.

53.1.2.9.2 Test purpose

1. To verify that the mobile station correctly interpret the value of BSN 2.

53.1.2.9.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

SS transmit an RLC radio block using MCS-8 containing two RLC data blocks with BSN1=bsn1 and BSN2=bsn2. That is block sequence number of second block is [bsn1+bsn2]modulo SNS.

SS polls the MS for acknowledgement.

SS verifies that the Received Bitmap correctly acknowledges Blocks with BSN=BSN1 and BSN=[bsn1+bsn2]modulo SNS.

Test is repeated with different combinations of bsn1 and bsn2.

Maximum Duration of Test

10 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: 64.
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-8 For 1st iteration BSN1 (bsn1) = 1, BSN2 (bsn2) = 2, SPB = '00'B, ES/P = '01'B, RRBP = '00'B For 2nd iteration BSN1 (bsn1) = 0, BSN2 (bsn2) = 63, SPB = '00'B, ES/P = '01'B, RRBP = '00'B For 3rd iteration BSN1 (bsn1) = 2000, BSN2 (bsn2) = 58, SPB = '00'B, ES/P = '01'B, RRBP = '00'B
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The SS verifies that the EGPRS Ack/Nack description IE contains For 1st iteration SSN=1, bit values for BSN= 1 and BSN(bsn1+bsn2)(mod 2048) = 3 in the RB are 1. For 2nd iteration SSN=2, bit value for BSN(bsn1+bsn2)(mod 2048) = 63 in the RB is 1. For 3rd iteration SSN=2002, bit value for BSN(bsn1+bsn2)(mod 2048) = 10 in the RB is 1.
4		{Completion of DL TBF}	

The complete test is repeated for the following combinations of BSN1 (bsn1) and BSN2 (bsn2) in step 2.

- BSN1 = 0, BSN2 = 63

- BSN1= 2000, BSN2 = 58

For the repetition using BSN1=2000 and BSN2=58; Before sending the block with BSN1=2000 and BSN2=58, SS needs to complete the transmission of 2000 blocks from BSN=0 to BSN=1999 in step 2 with acknowledgement of the blocks up to and including BSN=1999.

53.1.2.10 Acknowledged Mode/ Downlink TBF/ Split RLC Data Block

53.1.2.10.1 Conformance requirements

1. When an RLC data block is received with BSN within the active window i.e. such that [V(Q) <=BSN < V(Q) + WS] modulo SNS, the corresponding element in V(N) is set to the value RECEIVED (the RLC data block has passed FCS).

2. If the RLC data block is split over two radio blocks, the element shall be set to the value RECEIVED if both radio blocks have been received.

3. The element shall not be set to the value RECEIVED if any of the radio blocks has not been received.

References

3GPP TS 04.60, subclause 9.1.7.

53.1.2.10.2 Test purpose

To verify that in case an RLC data block is split over two radio blocks:

1. The corresponding V(N) element shall not be marked as RECEIVED if any of the two radio blocks is not received.

2. The corresponding V(N) element shall be marked as RECEIVED if both of the radio blocks are received.

53.1.2.10.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP Context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS establishes a downlink EGPRS TBF.

The SS sends a RLC data block n > N, n<WS using MCS-6. The SS sends the first part of a splitted RLC data block using MCS-3, with BSN=N (N< window size), SPB='10'B, and polls for the EGPRS PACKET DOWNLINK ACK/NACK message from the MS. The MS shall respond with an EGPRS PACKET DOWNLINK ACK/NACK message indicating the block BSN=N is not received.

The SS then sends the second part of the splitted RLC block with the same BSN=N (N<WS), SPB='11' using MCS 3, and polls for the EGPRS PACKET DOWNLIK ACK/NACK message from the MS. The MS shall respond with an EGPRS PACKET DOWNLINK ACK/NACK message with the BSN=N acknowledged.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: arbitrarily chosen
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-6, BSN=6, RRBP = '00'B
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The SS verifies that RBB is set to 0 for RLC data blocks with BSN = 0,1,2, 3,4 and 5 and RBB is set to 1 for BSN=6.
4	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-3, BSN starts from 0 ES/P = '00'B, SPB='10'B
5			Repeat step 4 until BSN = 3
6	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-3 BSN = 5, ES/P = '01'B, RRBP = '00'B,SPB='11'B
7	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The SS verifies that the bits in RBB for BSN=0,1,2,3,4,5 are set to '0'B.
8	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-3 BSN = 4, SPB = '10'B, ES/P = '01'B, RRBP = '00'B
9	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The SS verifies that the bit for BSN=4 in RBB is set to '0'.
10	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-3 BSN = 4, SPB = '11'B, ES/P = '01'B, RRBP = '00'B
11	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The SS verifies that the bit for BSN=4 in RBB is set to '1'.
			{Completion of downlink data transfer}

53.1.2.11 Acknowledged Mode/ Downlink TBF/ First Partial Bitmap and Next Partial Bitmap

53.1.2.11.1 Conformance requirements

1. In EGPRS downlink TBFs, an additional poll bit is added to the S/P field in every downlink RLC block so that the network can request the following:

   - First Partial Bitmap (FPB) segment with SSN = (V(Q) + 1) mod 2048 where SSN denotes the Starting Sequence Number.

   - Next Partial Bitmap (NPB) segment with SSN = (PBSN + 1) mod 2048 where PBSN denotes a Partial Bitmap Sequence Number variable stored at the receiver.

2. SSN is determined by the receiver as a function of S/P, V(Q) and PBSN. The FPB and NPB are specific instances of the EGPRS Ack/Nack Description Information Element within the Packet Downlink Ack/Nack message. The MS shall respond to S/P field according to table 4 in subclause 9.1.8.2.1 in 3GPP TS 04.60.

3. Based on PBSN, V(Q) and the S/P field set by the network, SSN and PBSN shall be determined according to table 5 in subclause 9.1.8.2.2 in 3GPP TS 04.60.

References

3GPP TS 04.60, subclause 9.1.8.2.

53.1.2.11.2 Test purpose

1. To verify the correct generation of SSN and RB in the First Partial Bitmap.

2. To verify the correct generation of SSN and RB in the Next Partial Bitmap.

53.1.2.11.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP Context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS establishes a downlink EGPRS TBF setting EGPRS window size to the maximum possible value in accordance with the number of timeslots allocated.

The SS sends a series of RLC data blocks with BSN=0, 2, 4, ..., 188 and with ES/P = '00'B.

The SS sends a RLC data block with BSN=189, ES/P = '01'B and RRBP='00'B.

The MS shall respond with an EGPRS PACKET DOWNLINK ACK/NACK message.. The SS verifies that the EGPRS Ack/Nack description IE contains the correct SSN and RB in the message. The BOW bit shall be set to '1'B and since it is the FPB, EOW bit shall not be set. Verify that the SSN is 2. Note down the BSN of the last block acknowledged (PBSN).

The SS then sends another RLC data block with BSN=190, ES/P = '10'B. Verifies that the MS shall respond with an EGPRS PACKET DOWNLINK ACK/NACK message, and that the EGPRS Ack/Nack description IE contains SSN = PBSN+1.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: Maximum value according to the number of Timeslots assigned for the TBF.
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-1 BSN = 2*N, SPB = '00'B, ES/P = '00'B
3			Repeat step 2 with N = 0..94
4	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-1 BSN = 189, SPB = '00'B, ES/P = '01'B, RRBP = '00'B
5	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The SS verifies that the EGPRS Ack/Nack description IE contains the correct SSN and RB in the message. Verify that BOW is set and EOW is not set.
6	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-1 BSN = 190, SPB = '00'B, ES/P = '10'B, RRBP = '00'B
7	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The SS verifies that the EGPRS Ack/Nack description IE contains the correct SSN and RB in the message: - Verify that SSN is equal to (PBSN+1) Mod SNS or as an implementation option verify that the SSN included allows the SS to accurately interpret the RB. - Verify that BOW is not set and EOW is set.

53.1.2.12 Acknowledged Mode/ Downlink TBF/ Decoding of Coding Schemes

53.1.2.12.1 Conformance requirements

1. In EGPRS TBF mode, the transfer of RLC Data Blocks in the acknowledged RLC/MAC mode can be controlled by a selective type I ARQ mechanism, or by type II hybrid ARQ (Incremental Redundancy: IR) mechanism, coupled with the numbering of the RLC Data Blocks within one Temporary Block Flow.

2. According to the link quality, an initial Modulation and Coding Scheme (MCS) is selected for an RLC block (see note). For the retransmissions, the same or another MCS from the same family of MCSs can be selected.

3. The selection of MCS is controlled by the network.

4. In EGPRS header, the Coding and Puncturing Scheme indicator field is used to indicate the kind of channel coding and puncturing used for data blocks.(see 3GPP TS 05.03)

References

3GPP TS 04.60, subclauses 9.3.2.1 and 10.4.8.a.

53.1.2.12.2   Test purpose

To verify that the mobile station correctly decode RLC data blocks sent using different coding schemes (MCS-1 to MCS-9).

53.1.2.12.3   Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP Context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS establishes a Downlink EGPRS TBF.

The send sends a few RLC data blocks in different coding schemes and asks for an acknowledgement from the MS.

The MS shall correctly acknowledge all the received data blocks.

Maximum Duration of Test

10 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: arbitrarily chosen
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-1, BSN=0
3	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With MCS-1, BSN=1
4			Repeat step 2 and 3 using MCS-2 till MCS 6 in each iteration. Repeat Step 2 using MCS 7, MCS8 and MCS-9. The BSNs of the data blocks shall be sequential, with BSN=16 and BSN=17 for the last block transmitted. ES/P = '01'B and RRBP='00'B is set in the header of last RLC Data Block sent with BSN=16 and 17.
5	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on the corresponding PACCH. The SS verifies that the MS acknowledges all the received RLC data blocks. SSN shall be equal to 19

53.1.2.13 Void

53.1.2.14 Acknowledged Mode/ Downlink TBF/ Received Bitmap/ Compressed

53.1.2.14.1 Conformance requirements

1. A Full Received Bitmap (FRB) is built from the receive state array V(N) by extracting the part between V(Q) and V(R) similar to the GPRS case.

2. From the FRB, a reported bitmap (RB) shall then be generated. The FRB shall be recalculated before each RB is generated. For downlink TBFs, the network may order the MS to transmit a certain RB size through use of the S/P field. The RB may be compressed or uncompressed.

3. The Compression bit in the reported bitmap shall be set to the value '1' if a compressed bitmap is sent, otherwise it shall be set to the value '0'.

4. If the compressed reported bitmap does not cover more blocks than the uncompressed reported bitmap, the receiver shall send the uncompressed reported bitmap. Otherwise compressed RB should be used.

References

3GPP TS 04.60, subclause 9.1.8.2.3.

53.1.2.14.2 Test purpose

1. To verify the Compression Bit is set to '1' when compressed RB is sent.

2. To verify that if the compressed reported bitmap covers more blocks than the uncompressed reported bitmap, and the FRB length is larger than the RB size, the receiver shall send the compressed reported bitmap.

53.1.2.14.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- EGPRS Multislotclass (TSPC_Type_EGPRS_Multislot_ClassX where X = 1..45)

PIXIT Statements

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Test Procedure

The SS establishes an acknowledged mode downlink EGPRS TBF with the MS:

1. Set the window size to the maximum value according to the number of timeslots assigned to TBF.

2. Make the compressed RB bitmap cover more blocks than uncompressed bitmap, and the FRB length is larger than the possible RB size, set the BSN sequence for transmit like 1, 2, 3, … 100, WS-1.

3. The SS sends those RLC data blocks with the expected BSNs and polls the MS in the last sent RLC data block.

4. The SS verifies that the compression bit in EGPRS PACKET DOWNLINK ACK/NACK should be '1' and the RB in EGPRS PACKET DOWNLINK ACK/NACK shall contain compressed bitmap for BSN=1 till BSN=WS-2.

5. The SS sends all the missed RLC data blocks to MS.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: WS=Maximum value according to the number of Timeslots assigned for the TBF.
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	The BSN sequence of RLC data block is 1, 2, 3, … 100, WS-1, In the last sent RLC data block ES/P='01'B, RRBP='00'B
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The Compression Bit of EGPRS PACKET DOWNLIN ACK/NACK is '1'B Verify that the RB contains a compressed bitmap representing the status of BSN=1 till BSN=WS-2 Note: MS may send uncompressed bitmap along with compressed bitmap to achieve the best compression gain.

53.1.2.15 Acknowledged Mode/ Downlink TBF/ Received Bitmap/ Uncompressed

53.1.2.15.1 Conformance requirements

1. A Full Received Bitmap (FRB) is built from the receive state array V(N) by extracting the part between V(Q) and V(R) similar to the GPRS case.

2. From the FRB, a reported bitmap (RB) shall then be generated. The FRB shall be recalculated before each RB is generated. For downlink TBFs, the network may order the MS to transmit a certain RB size through use of the S/P field. The RB may be compressed or uncompressed.

3. If the compressed reported bitmap does not cover more blocks than the uncompressed reported bitmap, the receiver shall send the uncompressed reported bitmap.

4. The Compression bit in the reported bitmap shall be set to the value '1' if a compressed bitmap is sent, otherwise it shall be set to the value '0'.

5. As an exception, if the FRB length or the range of indices from SSN to the end of FRB is less than or equal to RB size, the receiver may send the uncompressed reported bitmap without attempting compression.

References

3GPP TS 04.60, subclause 9.1.8.2.3.

53.1.2.15.2 Test purpose

1. To verify the Compression Bit is set to '0' when uncompressed RB is sent.

2. To verify that if the compressed reported bitmap does not covers more blocks than the uncompressed reported bitmap, the receiver shall send the uncompressed reported bitmap.

53.1.2.15.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- EGPRS Multislotclass (TSPC_Type_EGPRS_Multislot_ClassX where X = 1..45)

PIXIT Statements

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Test Procedure

The SS establishes an acknowledge mode downlink EGPRS TBF with the MS:

1. Set the window size to the maximum value according to the number of timeslots assigned to TBF.

2. Make the compressed RB bitmap cover less blocks than uncompressed bitmap, and the FRB length is larger than the possible RB size, set the BSN sequence for transmit like 1,3,5,7……(max value of windows size −1), all with odd value.

3. The SS sends those RLC data blocks with the expected BSNs and polls the MS in the last sent RLC data block.

4. The SS verifies that the compression bit in EGPRS PACKET DOWNLINK ACK/NACK should be '0' and the RB in EGPRS PACKET DOWNLINK ACK/NACK should be an uncompressed bitmap.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size: WS=Maximum value according to the number of Timeslots assigned for the TBF.
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	The BSN sequence of RLC data block is 1, 3, 5, 7, … WS-1, all have odd number In the last sent RLC data block ES/P='01'B, RRBP='00'B
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	The Compression Bit of EGPRS PACKET DOWNLIN ACK/NACK is '0'B The RB is an uncompressed RB

53.1.2.16 Acknowledged Mode/ Downlink TBF/ Received Block Bitmap/ Compressed Bitmap Starting Colour Code

53.1.2.16.1 Conformance requirements

1. In RB compression, no special code words are used either at the beginning of the bitmap or the end of a bitmap. A one bit indicator (i.e., Compressed Bitmap Starting Colour Code) is used to indicate whether the compressed bitmap starts with a run length of zeros or a run length of ones.

References

3GPP TS 04.60, subclause 9.1.10.

53.1.2.16.2 Test purpose

1. To verify the correct coding of Compressed Bitmap Starting Colour Code bit field in Packet Downlink ACK/NACK.

53.1.2.16.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

SS initiates the establishment of a downlink EGPRS TBF, setting window size value to WS in the IMMEDIATE ASSIGNMENT message. WS should be greater than the available space for RB. SS sends a sequence of RLC data blocks with BSN=0, 1, 2, 4, 5, WS-1 and polls for acknowledgement. MS shall send a Packet Downlink Ack/Nack message with COMPRESSED_ BITMAP_ STARTING_ COLOR_ CODE = 1. SS sends one RLC data block with BSN=3 and polls for acknowledgement. MS shall send a Packet Downlink Ack/Nack message with COMPRESSED_ BITMAP_ STARTING_ COLOR_ CODE=0.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size = 192.
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent a sequences of blocks on the assigned PDTCH, with BSN = 0, 1, 2, 4, 5, WS-1. In the last block of BSN = WS-1, ES/P = '01'B, RRBP = '00'B.
3	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. COMPRESSED_BITMAP_STARTING_COLOR_CODE = 1
4	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the assigned PDTCH, BSN = 3, ES/P = '01'B, RRBP = '00'B.
5	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. COMPRESSED_BITMAP_STARTING_COLOR_CODE = 0

53.1.2.17 Acknowledged Mode/ Downlink TBF/ Received Block Bitmap/ Terminating Code and Make-up Code

53.1.2.17.1 Conformance requirements

1. The T.4 procedure for encoding run lengths is as follows. Runs of ones and zeros alternate, and the run lengths are represented by the code words listed in the tables below. The code words for run lengths of zeros and ones are as described in T.4 except for one minor modification: the terminating code words used for indicating run lengths of 1 zero and 3 zeros are interchanged.

2. Run lengths greater than 63 bits are encoded first by the make-up code word which is equal to or shorter than that required. This is then followed by the terminating code word representing the difference between the required run length and the run length represented by the make-up code.

References

3GPP TS 04.60, subclause 9.1.10.

53.1.2.17.2 Test purpose

1. To verify that run lengths in the range 0-63 bits are encoded with their appropriate terminating code word.

2. To verify the correct use of make-up code word for run lengths in the range 64 and above.

53.1.2.17.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- EGPRS Multislotclass (TSPC_Type_EGPRS_Multislot_ClassX where X = 1..45)

PIXIT Statements

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Test Procedure

The SS initiates the establishment of a downlink EGPRS TBF, setting window size to the largest value WS corresponding the number of timeslots assigned to TBF.

The SS sends EGPRS RLC data blocks one by one with BSN from WS-1 to 1 and polls for acknowledgement in each block. The MS shall send a Packet Downlink Ack/Nack message in responding to each block received, the terminating code word or make-up code word for run length of ones or zeros shall be correct.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size = Maximum for the MS according to the number of timeslots assigned to TBF.
2	-		N = WS-1
3	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Sent on the assigned PDTCH, with BSN = N. ES/P = '01'B, RRBP = '00'B
4	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. Check if CRBB contains the correct makeup code word and/or terminating code word. Note: MS may send uncompressed bitmap along with compressed bitmap to achieve the best compression gain.
5	-		N = N –1
6	-		Repeat step 3 to 5 until N = 1.

53.1.2.18 Acknowledged Mode/ Downlink TBF/ Retransmission/ Padding

53.1.2.18.1 Conformance requirements

According to the link quality, an initial Modulation and Coding Scheme (MCS) is selected for an RLC block (see note). For the retransmissions, the same or another MCS from the same family of MCSs may be selected. E.g. if MCS-7 is selected for the first transmission of an RLC block, any MCS of the family B may be used for the retransmissions. Further, RLC data blocks initially transmitted with MCS4, MCS-5, MCS-6, MCS-7, MCS-8 or MCS-9, may be retransmitted with MCS-1, MCS-2 or MCS-3 as appropriate, by sending the different parts of the RLC data block in different radio blocks. In this case, the split block field in the header shall be set to indicate that the RLC data block is split, and the order of the two parts. For blocks initially transmitted with MCS-8 which are retransmitted using MCS-6 or MCS-3, padding of the first six octets shall be applied before each RLC data block, and the CPS field shall be set to indicate that this has been done (see an informative example in annex J).

References

3GPP TS 04.60, subclause 9.3.2.1

53.1.2.18.2 Test purpose

1. To verify that the MS correctly decodes the CPS field of Downlink Egprs RLC Data Block header.

2. To verify that the MS correctly decodes a retransmitted data block which contains first six octets of padding.

53.1.2.18.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

- EGPRS Multislotclass (TSPC_Type_EGPRS_Multislot_ClassX where X = 1..45)

PIXIT Statements

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Test Procedure

The SS initiates the establishment of a downlink EGPRS TBF, setting window size to the largest value WS corresponding the number of timeslots assigned to TBF.

The SS sends two EGPRS RLC radio blocks with BSN=0 BSN=1 and BSN=4 BSN=5 using MCS-8. In the last block FBI is set to 1 and the MS is polled for Acknowledgement.

The MS shall send a Egprs Packet Downlink Ack/Nack message acknowledging BSNs 0,1,4 and 5 and negatively acknowledging BSN=2 and BSN=3. SS verifies that FAI is set to 0.

The SS sends EGPRS RLC data block with BSN=2 using MCS-6, setting first 6 octets of the data block to padding, and setting CPS field to indicate the same and polls the MS for acknowledgement.

The MS shall send Egprs Packet Downlink Ack/Nack message acknowledging BSNs 0,1,2,4 and 5 and negatively acknowledging BSN=3. SS verifies that FAI is set to 0.

The SS sends first part of BSN=3 using MCS-3 with first six octets of the data block set to padding and polls the MS for acknowledgement. CPS is set correctly in the data block header to indicate that the block is first part of split block and that the data block is padded.

The MS shall send Egprs Packet Downlink Ack/Nack message acknowledging BSNs 0,1,2,4 and 5 and negatively acknowledging BSN=3. SS verifies that FAI is set to 0.

The SS sends second part of BSN=3 using MCS-3 and polls the MS for acknowledgement. CPS is set correctly in the data block header to indicate that the block is second part of split block and that the data block is not padded.

The MS shall send Egprs Packet Downlink Ack/Nack message acknowledging BSNs 0 to 5. SS verifies that FAI is set to 1.

Maximum Duration of Test

30 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Acknowledged Mode EGPRS Window Size = Maximum for the MS according to the number of timeslots assigned to TBF.
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Using MCS-8 Sent on the assigned PDTCH, with BSN = 0 and BSN=1.
3	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Using MCS-8 Sent on the assigned PDTCH, with BSN = 4 and BSN=5. FBI is set to 1. MS is polled for FPB
4	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SS verifies that BSN 0, 1, 4 and 5 are acknowledged, BSN 2 and 3 are not acknowledged and FAI=0
5	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Using MCS-6 Sent on the assigned PDTCH, with BSN = 2. First six octets of the data block shall be padding octets. CPS field shall indicate the same. MS is polled for FPB.
6	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SS verifies that BSN 0, 1, 2, 4 and 5 are acknowledged, BSN 3 is not acknowledged and FAI=0
7	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Using MCS-3 Sent on the assigned PDTCH, with BSN = 3. First 6 octets of the data block shall be padding octets. CPS field shall indicate that the data block is first part of split block and the data block is padded. MS is polled for FPB.
8	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SS verifies that BSN 0, 1, 2, 4 and 5 are acknowledged, BSN 3 is not acknowledged and FAI=0
9	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Using MCS-3 Sent on the assigned PDTCH, with BSN = 3. CPS field shall indicate that the data block is second part of split block and the data block is not padded. MS is polled for FPB.
10	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SS verifies that BSN 0, 1, 2, 3, 4 and 5 are acknowledged and FAI=1

53.1.2.19 Acknowledged Mode/ Downlink TBF/ TBF Reallocation/Window Size

53.1.2.19.1 Conformance requirements

For EGPRS the window size (WS) shall be set by the network according to the number of timeslots allocated in the direction of the TBF (uplink or downlink). The allowed window sizes are given in Table 9.1.9.2.1.

MS shall support the maximum window size corresponding to its multislot capability. The selected WS shall be indicated within PACKET UL/DL ASSIGNMENT and PACKET TIMESLOT RECONFIGURE using the coding defined in Table 9.1.9.2.1.

Once a window size is selected for a given MS, it may be changed to a larger size but not to a smaller size, in order to prevent dropping data blocks from the window.

NOTE: If a TBF is reallocated so that the number of allocated timeslots is reduced, the RLC window size may become larger than the maximum window size for the new resources.

References

3GPP TS 04.60, subclause 9.1.9.2

53.1.2.19.2 Test purpose

To verify that if a downlink TBF is reallocated reducing the number of timeslots so that the RLC window size becomes larger than the maximum window size for the new resources, the MS retains the old window size.

53.1.2.19.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting.

Mobile Station:

The MS is GPRS attached with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 2 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

SS establishes a downlink TBF allocating two timeslots. Downlink EGPRS Window Size is commanded to be 256 (the maximum according to the number of timeslots allocated to the TBF).

SS sends EGPRS RLC data block with BSN=1 on one assigned timeslot and BSN=191 in the other assigned timeslot to the MS, polling the MS for acknowledgement in the last block.

SS verifies that MS sends EGPRS PACKET DOWNLINK ACK/NACK message, positively acknowledging BSN=1 and BSN=191 and negatively acknowledging BSN=0 and all other data blocks from BSN=2 till BSN=190.

SS sends a PACKET DOWNLINK ASSIGNMENT message addressing the MS, changing the number of allocated downlink timeslots to 1.

SS sends an EGPRS RLC data block with BSN=255 on the new assigned PDCH, polling the MS for acknowledgement

SS verifies that MS sends EGPRS PACKET DOWNLINK ACK/NACK message in the assigned block period and that the received bitmap positively acknowledges blocks with BSN=1, BSN=191 and BSN=255 and negatively acknowledges BSN=0 and all blocks from BSN=2 till BSN=190 and BSN=192 till BSN=254.

Maximum Duration of Test

10 minutes.

Expected Sequence

Step	Direction	Message	Comments
1a	SS -> MS	IMMEDIATE ASSIGNMENT	For downlink TBF. Sent on PCH.
1b	SS -> MS	PACKET DOWNLINK ASSIGNMENT	Acknowledged Mode. Sent on PACCH. See specific message contents
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Using MCS-1. Sent at least 3 block periods after Step 1 Sent on the assigned PDTCH TN3, with BSN = 1
3	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Using MCS-1 Sent on the assigned PDTCH TN4, with BSN = 191 ES/P = '01'B, RRBP = '00'B
4	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH in TN4. SS verifies that the received bitmap positively acknowledges BSN =1 and BSN=191 and negatively acknowledges BSN=0 and BSN=2 till BSN=190.
5	SS -> MS	PACKET DOWNLINK ASSIGNMENT	Acknowledged Mode. Sent on PACCH of the assigned PDTCH in TN4. See specific message contents
6	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	Using MCS-1. Sent at least 3 block periods after Step 5 Sent on the PDTCH in TN3 assigned in Step 5, with BSN = 255 ES/P = '01'B, RRBP = '00'B
7	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the PDTCH assigned in Step 5. SS verifies that the received bitmap positively acknowledges BSN =1, BSN=191and BSN=255 and negatively acknowledges BSN=0, BSN=2 till BSN=190, and BSN=192 till BSN=254.

Specific Message Contents

PACKET DOWNLINK ASSIGNMENT message in step 1b:

MAC_MODE RLC_MODE TIMESLOT_ALLOCATION - EGPRS Window Size	00 Dynamic Allocation 0 Acknowledged mode 00011000 (TN3 and TN4) 00110 (256)

PACKET DOWNLINK ASSIGNMENT message in step 5:

MAC_MODE RLC_MODE TIMESLOT_ALLOCATION - EGPRS Window Size	00 Dynamic Allocation 0 Acknowledged mode 00010000 (TN3) 00110 (256)

53.2 Unacknowledged Mode

53.2.1 Unacknowledged Mode/ Uplink TBF

53.2.1.1 Unacknowledged Mode/ Uplink TBF/ Stall Indicator

53.2.1.1.1 Conformance requirements

The transfer of RLC data blocks in the RLC unacknowledged mode does not include any retransmissions, except during the release of an uplink TBF where the last transmitted uplink block may be retransmitted (see sub-clause 9.3.3.3).

The network shall send PACKET UPLINK ACK/NACK messages when needed.

The mobile station shall set the Stall indicator (SI) bit to '0' in all RLC data blocks.

References

3GPP TS 04.60, subclause 9.3.3, 9.3.3.2

53.2.1.1.2 Test purpose

To verify that the MS sets SI to '0' in all RLC data blocks

53.2.1.1.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 3 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

An uplink TBF in unacknowledged RLC mode is established. Uplink EGPRS Window Size is commanded to be 192. SS assigns resources to the MS to transmit WS data blocks in the uplink. SS verifies that MS transmits data blocks sequentially and that SI is not set in the data blocks.

SS assigns resource to the MS to transmit in uplink.

SS verifies that the MS transmits new data block with BSN=WS after BSN=WS-1 is transmitted and that SI is not set in the data block with BSN=WS.

SS allows the MS to complete the data transfer.

Maximum Duration of Test

10 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 4400 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1 EGPRS Window Size: 192
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the BSN of the received data block is 0, and SI is not set.
4	-		Repeat Steps 2 and 3 until BSN=191 is received
5	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
6	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the BSN of the received data block is 192, and SI is not set.
7	SS -> MS	PACKET UPLINK ACK/NACK	Acknowledging BSN=192
8		{Completion of uplink RLC data block transfer}	

53.2.1.2   Unacknowledged Mode/ Uplink TBF/ RBB and SSN

53.2.1.2.1   Conformance requirements

The transfer of RLC data blocks in the RLC unacknowledged mode does not include any retransmissions, except during the release of an uplink TBF where the last transmitted uplink block may be retransmitted (see sub-clause 9.3.3.3).

The SSN and RB are transmitted in both RLC acknowledged and RLC unacknowledged mode (note the SSN is calculated differently in EGPRS (refer to table 8.1.1.1) and GPRS (refer to 9.1.8.1)). The SSN and RB shall be ignored by the RLC receiver in unacknowledged mode.

References

> 3GPP TS 04.60, subclause 9.1.8.2, 9.3.3, 9.3.3.2

53.2.1.2.2   Test purpose

> To verify that the MS ignores SSN and RB included in Packet Uplink Ack/Nack message when in RLC unacknowledged mode.

53.2.1.2.3   Method of test

Initial Conditions

> System Simulator:

> > 1 cell with EGPRS support, default setting, PBCCH not present.

> Mobile Station:

> > The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 3 activated.

Specific PICS Statements

> -

PIXIT Statements

> -

Test Procedure

An uplink TBF in unacknowledged RLC mode is established. SS assigns resources to the MS to transmit data blocks in the uplink. After receiving data block with BSN=30, SS sends a Packet Uplink Ack/Nack message with SSN=21 and positively acknowledging BSN=21 till BSN=30.

SS assigns resources to the MS. SS verifies that MS ignores the SSN and RB sent in the Packet Uplink Ack/Nack message and continues transmitting new data blocks.

SS allows the MS to complete the data transfer.

Maximum Duration of Test

10 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Uplink dynamic allocation two phase access}	N = 1000 octets USF_GRANULARITY = 1 block EGPRS Channel Coding Command: MCS-1 EGPRS Window Size: 192
2	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
3	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the BSN of the received data block is 0.
4	-		Repeat Steps 2 and 3 until BSN=30 is received.
5	SS		Wait BS_CV_MAX block periods
6	SS -> MS	PACKET UPLINK ACK/NACK	SSN=21, Bitmap acknowledging BSN=21 till BSN=30
7	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
8	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the BSN of the received data block is 31.
9	SS -> MS	PACKET DOWNLINK DUMMY CONTROL BLOCK	Sent on the PACCH of the PDCH assigned, containing USF assigned to the MS.
10	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	Received on the assigned PDTCH SS verifies that the BSN of the received data block is 32.
11		{Completion of uplink RLC data block transfer}	

53.2.2 Unacknowledged Mode/ Downlink TBF

53.2.2.1 Unacknowledged Mode/ Downlink TBF/ V(R) and V(Q)

53.2.2.1.1 Conformance requirements

In RLC unacknowledged mode, all values of BSN are within the transmit window.

In RLC unacknowledged mode, V(R) shall be set to [BSN' + 1] modulo SNS, where BSN' is the BSN of most recently received RLC data block.

In RLC unacknowledged mode, if [V(R) - V(Q)] modulo SNS > WS after updating V(R), then V(Q) is set to [V(R) - WS] modulo SNS.

References

3GPP TS 04.60, subclause 9.1, 9.1.5, 9.1.6

53.2.2.1.2 Test purpose

To verify that in RLC unacknowledged mode, the MS correctly sets V(R) and V(Q) depending upon the BSN of the data block received.

53.2.2.1.3 Method of test

Initial Conditions

System Simulator:

1 cell with EGPRS support, default setting, PBCCH not present.

Mobile Station:

The MS is EGPRS updated with a P-TMSI allocated, SPLIT PG CYCLE negotiated and the test PDP context 3 activated.

Specific PICS Statements

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PIXIT Statements

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Test Procedure

The SS initiates the establishment of an unacknowledged downlink EGPRS TBF, setting window size value to 192.

SS sends data block with BSN=1, BSN=191 and poll the MS for acknowledgement. SS verifies that SSN=1 and the bitmap contains status of all blocks till BSN=191.

SS sends another data block with BSN=201 and polls the MS for acknowledgement. SS verifies that SSN=11 and the bitmap contains status of all blocks from 11 till 201.

Maximum Duration of Test

10 minutes.

Expected Sequence

Step	Direction	Message	Comments
1		{Downlink TBF establishment}	Unacknowledged Mode EGPRS Window Size: 192
2	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With BSN=1. Sent on the PDCH assigned in Step 1
3	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With BSN=191. Sent on the PDCH assigned in Step 1 MS is polled for FPB
4	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SS verifies that the SSN=1 and the bitmap acknowledge blocks with BSN=1 and BSN=191.
5	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With BSN=201. Sent on the PDCH assigned in Step 1 MS is polled for FPB
6	MS -> SS	EGPRS PACKET DOWNLINK ACK/NACK	Received on PACCH of the assigned PDTCH. SS verifies that the SSN=11 and the bitmap acknowledge blocks with BSN=191 and BSN=201.
7	SS -> MS	EGPRS DOWNLINK RLC DATA BLOCK	With BSN=202. FBI set to '1' Sent on the PDCH assigned in Step 1 With a valid RRBP
8	MS -> SS	PACKET CONTROL ACKNOWLEDGEMENT	Received on the block specified by RRBP.

53.3 Default Message Contents and Macros

53.3.1 Message Contents

53.3.2 Macros

53.3.2.1 Macro for uplink dynamic allocation two phase access

Step	Direction	Message	Comments
		{Uplink dynamic allocation two phase access}	Macro parameters: N: the number of data octets to be transferred, USF_GRANULARITY: 1 or 4 blocks, RLC_DATA_BLOCKS_GRANTED: 9-261 (close-end) or absent (open-end), EGPRS Channel Coding Command: MCS-1, -2, -3, -4, -5, -6, -6, -7, -8, -9 or MCS-5-7, MCS6-9, Resegment IE: incremental redundancy on/off in uplink direction, EGPRS Window Size: according to number of allocated timeslots, **TLLI_BLOCK_CHANNEL_CODING**: MCS-1 or as data block, TBF Starting Time:
0	MS		Trigger the MS to initiate uplink transfer of **N** octets of data according to the activated test PDP context.
1	MS -> SS	EGPRS PACKET CHANNEL REQUEST	Received on RACH.
2	SS -> MS	IMMEDIATE ASSIGNMENT	Multi block assignment allocating two blocks using Multiblock Allocation Struct, to order the MS to follow the two-phase access procedure. Sent on AGCH.
3	MS -> SS	PACKET RESOURCE REQUEST	Two phase access procedure. Received on the multi block assigned in step 2. EGPRS capability indicated in the MS Radio Access Capability IE. Check that the PEAK_THROUGHPUT, RADIO_PRIORITY and RLC_MODE are compliant with the PDP context used.
3a (conditional)	MS -> SS	ADDITIONAL MS RADIO ACCESS CAPABILITIES	If <ADDITIONAL MS RAC INFORMATION AVAILABLE> field in the received PACKET RESOURCE REQUEST message (step 3) indicates 1, then step 3a is performed.
3b (optional)	MS -> SS	uplink control block (e.g. PACKET MEASUREMENT REPORT, PACKET UPLINK DUMMY CONTROL BLOCK)	If <ADDITIONAL MS RAC INFORMATION AVAILABLE> field in the received PACKET RESOURCE REQUEST message (step 3) indicates 0, then step 3b is optionally performed.
4	SS -> MS	PACKET UPLINK ASSIGNMENT	Uplink dynamic allocation, no starting time (as default, otherwise use TBF Starting Time), sent on PACCH of the same PDCH assigned in step 2.

53.3.2.2 Macro for downlink TBF establishment (PBCCH not present)

Step	Direction	Message	Comments
		{Downlink TBF establishment}	Macro parameters: **TBF_STARTING_TIME**
1	SS -> MS	PAGING REQUEST	Page info contains P-TMSI of the MS. Sent on PCH.
2	MS -> SS	CHANNEL REQUEST	ACCESS TYPE = "One phase packet access". Received on RACH.
3	SS -> MS	IMMEDIATE ASSIGNMENT	Random Reference = pertaining to the message received in step 2. Dynamic allocation for RLC data blocks, Sent on AGCH.
4	MS -> SS	GPRS UPLINK RLC DATA BLOCK	LLC PDU implicitly indicating paging response, containing TLLI in the RLC/MAC header. Received on uplink PDTCH assigned in step 3.
5	SS -> MS	PACKET UPLINK ACK/NACK	Acknowledge the received RLC data block. Sent on uplink PACCH.
6	MS -> SS	PACKET CONTROL ACKNOWLEDGEMENT	Acknowledge the RLC control message. Received on uplink PACCH.
7	SS -> MS	IMMEDIATE ASSIGNMENT	Downlink Assignment, TLLI value as received. Sent on PCH. Macro parameter as assigned in the test case.

53.3.2.3 Macro for downlink TBF establishment using ACCESS TYPE = "signalling" (PBCCH not present)

The following table describes a signalling sequence performing a downlink TBF establishment procedure.

The macros in the test cases refer to the table below starting at the step required for the particular sequence.

These steps are only applicable to mobiles that support EGPRS Packet Channel Request with Establishment Cause 'signalling' on RACH in a cell supporting EGPRS Packet Channel Request.

Related PICS Statement: TSPC_EGPRS_ENHANC

Step	Direction	Message	Comments
		{Downlink TBF establishment}	Macro parameters: **TBF_STARTING_TIME**
1	SS -> MS	PAGING REQUEST	Page info contains P-TMSI of the MS. Sent on PCH.
2	MS -> SS	EGPRS PACKET CHANNEL REQUEST	ACCESS TYPE = "signalling". Received on RACH.
3	SS -> MS	IMMEDIATE ASSIGNMENT	Random Reference = pertaining to the message received in step 2. Assigning an EGPRS TBF. Dynamic allocation for RLC data blocks, Sent on AGCH.
4	MS -> SS	EGPRS UPLINK RLC DATA BLOCK	LLC PDU implicitly indicating paging response, containing TLLI in the RLC/MAC header. Received on uplink PDTCH assigned in step 3.
5	SS -> MS	EGPRS PACKET UPLINK ACK/NACK	Acknowledge the received RLC data block. Sent on uplink PACCH.
6	MS -> SS	PACKET CONTROL ACKNOWLEDGEMENT	Acknowledge the RLC control message. Received on uplink PACCH.
7	SS -> MS	IMMEDIATE ASSIGNMENT	Downlink Assignment, TLLI value as received. Assigning an EGPRS TBF. Sent on PCH. Macro parameter as assigned in the test case.