

Agenda Item: 9.2.4
Source: Motorola
Title: RRC parameters for the support of transmission diversity
Document for: Decision

1 Introduction

At the last RAN WG2 meeting, issues relating to transmission diversity were discussed in response to a liaison from RAN WG1[1]. This paper addresses those issues and proposes changes to the RRC parameters for the support of transmission diversity.

2 Discussion

The 25.2XX series defines STTD open loop transmission diversity, and three modes of closed loop transmission diversity. STTD may be applied to any of the downlink common physical channels and to the downlink dedicated physical channel. In soft handover, STTD may be applied independently to each SHO branch. The current working assumption is that feedback modes may only be applied to the downlink dedicated physical channel when not in SHO but this is still a study item in WG1

The Primary CCPCH Information Element, Secondary CCPCH Information Element, and AICH Information Element (a new information element not currently included in 25.331) should all include a STTD indicator. This allows STTD to be applied independently to any of the downlink common physical channels.

For the downlink DPCH there is a requirement to be able to change the transmission diversity mode upon entering SHO. It is considered to be important to signal the mode change implicitly when the network directs the UE to move into soft handover, as this reduces signalling overhead. To achieve this it is proposed that the Downlink DPCH Information Element should include two transmission diversity mode indicators, one that applies when the UE is in SHO and one that applies when the UE is not in SHO. Note that this does not prevent the network from signalling the mode change explicitly by means of a Physical Channel Reconfiguration Message before it signals the move into SHO.

The network will require channel measurements in order to make an appropriate choice of the transmission diversity mode (in particular, an estimate of the channel variation rate may be needed). RAN WG1 is currently considering methods of making these measurements within the Node B in which case there is no requirement for these measurements to be transferred over the air interface. This is considered to be a preferable approach as it reduces signalling overhead. However, should WG1 decide that UE measurements are necessary, then the current measurement procedures are considered to be sufficient as they enable the network to decide which measurements should be included in an initial RRC Connection Request message, and also which measurements should be reported during an RRC connection.

The liaison from RAN WG1[1] stated that a UE could optionally request a particular transmission diversity mode, but that the final decision is taken by the network. It is felt that basing the choice on channel measurements is more general, enabling the network to make a better mode decision, and for this reason there is no proposal to include signalling to allow UE mode requests.

3 Changes to RRC Messages

Proposed changes to the RRC messages are given in the table below.

25.331 section	Message	Information Element	Optional/Mandatory	Comment
10.1.6	System information	Primary CCPCH info	O	This IE may be included in the system information message as it now contains an STTD indicator.
		AICH info	M	New physical channel information element.

4 Changes to RRC Information Elements

The proposed changes to the RRC information elements are given the table below.

25.331 section	Information Element	Parameter	Optional/Mandatory	Comment
10.2.6.2	Primary CCPCH information	STTD indicator	O	New parameter. If the parameter is not present then the UE shall assume that STTD is not present.
		DL scrambling code	O	This parameter is changed from mandatory to optional as it is not necessary when the Primary CCPCH Information IE is used in System Information Message
10.2.6.3	Secondary CCPCH information	STTD indicator	O	New parameter. If the parameter is not present then the UE shall assume that STTD status is the same as for the Primary CCPCH.
New section needed	AICH information	DL scrambling code	O	New parameter. Only necessary if the DL scrambling code is different from the PCCPCH.
		Channelisation code	M	New parameter
		STTD indicator	O	New parameter. If the parameter is not present then the UE shall assume that STTD status is the same as for the Primary CCPCH.
10.2.6.8	Downlink DPCH information	SHO transmission diversity mode	O	New parameter. Indicates STTD or one of three feedback modes.
		Non SHO transmission diversity mode	O	New parameter Indicates STTD or one of three feedback modes

5 Conclusions

This paper discussed issues relating to the support of transmission diversity. It is recommended that the changes to the RRC messages and RRC information elements as described in sections 3 and 4 should be incorporated in 25.331.

6 References

[1] TSG RAN WG1, TSGR1#3(99)270 'Liaison statement to TSG RAN WG2 on Transmit Diversity Issues'