TSG-RAN Working Group 1 ***TSGR1#8(99)f73***
New York, U.S.A., 12 – 15 October 1999

TSG-RAN Working Group 2 (Radio layer 2 and Radio layer 3) TSGR2#7(99)d10
Malmö, Sweden, 20 - 24 September 1999

Agenda Item: 20

Source: RAN WG2

Title: Response to the liaison statement on SFN and BCH coding in FDD

To: TSG RAN WG1

RAN WG2 gratefully acknowledges the clarifications provided by RAN WG1 in response to our liaison on SFN coding. Please find comments on the topic below (original text from R1 preserved with small font):

SFN as an RRC parameter:
WG1's understanding of this request is that the SFN value would not be visible to Layer 1. WG1 would like to inform WG2 that we see the SFN as a very important Layer 1 parameter, which of course may also be used by higher layers.
Layer 1 uses the SFN for a number of reasons, for example:

- Scheduling of wake up times during idle mode
- The SFN of neighbour cells is decoded prior to a intra-frequency handover, in order to measure superframe time offset.
- The SFN is used in the parameterization of compressed mode

If the BCH transport block itself contains the SFN, then the SFN needs to be extracted by higher layers and then inform it to Layer 1. This would place a time constraint on the higher layer processing of this message in order for the layer 1 to use the SFN for the functions described above.

As the same CRC would be used for both SFN and other BCH information in the same transport channel (seen to be the preferred approach also on the "Clariffication of CRC attachment" from R1), the whole block needs to be decoded prior to checking the CRC. RAN WG2 currently believes that SFN being a BCCH System Information parameter doesn't change anything in the visibility or the feasibility of the parameter for the physical layer.

Broadcast rate of SFN:
Whilst Layer 1 requires to have visibility of the SFN value, we don't have a strong opinion as to whether the broadcast rate is either every 10ms or 20ms, however WG1 would not like to see a slower broadcast rate than 20ms. WG1 would like to ask WG2 for their opinion on this.
Also it should be noted that if the SFN is broadcast at a rate of 20ms, then the least significant bit conveys no information, so WG1 would propose not to transmit this bit. This would in no way limit the use of the SFN to identify 10ms frames, it just removes redundancy on the air interface. WG1 would like WG2's opinion on this.

RAN WG2 agrees that in case the SFN is sent every 20 ms there is no need to send the least significant bit. If a broadcast rate of 20 ms is acceptable, RAN WG2 would like to take advantage of the possibility to save in system information transmission. However, a more complete understanding on the exact use of SFN would be needed to indicate a preference.

Availability of SFN prior to inter-frequency FDD-FDD hard-handover:
WG1 would like to inform WG2 that in the case of a FDD to FDD inter-frequency hard-handover, the maximum compressed mode time gap length is not sufficient to allow decoding of any 10ms frames on the candidate frequency. This means that if the SFN is interleaved over at least 10ms as WG1 currently proposes, then it will not be possible to obtain the SFN from the candidate frequency prior to inter-frequency hard-handover. Is this acceptable to WG2?

WG2 sees a consequence with the approach: As the assumption is that the cells are unsynchronized, then if decoding the SFN is not possible prior to handover, it may not be possible to do a hard handover from macro diversity directly into macro diversity on the new frequency. This should either be possible, or then the restriction in the capabilities of the system needs to be described.

Protection requirements of SFN:
WG1 would like to ask WG2 their opinion on whether the SFN needs a different protection than the BCH data.

It was noted in WG2 that a more complete understanding on how SFN is used would be needed to provide a reply to this question.

Transmission Time Interval of the BCH data:

WG1 would like to ask WG2 if they have any preference as to what the transmission time interval should be. Currently WG1 is considering values of 10 and 20ms, are these acceptable to WG2?

The response is given in another LS from R2 (R2-99D11, “Answer to Liaison on Transport Channel

Coding of SFN and BCH data

With consideration of the above issues would it be acceptable to WG2 if the SFN and BCH transport blocks are encoded together with a single CRC in order to reduce overhead as proposed by WG1.

Using a common CRC is, of course, acceptable. However, as the current model describes transport blocks that are being CRC-protected by the physical layer, it is seen to be more consistent with the model to include the SFN into RRC system information messages.