Agenda item: **12**

Source: **Ad Hoc #1**

Title: **Report from Ad Hoc #1: TDD**

Document for: **Approval**

1 Introduction

Ad hoc #1 meeting on TDD, Dec. 1, 1999.
Starting Time: 8:00
End Time: 12:30

2 Documents relevant for TDD

In the following, the discussion and the results on the presented documents are given.

2.1 Liaison statements

Tdoc H94/99, "Answer to LS from RAN1 on power control – TDD aspects", TSG RAN WG3

Discussion:
- The answer given in this LS was noted.

2.2 SCH

Tdoc J34/99, "25.223 CR 004: Code allocation for case 3", Texas Instruments

Conclusion:
- Ad hoc 1 recommends to agree on the change request 25.223 CR 004 given in Tdoc J34/99.

Tdoc J62/99, "Beacon function in TDD sync case 3", Siemens

Conclusion:
- Ad hoc 1 recommends to agree on the text proposal given in Tdoc J62/99. The corresponding CR should be prepared which will be revision 2 of 25.221 CR 001.

2.3 Codes

Tdoc I89/99, "Allocation of midambles to physical channels in UTRA TDD mode (2)", Siemens

Discussion:
- There was a comment that an order of allocation of primary and secondary codes should be added. Part of this is addressed in I94/99, missing items should be added.
- If it is not yet specified elsewhere, it should be added that the power of the secondary code is the same as the power of the related primary code in the same time slot.
- There was a remark that the code-specific midamble is preferable in the case of joint detection in the downlink.
- It should be added that the code-specific midamble *should* be used in case of Tx diversity.

Conclusion:

- Ad hoc 1 recommends to agree on a revised version of the change request given in Tdoc I89/99 taking into account the comments mentioned above.

Tdoc I94/99, "25.222 CR 007: Update of rate matching rule for TDD", Siemens

Conclusion:
- Ad hoc 1 recommends to agree on the change request 25.222 CR 007 given in Tdoc I94/99.

Tdoc K18/99, "25.221 CR 007: Clarifications for spreading in UTRA TDD", Nokia, Siemens

Conclusion:
- Ad hoc 1 recommends to agree on a revised version of the change request 25.221 CR 007 given in Tdoc K18/99 after correcting a typo identified.
- Another change request replacing "symbols" by "bits" in the appropriate places should be prepared.

Tdoc I96/99, "25.223 CR 003: Alignment of terminology regarding spreading for TDD mode", Siemens

Discussion:
- In Figure 2, the text in the last box should read "spread and scrambled data" instead of "spread data".

Conclusion:
- Ad hoc 1 recommends to agree on a revised version of the change request 25.223 CR 003 given in Tdoc I96/99 taking into account the comment mentioned above.

Tdoc I97/99, "25.224 CR 005: Alignment of terminology regarding spreading for TDD mode", Siemens

Conclusion:
- Ad hoc 1 recommends to agree on the change request 25.224 CR 005 given in Tdoc I97/99.

2.4 Block STTD

Tdoc J27/99, "Performance degradation for P-CCPCH without block STTD encoding when block STTD is assumed by the UE receiver", Motorola

Discussion:
- Interdigital has similar results, even a smaller difference was found when diversity is assumed to be present, but is not used. This difference may be due to different receiver algorithms.
- It is recommended to include higher layer signalling for indicating the use of STTD for commonality reasons with FDD and since it allows a complexity reduction in the receiver.

Conclusion:
- It is recommended to include higher layer signalling for indicating the use of STTD.

Tdoc I42/99, "CRs related to introduction of block STTD encoding for P-CCPCH for the TDD mode", Motorola

25.221 CR 004, Block STTD capability for P-CCPCH, TDD component

Discussion:
- The text should read "the support of STTD is mandatory" instead of "the implementation of STTD is mandatory".
- The text should read "may be applied in the Node B" instead of "optional".

Conclusion:
- Ad hoc 1 recommends to agree on a revised version of the change request 25.221 CR 004 given in Tdoc I42/99 taking into account the comments mentioned above. This change request will be merged with an earlier change request concerning P-CCPCH.

25.224 CR 004, STTD capability for P-CCPCH, TDD component

Discussion:

- The text should read "The use of block STTD encoding will be indicated by higher layers" instead of the more detailed description on the procedures in the higher layers.
- The expression "may be applied" should be removed.

Conclusion:
- Ad hoc 1 recommends to agree on a revised version of the change request 25.224 CR 004 given in Tdoc I42/99 taking into account the comments mentioned above.

25.225 CR 002, Block STTD capability for P-CCPCH, TDD component

Discussion:
- The text in brackets should be replaced by a reference to the section on the beacon.

Conclusion:
- Ad hoc 1 recommends to agree on a revised version of the change request 25.225 CR 002 given in Tdoc I42/99 taking into account the comment mentioned above.

2.5 Cell parameter cycling

Tdoc H85/99, "Response to cell parameter cycling concerns raised in WG1#8", Texas Instruments

Discussion:
- It was clarified that the primary and secondary synchronisation sequences always have the same sign.
- Texas Instruments' results show the following behaviour: For synchronisation stages 1 and 2 and for stage 3 in case of non-coherent detection, the same performance can be achieved for the following three cases: without cycling, with cycling over 2 parameters and with cycling over 4 parameters. For the case of coherent stage 3, the performance is the same without cycling and with cycling over 2 parameters and compared to this, there is a 0.7 dB degradation in case of cycling over 4 parameters.
- There was a comment that the overall loss/gain in capacity for cycling over 4 compared to 2 parameters should be investigated. For instance, the handover may be delayed in case of cycling over 4 parameters instead of 2 which has an impact on capacity. However, this occurs only to some percentage of the time while the gain due to cycling over 4 instead of 2 parameters is always there.
- There was a remark that the gains due to code diversity without taking into account possible channel estimation gains should be investigated.

Conclusion:
- It was recommended that cell cycling should be part of release 99 although some details (cycling over two or four parameters) are still for further study. In order to include it, there are two options.
- Option 1 is to include change requests in the different specifications which introduce cycling over 2 parameters. In this case, in the report to RAN it should be mentioned that cycling over 4 instead of 2 is still under investigation and that some of the details need to be changed if cycling over 4 parameters is found out to be more favourable than cycling over 2. These possible changes when going from 2 to 4 are still part of release 99.
- Option 2 would be not to include cycling in the specifications now, but only to fill in a "coupon" for RAN according to the defined formal procedures indicating that cell cycling is part of release 99 for TDD, but that some details are still for further study.
- If no consensus can be achieved on option 1 until Dec. 3, 1999, then option 2 should apply.

Tdoc H86/99, "25.221 CR 003: Cycling of cell parameters", Texas Instruments

Tdoc H87/99, "25.223 CR 002: Cycling of cell parameters", Texas Instruments

Tdoc H88/99, "25.224 CR 003: Cycling of cell parameters", Texas Instruments

Discussion:
- These documents were not presented in detail.

Conclusion:

- These change requests should be updated in order to include cycling over 2 instead of 4 parameters in case option 1 is chosen.

2.6 TFCI

Tdoc I92/99, "Transmission of TFCI bits for TDD", Siemens

Discussion:
- It should be explicitly said that the *same* TFCI code word is repeated.
- The detailed mappings of the TFCI bits on the burst should be included.
- It should be clarified in the text that the TFCI uses the same spreading factor as the data within the same code.

Conclusion:
- Ad hoc 1 recommends to agree on the text proposal given in Tdoc I92/99 taking into account the comments mentioned above. The corresponding CR should be prepared.

Tdoc I93/99, "TFCI for S-CCPCH in TDD mode", Siemens

Conclusion:
- Ad hoc 1 recommends to agree on the text proposal given in Tdoc I93/99. The corresponding CR should be prepared.

2.7 Time slot format

Tdoc K30/99, "Inclusion of time slot format tables in TDD specifications (TS25.221)", Nokia

Discussion:
- The number of data bits in slot format #5 is incorrect. It should be 244.
- The slot format #5 should become #0 for simpler terminology since it is used for some common control channels.
- It is encouraged to also provide the slot formats for uplink including RACH.

Conclusion:
- Ad hoc 1 recommends to agree on inclusion of the table of time slot formats given in Tdoc K30/99 taking into account the comments mentioned above. Also, it is encouraged to provide the slot formats for uplink including RACH in the same manner. The corresponding CR should be prepared.

2.8 Physical channel mapping

Tdoc J57/99, "Modified physical channel mapping for multi-code transmission in TDD mode", Nokia

25.222 CR 009, Modified physical channel mapping scheme, Nokia

Discussion:
- There was a comment that for TTI value larger than one, no gain is expected since the bits are already mixed due to first interleaving.
- There was a comment that if we now open the discussion for further optimisation, we should rather optimise the scheme for the general case and not for a special case as seems to be done now, and this optimised scheme should then be part of release 2000.
- There was a comment that the scheme currently included in the specifications may have gains in certain cases over the proposed scheme.

Conclusion:
- Ad hoc 1 recommends to continue offline discussion until December 3, 1999. On December 3, 1999, it should be checked if agreement can be achieved to include the corresponding change request 25.222 CR 009 in the specifications. If this CR is adoped by RAN WG1, this would still leave 1 week for further investigations and comments before the RAN meeting takes place where the final decision on this CR is made.

2.9 Joint predistortion

Tdocs J48/99, I06/99, J46/99

Not presented due to lack of time.

2.10 Node B synchronisation

Tdocs J81/99

Not presented due to lack of time.

3 Conclusion

It is recommended by Ad Hoc #1 on TDD to modify the existing set of WG1 specifications based on the recommendations given in section 2.