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Abstract	Draft includes SN_REPORT header to be used in FBSS only. Using this header the MS can provide the Anchor BS with the last good received SDU's which may provide continuity of non-ARQ enabled connections during HO in the downlink. We propose to extend the usage of this header to hard handover, in addition to FBSS	
Purpose	Extend the usage of SN_REPORT header to hard handover, in addition to FBSS	
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SN_REPORT header for HO

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1. Motivation

To maintain continuity of DL traffic when switching from one BS (old Serving BS) to another BS (Target BS or new Serving BS), the last information unit successfully received by the MS needs to be identified and conveyed to the new Serving BS. Otherwise, ARQ DL window will have to be reset or SDU's will be retransmitted, thus introducing additional HO latency.

For FBSS, the standard provides a method to help overcome this problem, based on virtual SDU sequential numbering (SDU SN) for non-ARQ enabled connections and using the SN_REPORT header.

We offer to adopt and extend to the benefit of hard HO systems

2. Proposed Remedy

Items that require no changes to draft as result of extending usage of SN_REPORT from FBSS to hard HO (common for both methods):

- Declaring capability of supporting SDU SN is done exactly like in FBSS (during registration, via REG-REQ/RSP)
- Declaring that a connection is SDU SN enabled is done exactly like in FBSS (during connection provisioning, via DSA-REQ/RSP)
- Definition of SN_REPORT header and it usage remains exactly as in FBSS.

Items that are added to the draft, but are copied from FBSS section without changes:

- The SDU SN numbering method remains the same: Serving BS includes SDU SN extended subheader, at least once every 2^p MAC PDUs (p defined in REG-RSP) during HO.

Items that are added to the draft, but require modifications as result of extending the usage of SN_REPORT from FBSS to hard HO:

- Definition of SDU sequence numbering initiation time:
Upon transmitting MOB_BSHO-REQ/RSP, the (old) Serving BS initiates SDU sequence numbering (in FBSS, this is done upon Anchor SW request).
- Definition of SDU sequence numbering termination time:
Serving BS may terminate SDU sequence numbering not later than "estimated HO time" (in FBSS, this is done upon switching to new Anchor BS)
- Definition of time that MS transmits SN_REPORT:
Upon completion of HO and NW re-entry, the Target BS must provide UL resource and MS must transmit SN_REPORT header (PDU without payload), one or more.
- Definition of CIDs to use in SN_REPORT:
HO may include CID update, thus MS must use updated CIDs in SN_REPORT. MS must not include a CID in the SN_REPORT, if the respective connection was discontinued at the Target BS.

3. Changes summary

[Change the existing text in the first paragraph of 6.3.2.1 as shown below:]

In the DL, there is one MAC header that is the generic MAC header that begins each MAC PDU containing either MAC management messages or CS data.

In the UL, six MAC header formats are defined.

The first is the generic MAC header that begins each MAC PDU containing either MAC management messages or CS data.

The second is the bandwidth request header used to request additional bandwidth.

The third is the PHY channel report header used for the MS to send a PHY channel report to the BS. The fourth is the feedback header used for the MS to provide its feedback.

The fifth is the bandwidth request and UL TX power report header used for the MS to send a combined bandwidth request and UL Tx power report.

The sixth is the SN report header used by the MS to feedback SDU SN during [handover or](#) fast BS switching. The single-bit header type (HT) field distinguishes the generic MAC header and the rest of the header formats. The HT field shall be set to zero for the generic header and to one for other MAC headers.

[Insert new subclause 6.3.21.2.3:]

6.3.21.2.6.3 MS-Assisted coordination of DL transmission at Target BS for Hard HO

[Once the MS has successfully switched to the Target BS \(now new Serving BS\), to maintain continuity of transmission to the MS between the old and new Serving BSs, the last successfully received information unit needs to be identified to the new Serving BS. Depending on whether the connection is ARQ based or non-ARQ based, the identity of the next information unit can be given by the ARQ block sequence number or the MAC SDU sequence number respectively.](#)

[MS can optionally support the feedback of ARQ block sequence number or the virtual MAC SDU sequence number after the MS has successfully switched to the new Serving BS. The capability and the support for each connection are defined in the REG-REQ/RSP and DSA-REQ/RSP TLVs respectively.](#)

[For the connections that have SN Feedback enabled, the following procedures shall be performed by the BS and the MS:](#)

[For ARQ connections, the ARQ block sequence number is already available at the MS.](#)

[For non-ARQ connections, the old Serving BS shall include a SDU SN Extended subheader at least once every 2^p MAC PDUs, where p is specified in the SN Feedback support TLV \(11.7.8.9\). Upon transmitting MOB_BSHO-RSP \(in response to receiving MOB_MSHO-REQ, in case of MS initiated HO\) or upon transmitting MOB_BSHO-RSP \(in case of BS initiated HO\), the old Serving BS shall include SDU SN Extended subheader in MAC PDU at least before "Estimated HO time" \(the first time that MS is expected to communicate with the Target BS\). The MS shall maintain MAC SDU sequence number based on the information received from the BS. When the MS receives a MAC PDU without SDU SN Extended subheader, the MSS shall increment the MAC SDU sequence number by one for every SDU received. When the MS receives MAC SDU sequence number from the BS, it shall reset the MAC SDU sequence number based on the value included in SDU SN Extended subheader.](#)

[Upon completion of HO and NW re-entry, the Target BS \(now new Serving BS\) should assign UL resource for the MS to transmit the LSB of the sequence number\(s\) of ARQ block or virtual MAC SDU on the SN Report MAC header \(6.3.2.1.5\). The MS subsequently sends up to two SN Report MAC headers that include the next ARQ Block \(or virtual MAC SDU\) sequence number that it is expecting for each of its connections that have SN feedback enabled. The MS shall send the sequence number in numerical ascending order of the values of the CIDs values.](#)

[MS must use CIDs as assigned by the new Serving BS during HO via REG-RSP TLV's and include in the SN_REPORT only CIDs for connections that are continued at the new Serving BS.](#)

[Acknowledgement and/or retransmission of any outstanding ARQ blocks is handled per the ARQ mechanism defined in 6.3.4](#)

