TSG-RAN Meeting #8 ***RP-000198***
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(R1-000798, copy TSG-RAN) LS on 'Neighbour Cell SFN detection for Handover'

Source:	TSG RAN WG1
Title:	LS on 'Neighbour Cell SFN detection for Handover'
To:	TSG RAN WG2, TSG RAN WG4, SMG2
CC:	TSG RAN WG3, TSG RAN
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The UE may have pre-knowledge of the System Frame Number (SFN) of FDD Handover candidate neighbour cells (e.g. in synchronised networks). If this is not the case, the UE still has to know the SFN before being able to start communication on the new cell (or at least SFN mod 256). This is required on top of the frame timing which can be obtained, cf. an earlier LS [1]. WG1 has analysed the implications of this prerequisite, see the attached Tdoc [2].

This revealed, that it is impossible to determine this SFN in the handover preparation phase, because a 20ms observation window is neither available in GSM (idle frame) nor in UMTS. There exists a proposal that could allow reading the SFN even in those cases by repeating the (SFN mod 256) (or possible applying some other type of coding). This would require a change in the RRC coding of the "SFN-Prime" in the "SystemInformation-BCH" (SIB) in section 11.2 "PDU definitions" in [3]. The proposal has however not yet been progressed to a state where CRs could already be presented. This imposes of course some risk that such a proposal cannot be implemented in time for Release 99, an alternative would be to add an indication before of the SFN-Prime indicating whether or not this alternative coding of SFN-Prime is used. This would avoid overhead for synchronised Networks. This would perhaps also allow to later include it for Release 2000.

The only known alternative is to determine the SFN by decoding the SIB after having abandoned the old link and before establishing the new one. As detailed in [2] this would cause an extra delay in handover execution of 50 ms (+decoding time in the UE + implementation margin) in the worst case, i.e. when the UE first happens to start a decoding attempt on an odd SFN. If an activation time is specified in the handover, an additional delay of up to about 1 second could be observed: Because the UE lacks knowledge of the target cell timing, it cannot wait on the old cell until the activation time has elapsed but has to switch to the new cell immediately, decode the BCH, idle until the activation time has elapsed and only then start to establish a connection.

WG1 feels unable to decide on its own how to proceed and therefore would like to liase to the addressed TSGs as follows:

To WG4:

WG1 would like to check with WG4 whether the above mentioned 50 ms (+decoding time in the UE + implementation margin) are included in the performance requirements.

WG1 is unaware of the expected total handover execution time (from abandoning the old link until restarting transferring user data on the new link) e.g. there was no conclusion whether the RACH

procedure should be used in this case or not. WG1 would therefore like to ask WG4 whether the delays identified above are acceptable or whether the other alternative (repetition of SFN) should be further pursued by WG1.

To SMG2:

As GSM supports only shorter observation intervals than UMTS due to the limited time available in the existing idle frame, this matter seems to be of particular relevance for the GSM to UMTS handover. So the questions to WG4 also apply to SMG2.

To WG2:

WG1 would like to know whether the SFN prime (or a relevant part thereof) can be repeated or encoded in some way before being transferred to layer 1 (via MAC) in the usual way to enhance the decoding possibility using a limited decoding window. The outline of such a scheme can be found in [2]. In particular WG1 would like to know whether the implied reduction of the size of the payload of a System Information Block by some 14 bits would cause serious implications.

To WG3:

WG1 would like to also keep WG3 informed about this matter, even if it is not apparent whether this would have an immediate impact on the WG3 work.

TSG RAN WG1 would like to thank the addressed TSGs for their kind consideration of this very specific but nevertheless important aspect of inter frequency and inter system handover execution.


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References

[1] TSG RAN WG1, "LS on UMTS synchronisation channel detection"; TSG-RAN Working Group1 meeting #11; Tdoc R1-00-0456; San Diego, CA, U.S.A., February 29 – March 3, 2000 (attached)

[2] Siemens AG, "Neighbour Cell SFN detection for Handover preparation"; TSG RAN WG1#13; Tdoc R1-00-0689, Japan, Tokyo, May 22 – 25, 2000

[3] 3GPP TSG RAN WG2; 25.331 v3.2.0; RRC Protocol Specification