

Agenda item: 12
Source: Ad Hoc #1
Title: Report from Ad Hoc #1
Document for: Approval

1 Introduction

Ad hoc #1 meeting on TDD, Jan 19, 2000.

First Session:
Starting Time: 9:00
End Time: 12:30

Second Session:
Starting Time: 14:00
End Time: 16:15

2 Documents relevant for TDD

In the following, the discussion and the results on the presented documents are given. The recommended output documents (CRs, LS) are summarised in the next section.

2.1 Midamble Definition

Tdoc 0076/00, “Correction of Midamble Definition for TDD“, Siemens AG

Conclusion:

- AdHoc 1 recommends acceptance of CR011-221 contained in Tdoc 0076/00.

2.2 Liaison statements

Tdoc 0099/00, “LS on UE Measurement of ISCP“, TSG RAN WG4

Tdoc 0xxx/00, “Draft Answer to LS on UE Measurement of ISCP“, Siemens AG

Discussion:

- It should be added that no differences are seen for the requirements for the measurements in the UE and UTRAN.
- It should be added that the performance requirements should be independent of the implementation of the receiver.
- It should be clarified if the sentence on non-orthogonal interference is needed in the specification. The definition in the specification should be aligned with FDD.

Conclusion:

- Ad Hoc 1 recommends this LS with above modifications as a basis for discussion in plenary. The new LS is contained in Tdoc 0142/00.

2.3 Measurements

Tdoc 0124/00, “Correction of CPICH measurements and ‘RX Timing Deviation’ range“, Siemens AG

This document replaces Tdoc 0080/00.

Discussion:

- There was a remark that the Rx Timing Deviation should be reported back to the UE by higher layers.
- It was clarified that there is a possibility of a message arriving too early if the UE moves towards the base station.
- It was mentioned that corresponding changes in TS25.215 should be clarified.

Conclusion:

- AdHoc 1 recommends to accept the CR004r1-225 contained in Tdoc 0124/00.

2.4 Timing advance

Tdoc 0079/00, “Reduction of the Timing Advance range for TDD“, Siemens AG

Discussion:

- There was a question what happens if a UE reports from outside the maximum range. It was clarified that there is a safety margin since the guard period of the RACH is 192 chips and the value for the timing advance is 256 chips. However, if a signal falls outside the maximum range, it cannot be detected.

Conclusion:

- Ad Hoc 1 recommends to accept the CR006-224, CR should be merged with CR in TDoc 0098/00. The merged CR is contained in Tdoc 0133/00.

Tdoc 0098/00, “Changes to the section on Timing Advance in TS25.224“, Nokia

Discussion:

- It was clarified that the minimum resolution in WG4 is $\frac{1}{4}$ chip.

Conclusion:

- AdHoc 1 recommends to accept the CR007-224 contained in Tdoc 0098/00. This CR should be merged with the CR in TDoc 0079/00. The merged CR is contained in Tdoc 0133/00.

2.5 Updates of TS25.222

Tdoc 0081/00, “Refinements of Physical Channel Mapping“, Siemens AG

Conclusion:

- Ad Hoc 1 recommends to accept CR018-222 contained in Tdoc 0081/00.

Tdoc 0082/00, “Corrections to TS25.222“, Siemens AG

Discussion:

- There was a comment that the definition of zero length transport block should be the same as for FDD. Discussion with WG2 on the terminology is needed since in WG2, the minimum block size is one, otherwise there is no transport block at all.

Conclusion:

- Ad Hoc 1 recommends to accept CR017-222 contained in Tdoc 0082/00.

2.6 Cell Parameter Cycling

Tdoc 0070/00, “On the performance gain due to cell parameter cycling“, Interdigital

Discussion:

- It was stated that the analysis only examined the effect of channel estimation.
- The conclusion in the paper is that, when looking only at the effect of channel estimation, there is only a small gain due to cycling.
- However, besides the channel estimation effect, there is the second effect of averaging which has a much higher impact. This effect is analysed in Tdoc 0078/00
- The reason for the non-matching results concerning the channel estimation effect by TI and IDC has been clarified mostly and also this is no longer so relevant due to the fact that there is the second, more important effect of averaging.
- It was clarified that there is a complexity impact for cycling over four, but a minor complexity impact for cycling over 2 frames.

Tdoc 0078/00, “Simulation Results for TDD Cell Parameter cycling“, Siemens AG

Discussion:

- It was clarified that there is no performance degradation in the synchronisation procedure for the two frame cycling case.
- It was mentioned that the numbering of the codes for the uncoded and coded bit error rate results is not the same. Also, the curve to the left in Figure 7 is a particularly benign case.

Conclusion:

- Ad Hoc 1 recommends to accept cycling the cell parameters over two frames.

Tdoc 0104/00, “CRs on cell parameter cycling“, Texas Instruments

Conclusion:

- CR003r2-221 contained in Tdoc 0104/00 recommended for approval.
- CR002r2-223 contained in Tdoc 0104/00 recommended for approval after replacing ‘will’ by ‘shall’.
- CR003r2-224 contained in Tdoc 0104/00 recommended for approval.
- The updated CRs are contained in Tdoc 0135/00.

2.7 Out-of Synchronisation Handling

Tdoc 0075/00, “Out-of-Sync Procedure for TDD“, Siemens AG

Discussion:

- A list of questions was discussed:

Questions to higher layers on OOS:

- Is the Out-of-Synch-Message required repeatedly, or is it sufficient to provide a report once the status (in-synch or out-synch) has changed, i.e., what maximum update rate is expected? Requirements from higher layers are not fully clear to WG1 discussion partners for both, FDD and TDD.
- Do higher layers require that the Out-of-Synch-Message contains the SFN of the Frame at which this status was detected?
May be required due to possible delays on lu_b thus interface.
- Does out OOS apply only in connected state or even in RACH/FACH or other states? OOS for dedicated channels only?
- A description of current WG1 tasks should be added.

Regarding DTX:

- If no data is provided in all TrCH: Does this mean every TrCH reports ‘length 0’ or does every TrCH report ‘0 Transport blocks’ or do TrCH report individually?
- Shall L1 derive a condition as above on its own from TFCS or is there a particular Transport Format (0-Data) reported by higher layers?
Background for this question is that in WG1 there is the proposal to have a WG1 individual messaging in the case no data has to be transmitted. This message will replace higher layer information. Is this acceptable for other WGs?

Conclusion:

- Based on the questions given above, an LS to WG2 and WG3 should be drafted covering both TDD and FDD. The draft LS is contained in Tdoc 0144/00.

2.8 Power Control

Tdoc 0077/00, "Power adaptation for TDD dependent on spreading", Siemens AG

Discussion:

- It was stated that the step size granularity is still FFS, a proposed value is 1dB.
- There was a question how power control is affected by this scheme. It was stated that this is an overlay to the normal power control procedure.
- There was a question how a power up command from PC and a simultaneous reduction resulting from the scheme would be combined.
- It was confirmed that a fixed BER of 10⁻³ is assumed in the figures.
- It was clarified that the scheme should be used for both DL+UL.
- It was asked whether the power adaptation dependent on the spreading is not implicitly included in the UL open loop PC process and also in the DL closed loop PC process. It was stated that the UL PC format does take care on the SIR target, but this will take some time.
- It should be clarified how this is related to FDD gain factors in 25.331.

Conclusion:

- Discussion via email.

Tdoc 0073/00, "TDD closed loop power control in case of transmission pauses", Siemens AG

Discussion:

- It was mentioned that DTX on UL will be handled in a further contribution.
- It was stated that UL and DL should be harmonized, an UL measurement is already available.
- The case of beamforming has to be clarified.

Conclusion:

- Discussion via email.
- Summing up the TPC commands (tracking) in NodeB is seen as beneficial.

2.9 Service Mapping Examples

Tdoc 0083/00, "Additional Examples for Technical Report: "R1.04 – Channel Coding and Multiplexing Examples"", Alcatel, Siemens AG

Not presented due to lack of time.

Conclusion:

- Should be handled directly in plenary.

2.10 TDD work items for Release 2000

Tdoc 0084/00, "TDD work items for release 2000", Siemens AG

Conclusion:

- Ad Hoc 1 recommends the four work items listed in TDoc 0084/00 for inclusion in UTRA release 2000 (TDD Low Chip Rate, Hybrid ARQ II/III, Location Services/Positioning, TDD NodeB Synchronisation via Air).

2.11 TDD Low Chip Rate Option

Tdoc 0093/00, "New specification request", CWTS and

Tdoc 0132/00, "TDD Narrowband chiprate – how to proceed", WG1 chairman

Discussion concerning the procedure:

- There was a remark that only from March, we have the specifications for release 2000 available, thus we need a phased approach with an intermediate document to capture decisions.
- Interactions with other WG's have to be considered, a consolidated plan at RAN level is needed. This requires co-ordination at RAN plenary.

Conclusion concerning the procedure:

The following procedure for inclusion of the low chip rate option in release 2000 was agreed in Ad Hoc 1 and is recommended for approval in the WG1 plenary:

- *From 1/2000 to 5/2000, WG1 intends to create a technical report on the low chip rate TDD physical layer. This report shall be approved at WG1 in 5/00 and submitted to TSG RAN #8 in 6/2000 for approval.*
- *Based on the report it should be decided at TSG RAN #8 in 6/2000 which new specifications are possibly required and what will be accommodated in the existing specifications.*
- *By 9/2000 (TSG RAN#9), WG1 would present possible new specifications and Change Requests to existing TDD specs on the 1.28 Mchips/s TDD details for TSG RAN approval.*
- *By 12/2000, possible remaining corrections and clarifications of the low chip rate TDD issues shall be finalised.*

The work plan will be discussed in the TSG RAN #7, but WG1 sees interdependencies in the work to be carried out in the different working groups and, therefore, will seek feedback from other WG's on the schedule before preparing the proposal for the time plan for the TSG RAN.

Further details concerning the procedure:

- It should be checked whether a specification can be approved as version 3.0.0 already at the first time it is presented to RAN.
- It was clarified that it is possible to agree on technical items concerning the low chip rate option within WG1 also before the milestone of approval of the technical report in 5/2000.
- In order to get feedback from other WG's on the schedule proposed in WG1 for the work on the low chip rate option of TDD, it is recommended to send a liaison statement to WG2, WG3 and WG4. A draft of this liaison statement can be found in Tdoc 0148/00.
- The time plan should be refined at the next WG1 meeting based on the feedback from other WG's.

Discussion on the technical report:

- Also, interactions to other working groups should be captured in the technical report.
- Considering the toolbox approach in UTRA, it should be indicated in the technical report which feature is mandatory / optional in the UE / Node B and which feature can be switched on and off for the low chip rate option.

Conclusion:

- A new technical report should be set up which describes the physical layer of the low chip rate option of TDD and which contains the commonalities and differences between the UTRA TDD high chip rate and low chip rate option. The table of contents of the new TR should be based on the existing WG1 TDD specifications. Tdoc 0149/00 contains a first version of this technical report, which is a proposal for the table of contents of this report.
- There are two volunteers for the editorship of this technical report: Mr. Yang from CATT and Mr. Aksentijevic from Nokia. The editorship should be decided in the plenary.

Tdoc 0094/00, "WG1 Work plan for low chip rate TDD option", CWTS

- Tdoc 0094/00 should be updated including the procedure described in the text in italics given above, also including the milestones 6/2000, 9/2000 and 12/2000 mentioned there.
- It should be checked if the template used is the official format for work item descriptions.

- There may be an impact on other RAN3 specifications as well (25.433, 25.423, ...), these should be added to the list of documents impacted.
- A corresponding work item description has to be provided to the terminal group TSG T.
- There will be an impact on the RAN4 specs and the RAN4 TR (technical report); these should be added to the list of documents impacted.
- It has to be clarified with the WG1 chairman whether supporting members in terms of individual companies are needed or if we can put "WG1" in this field of the work item description.
- It has to be clarified with the WG1 chairman if there is one rapporteur for all WG's and what is his role considering the fact that most WG meetings will be held in parallel.

Conclusion:

- The work item description given in Tdoc 0094/00 has to be refined according to the comments given above by next WG1 meeting.

Tdoc 0092/00, "Frame Structure for low chip rate TDD option", CWTS

Discussion:

- There was a question for clarification whether the details of the proposed frame structure (e.g., 5 ms frame, new UL synchronisation burst) are related to beamforming.
- It was clarified that the UL synchronisation burst is not always followed by a RACH immediately.
- There was a comment that the RACH in GSM has extended guard time and midamble to solve the problem of timing adjustment. In the proposed frame structure, first an UL synchronisation burst is transmitted for timing adjustment and then a RACH burst is transmitted as a normal burst together with payload. What is performed in GSM in one phase is performed here in 2 phases. It was asked why this approach is better than the more classical approach as used in GSM. The answer was that normal and access slots can be active in the same slot. In this case, the interference is reduced for other users if they are time-aligned.
- There was a remark that in the current UTRA-TDD specifications, the burst contains as well TFCI and TPC bits. Introducing UL synchronisation, in addition timing sync bits are needed. These bits are not identified in the burst structures given in Tdoc 0092/00. It was clarified that this is not depicted, but included in payload/data fields.
- It was asked why the guard period in Figure 1 between the last normal traffic time slot and the DL synchronisation time slot are different. It was stated that this avoids interference to the traffic time slot from the strong pilot time slot in the case of smart antennas.
- Also, there is a guard period between UL and DL, in order to guarantee a cell radius of 10 km in case of UL synchronisation, where the transmission is advanced.
- There was a question that if this larger guard time allows 10 km cell radius, whether there is a possibility like in GSM to extend this range. The answer was that there is a tradeoff between small cells in a city and large cells in rural areas.

Conclusion:

- The text should be updated including such background information and explanations as given above.

2.12 NodeB Synchronisation via air

Tdoc 0074/00, "Node B synchronisation for TDD", Siemens AG

Discussion:

- It was clarified that Node B synchronisation via air will not be mandatory.
- It was explained that a coordination between neighbouring Node B's is needed so that they do not send the RACH at the same time. This influences lub.
- The period of the update is in the order of 20 s.
- A Node B has to send a RACH every, e.g., 20 s, but it is not affected by surrounding Node B's sending RACHs. Therefore, there is virtually no impact on the RACH capacity.

Conclusion:

- The topic will be discussed via email.

3 Conclusion

It is recommended by Ad Hoc #1 on TDD to modify the existing set of WG1 specifications based on the following CRs:

| Nr. | CR | TDoc | Topic | Source |
|-----|-------------|------|--|-------------------|
| 1 | CR011-221 | 0076 | Correction of Midamble Definition for TDD | Siemens AG |
| 2 | CR004r1-225 | 0124 | Correction of CPICH measurements and 'RX Timing Deviation' range | Siemens AG |
| 3 | CR007r1-224 | 0133 | Changes to the section on Timing Advance in TS25.224 | Nokia, Siemens AG |
| 4 | CR018-222 | 0081 | Refinements of physical channel mapping | Siemens AG |
| 5 | CR017-222 | 0082 | Corrections to TS25.222 | Siemens AG |
| 6 | CR003r2-221 | 0135 | Cell Parameter Cycling | Texas Instruments |
| 7 | CR002r3-223 | 0135 | Cell Parameter Cycling | Texas Instruments |
| 8 | CR003r2-224 | 0135 | Cell Parameter Cycling | Texas Instruments |

Furthermore, it is recommended to send LS to other working groups based on the following drafts:

| Nr. | Tdoc | Title | Source | TO: | CC: |
|-----|------|---|----------------|---------------|-----|
| 1 | 0142 | Draft Answer to LS on UE measurement of ISCP | Siemens AG | WG4 | - |
| 2 | 0144 | Draft Answer to LS on Out-of-Sync Procedure | Drafting Group | WG2, WG3 | - |
| 3 | 0148 | Time schedule on the work on the Low Chip Rate TDD in RAN WG1 | Nokia | WG2, WG3, WG4 | - |

Tdoc 0083/00, "Additional Examples for Technical Report: "R1.04 – Channel Coding and Multiplexing Examples"", by Alcatel and Siemens AG should be handled in the plenary.

The recommendation by Ad Hoc 1 to include the 4 work items

- TDD Low Chip Rate
- Hybrid ARQ II/III
- Location Services/Positioning
- TDD NodeB Synchronisation via Air

in UTRA release 2000 as given in Tdoc 0084/00 should be confirmed in the plenary.

The procedure as described in italics in section 2.11 for inclusion of the low chip rate option in release 2000 was agreed in Ad Hoc 1 and is recommended for approval in the WG1 plenary.

A new technical report should be set up which describes the physical layer of the low chip rate option of TDD and which contains the commonalities and differences between the UTRA TDD high chip rate and low chip rate option. The table of contents of the new TR should be based on the existing WG1 TDD specifications. Tdoc 0149/00 contains a first version of this technical report, which is a proposal for the table of contents of this report.

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