

**Source: Sync Ad Hoc**

**Title: Sync Ad Hoc Minutes**

1 OPENING OF THE MEETING

The meeting was chaired by Jean-Marie Calmel.

Minutes were taken by G.J.v.Lieshout

2 APPROVAL OF THE AGENDA

Proposed agenda was approved.

3 REPORT FROM STUDY ITEM / MAIL DISCUSSION

Superframe, ToAWS/ToAWE, Tm and OFF

**986: Draft report at SI-ARC/5 (Ericsson)**

Paper was presented. No comments/questions were received.

4 CONTRIBUTIONS AND CONCLUSIONS ON TECHNICAL KEY ISSUES

4.1 DEFINITION OF OFF RELATIVE TO TM

**880: Model and parameters for UE-UTRAN frame synchronisation (Nokia)**

Paper was presented. It was clarified that node-sync is not addressed in this contribution.

Following clarifications were received:

1) Use of OFF / DOFF:

Proposed range of DOFF is interleaving size. With max 80ms interleaving, the maximum is 80ms.

Two different opinions existed:

<b>Proposal 1: Nokia view as stated in this contribution</b>  <b>OFF = offset between CellSFN and CFN in frames</b> <b>DOFF with range 0-80ms</b>	<b>Proposal 2: Ericsson view</b>  <b>OFF = offset between CellSFN and CFN in frames</b> <b>Td with range 0-10ms</b>
- multiple combinations of OFF and DOFF can lead to the same total offset	+ only 1 possible combination of OFF and Td can lead to a certain total offset.

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E.g. when going from common to dedicated channels, the UTRAN shall correct the internal Cell SFN with:

- Ericsson: OFF (0 to 7 frames) + Td (0-10ms)
- Nokia: DOFF (0-80ms), with OFF = 0

In both solutions:

- OFF has the same range as the CFN;
- OFF is used to correct the CFN to the different Cell SFN's;

In principle the end result will be the same. OFF discussion will continue under agenda item 4.4.

2) Tm:

- Is sent to the node-B. Definition as in this contribution was challenged by Alcatel. R3:685 proposes definition of Tm (relative to Tx-T0). Definition was agreed.

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**1. PROPOSAL TO WG3 PLENARY: Tm definition**

It is proposed that WG3 accepts the following definition for Tm:

The  $T_m$  measured by the UE should be defined as the time difference between " $T_{TX,UL} - T_o$ " and the earliest received PCCPCH path of the target cell, whereas  $T_{TX,UL}$  is the time when the UE transmits an uplink DPCH frame. Hence, " $T_{TX,UL} - T_o$ " is the "optimum" arrival time for the first path of a received DPCH.

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The other points in the document will be discussed under separate points in the agenda.

4.2 CFN RANGE

*Currently 72. Need to be confirmed it is large enough.*

In addition to 880, the following contributions discuss this issue:

**874: Relationship between Cell SFN and super-frame cycle (Ericsson)**

It was discussed what should determine the size of the CFN. It was stated that the hardest requirement is given by the synchronised RL-reconfiguration procedure (signalling + L3 handling). In addition internal UTRAN delays effect the size of the CFN.

The discussion was between 7 bits (0-127) and 8 bits (0-255).

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**2. PROPOSAL TO WG3 PLENARY: CFN cycle**

It is proposed that the WG3 plenary accepts the following statements:

- a) The super-frame length is decorrelated from the CFN size. The size of the super-frame is not considered a WG3 issue.
- b) The CFN has range of 256 (8 bit counter)
- c) When the UE calculates the OFF, it will compare the CFN with the 8 lowest bits of the Cell SFN.
- d) This requires that Cell SFN is continuous counter with range  $2^x$  and  $x > 8$

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e) WG3 should send liaison to WG1, WG2 and WG4 about this de-correlation, the size of the CFN and the requirements on the Cell SFN.  
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4.3 UE MEASUREMENT OF OFF

*Network can order this measurement from UE. The broadcasted cell SFN need to have a range corresponding to delay/sync performance of UTRAN procedures.*

**842: Response to LS on UE requirement to report OFF (WG2 LS)**

Liaison indicates that the UTRAN can signal to the UE to:

1. to report the CFN-SFN time difference based on BCH sync => only Tm;
2. to report the CFN-SFN time different based on decoded BCH information (include SFN decoding) => OFF + Tm

This means that Tm is always reported. This is what WG3 wanted.

4.4 INITIALISATION OF CFN

*When and how this is done ?*

**876: Initialisation of CFN Including frame Offset (Ericsson)**

The paper was presented.

The following was agreed:

It was argued that asking for the initialisation of the CFN is really the wrong question. The question should be the initialisation of the OFF value.

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**3. PROPOSAL TO PLENARY: OFF, DOFF and Tm**

It is proposed that the WG3 plenary accepts the following statements:

- a) At first RL-setup, the SRNC transmits OFF (max interleaving depth so currently 0..7) and Td to the node-B.
- b) At second RL-setup, the SRNC transmits OFF (maybe measured by the UE or known by the SRNC) and Tm (measured by the UE) to the node-B.
- c) For the first RL, the SRNC transmits a DOFF to the UE with RRC. The DOFF value is derived from the OFF and Td send to the node-B: DOFF = OFF + Td.

Note: In RL-Setup, Tm and Td are both optional IE's and 1 of the two needs to be present. In RL-ADDITION, no Td IE needs to be present.  
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4.5 NODE SYNC

*Whether there is a need to standardise this or not, and if so, the mechanism.*

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**881: Measurement of UL/DL transmission delay and Achievement of Node synchronisation (Nokia)**

It was clarified that the "Node B processing time" mentioned in the 3<sup>rd</sup> bullet proposed is the time between the last time of arrival for a frame in order to be send out on the Uu and the Uu timing. This in order to know the difference between the reported TOA and the timing on the Uu.

**872: A potential merged sync solution including two approaches (Ericsson)**

It was clarified that this document was only provided as background information to show that mixing of the "on the fly" approach and the "node-B sync" approach could be mixed by an operator/manufacturer. It is not intended to standardise any of these mixing possibilities.

**873: Node offset measurements using Synchronisation Control frames (Ericsson)**

It was clarified that in this contribution it is proposed the long counters in order to enable correct page scheduling from the CRNC. This in contradiction with e.g. 881 where the CFN and TOA are both short (8 bit) values. Both 873 and 881 propose the use of the current UL and DL synchronisation frames.

**852: Synchronisation of UTRAN nodes by AAL0/ATM cells (Alcatel)**

The contribution contains really 2 proposals:

- 2.1. => Use of new transport bearer based on ATM0
- 2.2. => Use of new application part conform RFC1305

**985: Rationale for AAL0 on high priority VC for Node Offset Measurements (NTT DoCoMo)**

This paper argues that either a high priority AAL2 VC or an AAL0 based solution should be used, and indicates a preference for an AAL0 solution.

**A19: Node Offset measurement Procedure (NTT DoCoMo)**

In line with 852. NTT clarified that they think about a 0.125ms resolution for tx.

Providing an overview on the different proposals, roughly the following can be stated:

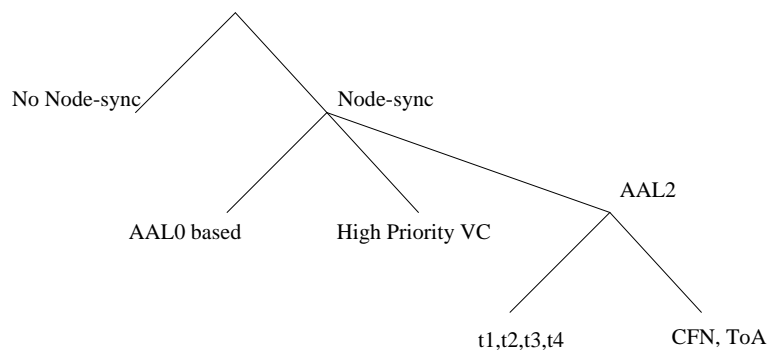
Parameters Transport	CFN/ToA/Processing time	RFC 1305 (t1-t3)
AAL2	881 (Nokia)	872, 873 (Ericsson)
AAL0	-	852 (Alcatel) 985, A19 (NTT DoCoMo)

The assumed inaccuracy of an AAL0 based solution is in the order of 1 ms. The inaccuracy obtained by the AAL2 will depend e.g. on the QOS of the AAL2. E.g. if a FACH is used and speech DCH's have a higher priority, the delay variation might be 10's of ms.

We can also show the different possibilities in a decision tree:

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NTT DoCoMo indicated that they think Node-Sync is needed for minimising the UTRAN internal delay when establishing a new RL.

Ericsson indicated that they think that when adding a longer RL, getting all RL's timing aligned internally in the UTRAN might take several tens of frames (including Window changes with RL-Reconfiguration). Nokia indicated that this will not be a period of data loss, but "just" a delay in the RL-ADDITION since you perform this timing alignment before you update the active set in the UE.

A way out could be to specify a mechanism and not specify at what level of priority it should be executed. However, e.g. Alcatel stated that if it is not run on a high priority bearer, there is no need for the procedure at all.

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**4. PROPOSAL TO PLENARY: Node sync**

It is proposed that the WG3 plenary accepts the following statements:

- No agreement is reached on the fact if node-sync is really needed or not. Therefore supporting related procedures should not be indicated as mandatory.
- Parameters t1,t2,t3 will be included in new user plane control frames called node-sync control frames. Since it is claimed that the network can work without this procedure, an operator wanting this procedure should make sure that the procedure is supported by all its equipment.
- An additional remark will indicate that the node-sync control frames can also be used (again as an operator choice) on a separate high priority VC not carrying any user data.

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4.6 HFN KNOWLEDGE IN CRNC FOR LONG SLEEPMODE PAGING

No contribution were available.

4.7 TDD SYNCHRONISATION ISSUES

**959: TDD Synchronisation (Italtel/Siemens)**

This contribution proposes two things:

1. to define a synchronisation port on the node-B;
2. a first signal layout for the sync port;

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The need for a multi-frame sync signal is not obvious at the moment.  
Therefore the details signal layout is still FFS.  
No sync output port should be mandated.  
It should be stated that both the frame and the multi-frame should start at the falling edge of a pulse.

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**5. PROPOSAL TO PLENARY: TDD Sync port**

It is proposed that the WG3 plenary accepts the following statements:

- to accept that a node-B can have a sync input port and / or a sync output port for TDD. Both are optional since providing an output is optional for a node-B and since also on-the-air synchronisation can be used, also the input is optional.
- in principle a new Technical Specification is needed to include the detailed specification of the TDD sync port. Proposal is to include the detailed description of the port in an annex to the 25.401 for the moment.
- the need for a multi-frame sync signal is not obvious at the moment. Therefore the detailed signal layout should be indicated as FFS.
- it should be stated that both the frame and the multi-frame should start at the falling edge of a pulse.
- sync port in/output ports should also be included in the figure 8, indicating clearly that this are optional ports for TDD.
- section 9.7 should include the text from Tdoc959 paragraphs 1.1 and 1.2. and indicate the existence of the sync ports. Usage/need for multi-frame sync should be marked FFS.

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**905: Synchronisation of TDD cells (InterDigital Comm. Corp)**

This paper was presented.

**882: NBAP & RNSAP procedure for TDD Synchronisation (some additions/modifications to R3-99905)**

In total 5 procedures are defined:

NBAP:

- neighbor cell measurement
- synchronisation adjustment
- node B out of sync indication

It was clarified that this procedure will not be used by the node-B with the external timing source. Only the nodes (this are most nodes) which received a synchronisation adjustment request indicating a Master\_Cell\_Id IE will use this.

- synchronisation restart request

RNSAP:

- neighbor cell measurement

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**6. PROPOSAL TO PLENARY: TDD Sync on air**

It is proposed that the WG3 plenary accepts the following statements:

- It is proposed to accept the NBAP cell synchronisation procedures as described in 882.
- It is proposed to accept the RNSAP cell synchronisation procedure as described in 882 and include it in the global module with a TDD tag, or in a

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separate TDD module.

– It is proposed that Tdoc 882 is accepted as a whole. This includes a liaison statement to be drafted and send to WG1/4 to get a confirmation on the feasibility. All NBAP and RNSAP procedures should be marked pending the response to this liaison.

– In addition the section 9.7 as proposed on page 2 in Tdoc905 is proposed to be included in 25.401.

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4.8 OTHER ISSUES

4.8.1 lu- lur/lub sync:

**869: lu Data frames (Motorola)**

It was clarified that the proposal was mainly targetted at the DL.

**979: Time alignment procedure without user data transmission (NTT DoCoMo)**

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**7. PROPOSAL TO PLENARY: lu user plane**

It is proposed that contributions 869 and 979 are deferred to the lu SWG.

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4.8.2 Definitions:

**875: Definition of TOA, ToAWS, ToAWE in 25.401 (.427 & .435) (Ericsson)**

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**8. PROPOSAL TO PLENARY: lu user plane**

It is proposed to accept Tdoc 875 with the following modifications:

- “super-frame length” should be replaced by “CFN” size used over the related transport channel (e.g. FNcell range on common channels);
- ToAWS should be defined relative to the ToAWE;
- the ToAWS has a range of “0..CFN/2-1ms”

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**878: Sync related counters – ranges, resolution and acronyms (Ericsson)**

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**9. PROPOSAL TO PLENARY: sync counters**

It is proposed to the WG3 plenary to accept Tdoc 878 with the following modifications:

- EFN and CFN should be 8 bits instead of 7;
- HFN size indication should be removed.
- WG2 has called the IFN, CSN (Ciphering Sequence Number). Therefore IFN should be replaced by CSN.
- Remove EFN and indicate the CFN is used on both common and dedicated channels. This should also be reflected in the common channel frame protocols (replace FNcell by CFN)

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– Remove Td of CFN definition (whole definition line can be removed);  
In addition it is proposed to liaise these definitions to WG1 and 2.

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**A21: Proposed liaison from WG3 to WG1 on synchronisation issues  
(Alcatel)**

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**10. PROPOSAL TO PLENARY: sync counters**

It is proposed to the WG3 plenary to accept Tdoc A21 with the following  
modifications:

- remove question 2;
- add contribution 685 as an annex to the liaison.

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**11. PROPOSAL TO PLENARY: Deferred papers**

It is proposed to the WG3 plenary to handle the following contributions:  
877, 879, LS914, 977, A05, A21

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4.9 TEXT PROPOSALS (REFLECTING DECISIONS ON KEY ISSUES) (IF TIME  
PERMITS)

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