

## CHANGE REQUEST

⌘ **44.065 CR 024** ⌘ rev - ⌘ Current version: **6.3.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

**Proposed change affects:** | UICC apps ⌘  ME  Radio Access Network  Core Network

<b>Title:</b>	⌘ Modifications for PS HO in A/Gb mode ⌘		
<b>Source:</b>	⌘ Nokia ⌘		
<b>Work item code:</b>	⌘ SCSAGB ⌘	<b>Date:</b>	⌘ ⌘
<b>Category:</b>	⌘ <b>B</b> ⌘	<b>Release:</b>	⌘ Rel-6 ⌘
	Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Use <u>one</u> of the following releases: <b>Ph2</b> (GSM Phase 2) <b>R96</b> (Release 1996) <b>R97</b> (Release 1997) <b>R98</b> (Release 1998) <b>R99</b> (Release 1999) <b>Rel-4</b> (Release 4) <b>Rel-5</b> (Release 5) <b>Rel-6</b> (Release 6) <b>Rel-7</b> (Release 7)

<b>Reason for change:</b>	⌘ With the PS HO feature it is possible to request a Reset of the SNDCP in case of a inter SGSN change or inter RAT change towards A/Gb mode. The possibility to send data during XID negotiation is introduced.
<b>Summary of change:</b>	⌘ It is defined, that the LL-RESET.indication could also be indicated by LLC in case of a PS HO.
<b>Consequences if not approved:</b>	⌘ Missing definition how SNDCP shall behave in case of a PS HO.

<b>Clauses affected:</b>	⌘ 2; 5.1.2; 5.1.2.1; 6.2.1.3; 6.8 ⌘										
<b>Other specs affected:</b>	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td></td> <td>X</td> </tr> </table> Other core specifications Test specifications O&M Specifications	Y	N	X			X		X	⌘ 24.008 CR 992; 44.064 CR 011 ⌘	
Y	N										
X											
	X										
	X										
<b>Other comments:</b>	⌘ ⌘										

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## 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service Description; Stage 1".
- [3] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".
- [4] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".
- [5] 3GPP TS 44.018: "Mobile radio interface; Layer 3 specification; Radio Resource Control Protocol".
- [5a] 3GPP TS 24.008: "Mobile radio interface; Layer 3 specification; Core Network Protocols; Stage 3".
- [6] 3GPP TS 44.064: "General Packet Radio Service (GPRS); Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".
- [7] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".
- [8] ITU-T Recommendation V.42 bis: "Data compression procedures for data circuit-terminating equipment (DCE) using error correcting procedures".
- [9] IETF RFC 1144: "Compressing TCP/IP headers for low-speed serial links", V. Jacobson.
- [10] IETF RFC 2507: "IP Header Compression", M. Degermark, B. Nordgren, S. Pink.
- [11] ITU-T Recommendation V.44: "Data compression procedures".
- [12] IETF RFC 3095: "RObust Header Compression (ROHC): Framework and four profiles: RTP, UDP, ESP, and uncompressed". C. Bormann et al.
- [13] IETF RFC 3241: "Robust Header Compression (ROHC) over PPP". C. Bormann.
- [14] "RObust Header Compression (ROHC) Profile Identifiers". IANA registry at: <http://www.iana.org/assignments/rohc-pro-ids>
- [15] [3GPP TS 43.129: "Packet-switched handover for GERAN A/Gb mode; Stage 2"](#).

## 5.1.2 Service primitives used by SMDCP layer

The SMDCP layer uses the service primitives provided by the SM sublayer and the LLC layer (see table 2). SM is specified in 3GPP TS 24.008 [5a] and LLC in 3GPP TS 44.064 [6].

**Table 2: Service primitives used by the SMDCP entity**

Generic Name	Type				Parameters
	Request	Indication	Response	Confirm	
<b>SMDCP ↔ LLC</b>					
LL-RESET	-	X	-	-	TLLI, <a href="#">old XID indicator</a>
LL-ESTABLISH	X	-	-	-	TLLI, XID Requested
LL-ESTABLISH	-	X	-	-	TLLI, XID Requested, N201-I, N201-U
LL-ESTABLISH	-	-	X	-	TLLI, XID Negotiated
LL-ESTABLISH	-	-	-	X	TLLI, XID Negotiated, N201-I, N201-U
LL-RELEASE	X	-	-	-	TLLI, Local
LL-RELEASE	-	X	-	-	TLLI, Cause
LL-RELEASE	-	-	-	X	TLLI
LL-XID	X	-	-	-	TLLI, XID Requested
LL-XID	-	X	-	-	TLLI, XID Requested, N201-I, N201-U
LL-XID	-	-	X	-	TLLI, XID Negotiated
LL-XID	-	-	-	X	TLLI, XID Negotiated, N201-I, N201-U
LL-DATA	X	-	-	-	TLLI, SN-PDU, Reference, QoS Parameters, Radio Priority
LL-DATA	-	X	-	-	TLLI, SN-PDU
LL-DATA	-	-	-	X	TLLI, Reference
LL-UNITDATA	X	-	-	-	TLLI, SN-PDU, QoS Parameters, Radio Priority, Cipher
LL-UNITDATA	-	X	-	-	TLLI, SN-PDU
LL-STATUS	-	X	-	-	TLLI, Cause
<b>SMDCP ↔ SM</b>					
SNSM-ACTIVATE	-	X	-	-	TLLI, NSAPI, QoS profile, SAPI, Radio Priority
SNSM-ACTIVATE	-	-	X	-	TLLI, NSAPI
SNSM-DEACTIVATE	-	X	-	-	TLLI, NSAPI(s), LLC Release Indicator, XID Negotiation Indicator
SNSM-DEACTIVATE	-	-	X	-	TLLI, NSAPI
SNSM-MODIFY	-	X	-	-	TLLI, NSAPI, QoS Profile, SAPI, Radio Priority, Send N-PDU Number, Receive N-PDU Number
SNSM-MODIFY	-	-	X	-	TLLI, NSAPI
SNSM-STATUS	X	-	-	-	TLLI, SAPI, Cause
SNSM-SEQUENCE	-	X	X	-	TLLI, NSAPI, Receive N-PDU Number
SNSM-STOP-ASSIGN	-	X	-	-	TLLI, NSAPI

### 5.1.2.1 LL-RESET.indication

Indication used by the LLC layer in the SGSN to indicate to the SMDCP layer that the Reset XID parameter has been transmitted, and by the LLC layer in the MS to indicate to the SMDCP layer that the Reset XID parameter has been received.

This indication is also used by the LLC layer in the SGSN to indicate to the SMDCP layer that a PS handover with a request to Reset is performed, and by the LLC layer in the MS to indicate to the SMDCP layer that a PS handover with a request to Reset has been received (see 3GPP TS 43.129 [15] and 3GPP TS 24.008 [5a]).

Upon receipt of the LL-RESET.indication, the SMDCP layer shall:

- treat all outstanding SMDCP ↔ LLC request type primitives as not sent;
- if the old XID indicator is set, use current SMDCP XID parameters and re-initialize any negotiated compression entities; otherwise, reset all SMDCP XID parameters to their default values (for the definition of default values see subclause 6.8.2 and clause 8, table 8);
- in the MS, for every NSAPI using unacknowledged peer-to-peer LLC operation, set the Send N-PDU number (unacknowledged) to 0; and
- for every NSAPI using acknowledged peer-to-peer LLC operation, enter the recovery state and suspend the transmission of SN-PDUs until an SNSM-SEQUENCE.indication primitive is received for the NSAPI. In the SGSN the SMDCP layer shall re-establish acknowledged peer-to-peer operation for the affected SAPIs in the LLC layer.

### 6.2.1.3 Establishment procedure

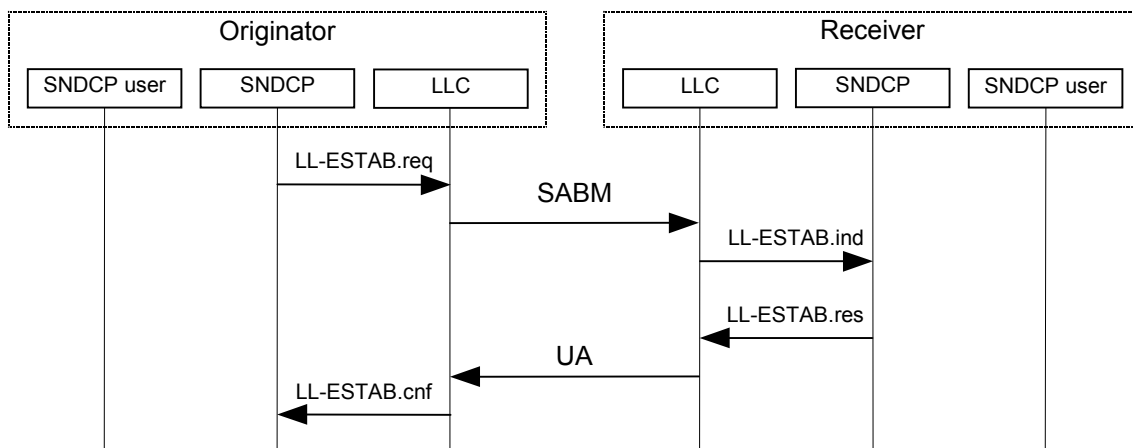
The SNDCP layer shall initiate the establishment or re-establishment by sending an LL-ESTABLISH.request primitive to the relevant LLC SAP. SNDCP XID parameters may be included in an SNDCP XID block in the LL-ESTABLISH.request primitive. If no SNDCP XID parameter is to be included, an empty SNDCP XID block shall be included.

Following the sending of the LL-ESTABLISH.request primitive, the SNDCP layer shall suspend the transfer of SN-DATA and may continue the transfer of SN-UNITDATA primitives to the LLC SAP to which the LL-ESTABLISH.request is sent. Transfer of SN-DATA ~~and SN-UNITDATA~~ primitives shall be resumed when the establishment procedure has been successfully completed.

The establishment procedure ends through one of the following means:

- successful (receiving LL-ESTABLISH.confirm);
- failure (receiving LL-RELEASE.indication); or
- successful following collision resolution (receiving LL-ESTABLISH.indication and sending LL-ESTABLISH.response, see subclause 6.2.1.4).

Upon receipt of an LL-ESTABLISH.indication primitive, if an SNDCP XID block is present, the peer SNDCP entity shall respond with an LL-ESTABLISH.response primitive. SNDCP XID parameters may be included in an SNDCP XID block in the LL-ESTABLISH.response primitive. If no SNDCP XID parameter is to be included, an empty SNDCP XID block shall be included. If there is no SNDCP XID block in the LL-ESTABLISH.indication primitive, the peer SNDCP entity shall not respond with an LL-ESTABLISH.response primitive.



**Figure 6: SNDCP-initiated establishment / re-establishment**

## 6.8 XID parameter negotiation

Negotiation of XID parameters between peer SNDCP entities may be carried out to ensure optimal information transfer. The parameters are called SNDCP exchange identity (XID) parameters.

SNDCP XID parameter negotiation may be initiated by the SNDCP entity at the MS or at the SGSN. If SNDCP XID parameters are to be changed, ~~SNDCP XID negotiation shall be initiated prior to data transfer~~ - the MS shall initiate SNDCP XID negotiation upon receipt of SNSM-ACTIVATE.indication; the SGSN shall initiate SNDCP XID negotiation upon receipt of the SNSM-MODIFY.indication primitive if an NSAPI has been put into use (in the case of an Inter-SGSN Routing Area Update), or if the change in QoS profile to an existing NSAPI results in a change in compressor(s) used by the NSAPI.

When an NSAPI no longer uses a compression entity due to a PDP context deactivation or a PDP context modification, an SNDCP XID negotiation shall be performed to remove the NSAPI from the Applicable NSAPIs of the compression entity. The negotiation shall be initiated by the MS upon receipt of the SNSM-DEACTIVATE.indication with XID Negotiation Indicator in the case of explicit PDP context deactivation by peer-to-peer signalling between the SM entities. The negotiation shall be initiated by the SGSN upon receipt of the SNSM-MODIFY.indication in the case of PDP context modification. If a PDP context is deactivated locally, without peer-to-peer signalling between the SM entities, the SM entity at the MS and the SM entity at the SGSN each shall send an SNSM-DEACTIVATE.indication without XID Negotiation Indicator to its respective SNDCP entity. Upon receipt of this primitive without XID Negotiation Indicator the SNDCP entity shall remove the NSAPI from the Applicable NSAPIs of the compression entity without any XID negotiation.

The XID negotiation is a one-step procedure; i.e. the initiating end proposes parameter values, and the responding end either accepts these or offers different values in their place according to the XID negotiation rules described in the present document; the rules limit the range of parameter values as well as the sense of negotiation. The initiating end accepts (or rejects) the values in the response; this concludes the negotiation.

The block format for the SNDCP XID parameter negotiation is shown in figure 10. Not all parameters have to be included in the XID block, only parameters that are negotiated. Parameters may be included in any order. Also it shall be possible to negotiate parameters for more than one NSAPI in one XID block since more than one NSAPI can use the same SAPI.

Bit	8	7	6	5	4	3	2	1
Octet 1	Parameter type=0							
Octet 2	Length=1							
Octet 3	Version number							
Octet 4	Parameter type=1							
Octet 5	Length=n-5							
Octet 6	P	X	X	Entity number				
Octet 7 (optional)								
Octet 8	Length=k-8							
Octet 9 ... (optional)								
Octet j	High-order octet							
...	...							
Octet k	Low-order octet							
Octet k+1	P	X	X	Entity number				
Octet k+2 (optional)								
Octet k+3	Length=m-(k+3)							
Octet k+4 ... (optional)								
Octet k+y	High-order octet							
...	...							
Octet m	Low-order octet							
...	...							
Octet n	Low-order octet							
Octet n+1	Parameter type=2							
Octet n+2	Length=r-(n+2)							
Octet n+3	P	X	X	Entity number				
Octet n+4 (optional)								
Octet n+5	Length=p-(n+5)							
Octet n+6... (optional)								
Octet n+w	High-order octet							
...	...							
Octet p	Low-order octet							
Octet p+1	P	X	X	Entity number				
Octet p+2 (optional)								
Octet p+3	Length=q-(p+3)							
Octet p+4 ... (optional)								
Octet p+v	High-order octet							
...	...							
Octet q	Low-order octet							
...	...							
Octet r	Low-order octet							

Figure 10: Example of SND CP XID block format

The SNDCP user uses SN-XID.request to initiate the negotiation of the XID parameters. The SNDCP entity sends the proposed SNDCP XID parameters to the LLC SAP with the LL-XID.request or LL-ESTABLISH.request. The LLC SAP shall issue an XID command containing the SNDCP XID parameters (see 3GPP TS 44.064 [6]). The peer LLC SAP shall, upon receipt of the XID command, indicate the SNDCP XID parameters to SNDCP entity using LL-XID.indication or LL-ESTABLISH.indication. The peer SNDCP entity shall select appropriate values for the proposed parameters or negotiate the appropriate values with the SNDCP user entity with the SN-XID.indication and SN-XID.response primitives. When the appropriate parameter values are known by the peer SNDCP entity, it shall use the LL-XID.response or LL-ESTABLISH.response primitive to continue negotiation. Upon reception of the response, the LLC SAP shall send the received parameters to the SNDCP entity using the LL-XID.confirm or LL-ESTABLISH.confirm primitive. The SNDCP entity delivers the negotiated parameters to the SNDCP user. This is illustrated in figure 11. The originator of the negotiation shall apply the new parameter values after it has received the 'confirm' primitive. The responding end of the negotiation shall apply the new parameter values after it has sent the replying 'response' primitive.

Following the sending of the LL-XID.request or LL-ESTABLISH.request primitive with requested XID parameters, the SNDCP layer shall act as follows:

- if at least one SNDCP XID parameter has been negotiated to a value different from its default value, the SNDCP layer shall suspend the transfer of SN-DATA and SN-UNITDATA primitives to the LLC SAP to which the LL-XID.request is sent. (For the definition of default values see subclause 6.8.2 and clause 8, table 8);
- if all SNDCP XID parameters are still equal to their default values, the SNDCP layer shall suspend the transfer of SN-DATA and may continue the transfer of SN-UNITDATA primitives to the LLC SAP to which the LL-XID.request is sent. The originator of the negotiation shall apply the default parameter values until the SNDCP XID negotiation is successfully completed. The responding end of the negotiation shall apply the default parameter values until it has sent the replying 'response' primitive which indicates the successful completion of the SNDCP XID negotiation.

Transfer of SN-DATA and SN-UNITDATA primitives shall be resumed when the SNDCP XID negotiation has been successfully completed.

The SNDCP XID negotiation ends through one of the following means:

- successful (receiving LL-XID.confirm or LL-ESTABLISH.confirm);
- failure (receiving LL-RELEASE.indication, or LL-STATUS.indication); or
- successful following collision resolution (receiving LL-ESTABLISH.indication and sending LL-ESTABLISH.response, or receiving LL-XID.indication and sending LL-XID.response, see subclause 6.2.1.4).

LLC may also initiate LLC XID negotiation, in which case LLC may send an LL-XID.indication to inform SNDCP the values of N201-I and N201-U. This is illustrated in figure 12. If the SNDCP entity receives an LL-XID.indication without an SNDCP XID block, it shall not respond with the LL-XID.response primitive.

Negotiation of SNDCP version number is always between the peer SNDCP entities. The version number is not known by the SNDCP user. However, negotiation of the parameters for compression algorithms may be carried out between the SNDCP user entities.

Negotiation of SNDCP XID parameters for an NSAPI shall be carried out in the SAPI to which the NSAPI is mapped.



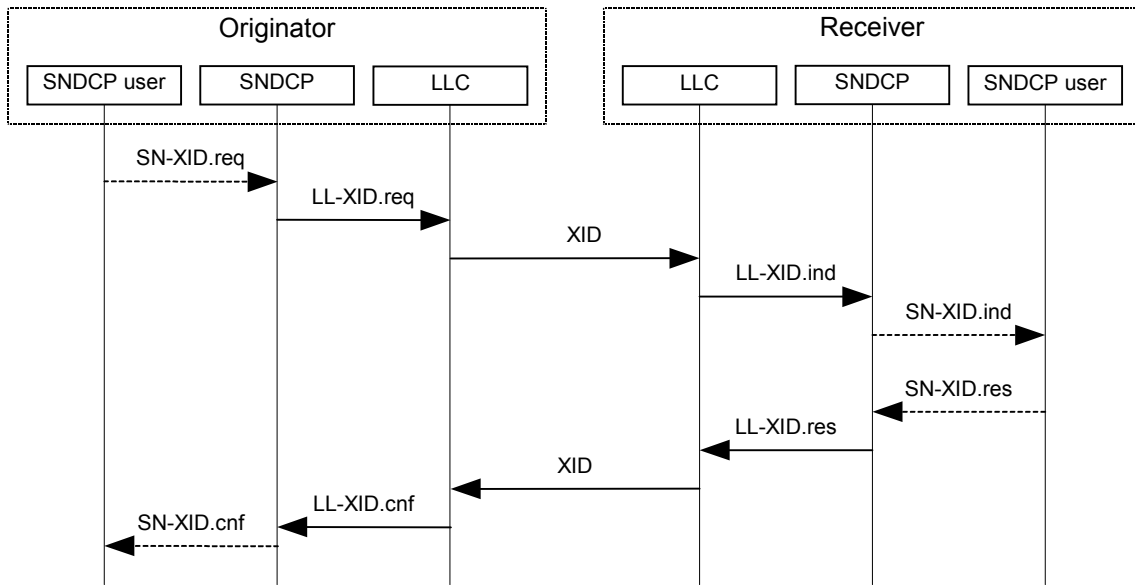


Figure 11: SNDCP XID negotiation procedure

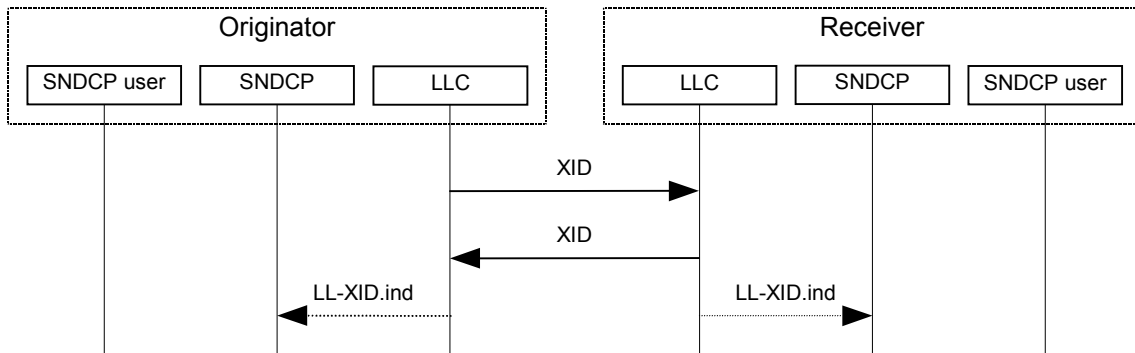


Figure 12: LLC XID negotiation procedure