Source:	**3GPP TSG RAN WG1**
To:	**3GPP TSG RAN WG2**
	3GPP TSG RAN WG3
Title:	**LS on TFCI in the case of invalid set of transport blocks and during DPCH synchronisation**
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RAN1 has discussed the appropriate behaviour of Layer 1, in relation to TFCI transmission, under the following conditions:

1. An invalid set of transport blocks is provided to layer 1.
2. Initialisation of DPCH in FDD (as described in 25.214 section 4.3, where DPCCH is first transmitted, and DPDCH starts later)

A number of inter-related issues have emerged and RAN1 seeks comments on the proposed solution.

Discussion

Invalid set of transport blocks delivered to Layer 1

Currently this is addressed in 25.427 (Iub/Iur Interface User Plane Protocol), where the following statement in 5.1.2 (Downlink) appears: "FDD- In case the Node B receives an unknown combination of DCH data frames, it shall transmit only the DPCCH without TFCI bits."

Considering this section in general, RAN1 concluded the following:

- In such a case it is reasonable that no DPDCH should be transmitted.

- Applying DTX to the TFCI in the downlink means that the UE could attempt to decode a null TFCI codeword. However, this DTX on TFCI may be suitable in FDD soft handover only, since it could avoid the UE receiving conflicting TFCIs.

- DTX cannot be applied to TFCI in the FDD uplink, so some other solution is needed.

- Since the transmission of TFCI should ideally be covered by the Layer 1 specifications, if a mechanism of the kind mentioned in 25.427 is to be retained, it would be preferable to describe it in Layer 1 specifications instead.

Initialisation of DPCH in FDD

During DPCH synchronisation, the typical sequence would be as follows:
1. downlink DPCCH starts
2. uplink DPCCH starts
3. uplink DPDCH starts
4. downlink DPDCH starts

Thus, a period of DPCCH transmission with no data (in both uplink and downlink) is unavoidable. Unfortunately, during this procedure no TFIs would be visible to Layer 1 and so according to the current specifications, the TFCI would consequently be undefined. However, a TFCI for "no data" might be used if available. If not, some other TFCI value could be used (e.g. a reserved one).

Proposed Solution

In the light of the above points, RAN1 proposes the following changes to Layer 1 specifications applicable to dedicated channels:

- When Layer 1 receives an invalid set of transport blocks, no DPDCH will be transmitted, and TFCI will be assigned the value corresponding to "no data" (if such a TFCI is available), otherwise the TFCI bits (before coding) will be set to all "1"s. This would be generally applicable to both FDD and TDD, and both UTRAN and UE. However, it may be necessary to deal with the possible problem of the UE receiving different TFCIs from different Node Bs when in soft handover. Therefore two additional possibilities are being considered for the FDD downlink, in the event that an invalid set of transport blocks is received by Layer 1:

    (a) TFCI is not transmitted (i.e. DTX is applied to the TFCI field).
    (b) DTX is only applied to TFCI in soft handover (if not in soft handover, use TFCI for "no data", if available, otherwise TFCI set to all "1"s).

- In the case of initialisation of FDD DPCH, in the radio frames where no data is available, a similar mechanism will be applied (i.e. use TFCI for "no data", if available, otherwise TFCI set to all "1"s).

- In the case of BTFD, an invalid set of transport blocks will result in transmission of DPCCH only.

RAN1 hopes to be able to introduce these changes to both FDD and TDD Layer 1 specifications as soon as possible.

Conclusion

RAN1 would welcome any comments from RAN2 and RAN3 on the proposed solution outlined above.

If RAN3 agrees, then section 5.1.2 in 25.427 should be modified to remove the description of Layer 1 behaviour, as it should be adequately covered by the proposed changes to the Layer 1 specifications.