3GPP TSG-RAN Working Group 2 **Tdoc TSG-RAN WG2 198/99**
13 – 16 April 1999
Yokohama, Japan

Source: **Secretary 3GPP TSG-RAN Working Group 2 (NEC Technologies UK)**

Draft minutes of the 3GPP TSG-RAN WG2 meeting #2
8 – 11 March 1999, Stockholm, Sweden

1. Opening of the meeting

The Chairman of the 3GPP TSG-RAN WG2, Mr. Denis Fauconnier (Nortel) opened the meeting and welcomed the delegates.

2. Approval of the agenda

The agenda (td 51) was approved. It was clarified that the contributions on R2.01 would be treated under agenda item 9 before the discussion of the protocol issues.

3. Appointment of Chairman, Vice-Chairman and Secretary

The group approved the following positions:

Chairman:	Denis Fauconnier (Nortel)
Vice Chairman:	Mikko Rinne (Nokia)
Secretary:	Georgi Petkov (NEC Technologies UK)

4. Approval of past activities

4.1 minutes of the previous meeting

The minutes of the 1st meeting of the 3GPP TSG-RAN WG2 (td 52) were approved as td 62 including the comments received via e-mail.

4.2 permanent documents

Td 106 (Editor): TS RAN S2.01 v010: Radio Interface Protocol Architecture
Approved.

Td 54 (Editor): 3GPP S2.02 v001: Layer 1; General requirements
Approved and will be reissued as version 0.1.0

Td 55 (Editor): 3GPP S2.03 v001: UE States and Procedures in Connected Mode

Approved with an addition of a comment by the Editor.

Td 56 (Editor): 3GPP S2.04 v001: Description of Idle Mode Procedures
Approved.

Td 57 (Editor): 3GPP S2.21 v001: Description of the MAC protocol
Approved

Td 58 (Editor): 3GPP S2.22 v001: Description of the RLC protocol
Approved. Editorial changes
Note: Section 9.2 to be reviewed. The text related to SDL in section [?] to be indicated FFS.

Td 59 (Editor): 3GPP S2.31 v001: RRC protocol
Approved.

Td 60 (Editor): 3GPP R2.01 v001: Description of principles for error handling and message description
Approved (No changes since the version approved at the January meeting).

5. Reports & liaisons from other groups

5.1 TSG RAN, SMG

The Chairman reported on the work of ETSI SMG and 3GPP TSG RAN. The main issues were summarised as follows:

The TSG RAN meeting (2-4 March 99) dealt mostly with organisational matters.

Elections:

Chairman	Yukitsuna Furuya (NEC)
Vice Chairman	Donald Zelmer (BellSouth)
Vice Chairman	Francois Courau (Alcatel)

It had been decided that TSG-SA would be responsible for the coordination of all TSG-s and the other TSG-s would report to TSG-SA

The TSG-RAN agreed its milestones and discussed document/version numbering.

Clarification of Working Groups responsibilities:

- WG4 is responsible for all RF aspects including RF specification, The item "protocol aspects from system point of view" has been remloved from WG4 ToR and replaced by "RF system aspects".

- WG1 is responsible for physical layer baseband issues, excluding RF. WG1 should not work on procedures except if they are completely hidden from upper layers. parts from WG1 documentation which cover procedure aspects will be moved to WG2 documentation. DCA will be moved to WG2.

- The scope of WG2 was confirmed with some additions: WG2 will be responsible for the study of Radio Resource Management (RRM) from UTRAN perspective. The result will be contained in a report "RRM startegies" that will include HO and DCA. WG2 will study the requirements from TSG SA, and derive the corresponding RRM startegies. The report will then be provided to the other WGs for consideration. S2.02 will be reflecting the interactions with WG1.

- Some overlap between network signalling procedures in WG3 and Radio Interface Protocol inter-layer procedures in S2.03 of WG2 was pointed out. WG3 should study S2.03 and ensure the consistency of the work between the two WGs.

Ericsson: WG2 should consider the milestones for the TSG-RAN and ensure that the work is progressed without delay and the deadlines are adhered to.

Chairman: The working assumption was that everything in the current versions of the permanent documents should be progressed and the items, which are not completed, may have to be left out of Release 99.

Philips: How would the items left out of Release 99 be handled (FFS in the main text, in Annexes or taken out of the specification document)

Chairman: This will be decided on a case by case basis.

5.2 Other

Td 177 (Siemens): Clarifications on WG2 Workplan

Ericsson: The statement "… improve version 1.0.0 …" needed clarification.

Siemens: Some parts of versions 1.0.0 may not be mature and would depend on the work in other work.

Ericsson: The discussion of the time plan in TSG-RAN indicated that after the dates for completion there should be no major work left to be done. The proposal in td 177 was not in line with the above assumption.

Alcatel: Supports the proposal to keep the MAC specification open in order to reflect interdependency with other groups and try to finalise the documents at the end of 1999.

Chairman: The understanding was that the agreed evolution of MAC meant that features not finalised by the deadline approved by the TSG-RAN should be for the Releases after 99. After April 99, there should be only corrections and not addition of new features. The agreement however allows some possibility to consider changes on a case by case bases.

Td 63 (SMG12): Liaison statement on UMTS Simultaneous Mode

The Chairman briefly presented the Liaison Statement (LS) from SMG12. The requirement for support of simultaneous mode from the document was noted (it had already been taken into consideration).

Td 64 (TSG-RAN WG4): Liaison to 3GPP TSG RAN WG2 and WG1 on system level protocol aspects

The document was noted. The issue had been resolved already.

Td 65 (TSG-RAN WG3): Liaison Statement on Inter RNS Cell/URA Update procedures

Nokia presented the document.

Clarifications:
Iur related requirements: WG2 is aware of the issues.
Protocol termination related: WG2 will cover the issues in the discussion of S2.03.

Td 67 (TSG-RAN WG3): Definition and usage of RNTI, LS from TSG-RAN WG3
The document was treated after the discussion of RNTI and Cell update issues (Agenda Item 8 below).

Ericsson: Prefer to have the identity on RRC but could agree to have it in the MAC if all other companies prefer this solution. This was conditional on accepting DCCH.
Nokia: Identity on MAC is fine but still have concern about DCCH. Expected problems with DCCH and would prefer to leave the issue open.

TM: Proposed 'Cell Update' as a backward procedure instead of forward and have it on DCCH.
Chairman: It is a new procedure so will be treated separately

Ericsson: Regarding 'Usage of RNTI' for initial random access disagreed to have S-RNTI with RNC-ID used as UE identifier in all CCCH. Prefer to have initial access with CN identity.

Decisions:

- Include in the reply to RAN WG3 that current working assumption is to have identity in MAC on DCCH with note FFS and a comment that CCCH is still under study.
- Add to S2.01 a sub-section on addressing. Also capture in S2.01 the first two paragraphs of the 'Usage of RNTI'. Indicate that for initial access the issue on RNTI usage remained open, conditional on decisions in RAN WG1.

Td 91 (Golden Bridge Technologies):

The document was approved.

Td 68 (TSG-SA WG1): Answer to Liaison statement on UMTS Simultaneous Mode from SMG12

Comments and clarifications:
Handover between UMTS and GPRS had not yet been considered. The terminals capable of such HO would be defined towards the end of 99 and WG2 would not be able to preclude the its work on HO before the work on the terminal is finalised.

The document was noted. WG2 would try to fulfil the requirements indicated in this LS.

Td 72 (Ericsson, Siemens Panasonic, NEC, NTT DoCoMo, Vodafone) Harmonisation of TDD & ODMA
Vodafone presented the contribution.

The document was noted.

Td 86 (TSG-T1): Test specification structure and schedule

Clarifications:
- The First six bullets were relevant to RAN WG2.
- In the specification the PNE discussed at the last TSG-RAN meeting (2-4 March 99) rules will be used and the Specifications Editors should ensure the consistency.

The Chairman will reply to TSG-T1 in a LS (td 183) by sending the work plan of RAN WG2.

Td 88 (Editor): 3GPP R2.02 v001: Radio Resource Management Strategies

The document was approved. It was decided to establish an e-mail ad hoc group to work on RRM. Check what had been agreed in RAN WG1 on TDD DCA and also what had been decided in RAN WG2 on RR mobility.

6. Documentation structure

The meeting decided to maintain S2.03 as one document.

Td 182 (CSELT, Telia, Vodafone and Mannesmann): Scope and Index Draft Proposal for the Recommendation on Radio Resource Management Strategies

Clarifications:
- Idle Mode Tasks includes issues such as Cell selection/reselection
- Difference between RRC and RRM is as follows:
  RRC is one protocol layer
  RRM is a function that spans the whole UTRAN
- Radio admission control should be added as a separate section.

Ericsson: Terminology should be aligned with the other WG2 documents, e.g. HO should be referred as connection mobility control. DCA should be added and some of the sections need to be reconsidered.

Siemens: The DCA should be described in general and not specified in detail in this document.

Approved changes:
- New sections:
  Admission control
  RAB control
- Clarifications:
  Scope to include "… strategies supported by the UTRAN specifications and typical algorithms …"
  HO should be referred as connection mobility control

6.1 Review after RAN meeting

6.2 Appointment of editors

The Editors of the TSG-RAN WG2 permanent documents are as follows:

S2.01: Ericsson (Wolfgan Granzow)
S2.02: Nortel (Pierre Lescuyer)
S2.03: Nokia (Mikko Rinne)
S2.04: Nokia (Tommi Leivonen)
S2.21: Siemens (Armin Sitte)
S2.22: CSELT (Marko Mastroforti)
S2.31: Motorola (Stephen Barrett)
R2.01: Philips (Jean Dumazy)
R2.02: CSELT (Daniele Franceschini)

7. Results of e-mail discussions

7.1 Specification methodology

Td 173 (Nokia): Report from the spec.methodology e-mail discussion group
Nokia presented the results from the e-mail discussion on specification methodology

T. Modus: CSN.1 has been pushed without sufficient discussion. Protocol encoding rules should be discussed in more detail before selection is made.
Chairman: The same encoding rule should be used for all protocol layers wherever possible.

The document was noted.

Td 130 (Motorola): Report from the USCH email discussion group
Motorola presented the document. France Telecom, Mitsubishi and Alcatel had participated in the e-mail discussion.

GBT: Interleaving and FEC could resolve the problems covered with the proposed timing advance mechanism.
Motorola: Agreed.

There was no report on the RLC discussion as there had been no exchange of e-mail except for two documents having been posted by Ericsson and a reply by Siemens.

8. Items with inter layer and/or protocol architecture impact (S2.0X specifications)

Td 145 (Ericsson): Handover between UMTS and GPRS

Comments and Clarification:

- Class A terminal has not been treated. The presented case is only for packet operation (GPRS).
- Clarification needed whether connecting state could be common for UMTS and GPRS.
- Regarding HO for IP domain to UTRAN and PSTN domain to UTRAN the difference is only at the GSM side.
- It is possible to have link between 'URA Connected' and 'Connecting to GPRS' states. Not shown as it is still under study.
- Clarification was needed about the different types of idle mode.
- The different parts of 'Idle Mode' are necessary as it should be possible to indicate how 'GPRS Packet Transfer Mode' can be reached.

Section 3 of the document to be sent in a LS (Ericsson) to RAN WG3 and SMG. Note that (regarding Figure 3) UTRAN can also broadcast system information.

Figure 2 to be incorporated in S2.03 with the following changes:
- Combine 'Connecting' with 'Connecting from GPRS' state
- Show that 'Connecting to GPRS' could be reached from 'URA that Connected' state and indicate as FFS

Td 151 (Ericsson): Merge proposal of L1 primitives in ETSI and ARIB documentation

Comments and Clarification:

Philips: Objected to the proposed changes. For example, could not accept 'RPHY-TrCH-Config' (Release) should be left more general (i.e. without 'TrCH'

Ericsson: The changes were needed to reflect the merging with the ARIB document.

Chairman: It should be possible to cover TrCH Config/Release with 'RPHY-RL-Setup/Release/Modify.

NTT DoCoMo: clarified the need for having the TrCH specific primitives.

Siemens: Section 10.1.1 and 10.1.2 applies for TDD and should be without FFS.

The proposed changes (Section 10) in the document were approved.
MPHY for the MAC and RPHY will be used for the names of the respective primitives.

Td 176 (Siemens): Usage of the SCH in TDD mode

Comments and Clarification:
- The 5 bits for L1 synchronisation are used for mid-amble synchronisation and finding the spreading code.
- The SCCH is transferred at 2 slots per frame.
- The data is found from the SCH for identifying the BCH offset is similarly to FDD.

Ericsson: It should be possible to regard the proposed synchronisation channel as BCH as the same functionality is available in FDD.

The proposed changes were approved with the suggestion that the issue should be studied in more detail in order to understand TDD multi-framing mechanism.

Td 67 (TSG-RAN WG3): Definition and usage of RNTI, LS from TSG-RAN WG3

Comments and Clarification:

Nokia: There is no longer relationship between an RNTI and URA.
Complexity is due to the use of common channels over the Iur interface.

Td 175 (Nokia): UE Addressing for cell and URA update signalling
The document assumes the proposal in the LS from RAN WG3.

Conclusion was not reached during the discussion of the above two documents at this stage.

8.1 Idle Mode procedures

8.1.1 Cell selection and reselection

8.1.2 Idle mode tasks (BCCH monitoring, Paging monitoring, Neighbour cell monitoring…)

Td 75 (LGI): Definitions of Multicast service and requirements
The document was presented for information only.

The Chairman indicated that the UMTS Release 99 is not expected to support multicast.

It was suggested that the proposal should be submitted to TSG-SA WG1, which is responsible for discussing and deciding on services and requirements.

Td 76 (LGI): Definition and characteristics of Multicast Channels

Comments and clarifications:
- It was unclear why it should not be possible to use FACH instead of MCCH. One of the reasons suggested by LGI was to provide flexibility.
- The proposal had not been presented to RAN WG1 yet. This will depend on the outcome of the discussion in RAN WG2, i.e. if the need for the proposed channels was agreed in this group.

The proposal should be submitted to TSG-SA WG1 for consideration and request a reply to be sent back to RAN WG2. LGI will initiate an e-mail discussion on the RAN WG2 reflector and will report on the results at the next meeting.

8.2 Random Access procedure

Td 73 (Telia): Physical location of the UTRAN side MAC for RACH/FACH

Motorola: Not clear what would be the advantage of moving the FACH acknowledgement to RNC, as the round trip delay would increase.
Chairman: Scheduling FACH in one place is an advantage.
Nokia: The main goal should be to conclude on the termination of the FACH as soon as possible. Hence Nokia could accept either solution for the FACH scheduling function (in Node B or RNC).

Chairman: RACH always terminates in the CRNC and the ACK is returned on FACH from CRNC. Decide later on whether FACH in Node B could not be removed in future.

TM: Preferred to have the FACH ACK from the Node B for short round trip delay.

Siemens and Vodafone support having both RACH and FACH in one node, i.e. CRNC.

Send LS-s to RAN WG1 (action Siemens) and WG3 (action Telecom Modus) listing different possibilities discussed in WG2. Start an ad hoc discussion on the e-mail reflector. Telia to report on the discussion.

Td 178 (Siemens): Comments to the Random Access procedure

Comments and clarifications:
An issue proposed for discussion was whether the MAC or RLC does the RACH/FACH ACK.

Td 80 (NEC): Change requests related Random Access procedure

Comments and clarifications:
It was not proposed to remove the use of acknowledged mode for the RLC in RACH/FACH.

The contribution was left for an e-mail discussion

8.2.1 Admission control (e.g. access classes)

Td 170 (DACOM): The Methods for Service Addition
Proposed a new mechanism involving control at MAC level.

Comments and clarifications:

Nokia: Does the proposal intend to replace the RAB setup?

Nortel: The proposal can be handled only with the RRC message and the need to modify MAC header.

Chairman: So far it had been assumed that control is at RRC level. It is not clear what is the reason for proposing a new protocol.

DACOM: The discussion should be left for the next meeting.

The document was noted.

Td 133 (Sony): RACH Prioritisation Scheme for Multi-Service Provision
Proposed to introduce partitioning of the RACH resources into Access Service Classes (ASC).

Comments and clarifications:
The selection of the access classes is expected to be responsibility of RRC.

Siemens: The details of the proposal to be kept FFS as possible problems with the interference and back-off.

Philips: There is need to consider how to map the different channels multiplexed on the RACH onto different access classes.

Ericsson: The impact of using the ASC on BCCH capacity and back-off algorithm should be taken into account.

The proposal was approved with a note that mapping of services onto access service classes and effect on retransmission and back-off should be FFS.

Td 174 (Bosch): RACH Admission Control

Proposed to implement admission control for user access prioritisation.

Comments and clarifications:

- The bit map information is transmitted very infrequently under normal conditions. The frequency would increase only under special conditions.
- The access restriction is expected to apply for a period of time. The length of this period is under further study.

Ericsson: Such a system could have useful properties but it would require more detailed study as the consequences of barring access to a cell could, for example, have adverse implications to neighbouring cells.

Motorola: It should be possible to return from the 'R>=A' decision box back to the 'special access rights' decision box.

Chairman: The scheme could be viewed at this stage that it applies to barring new connection attempts only.

Bosch to provide further justification for introducing the proposed scheme.

8.2.2 Back-off algorithm and control by the network

8.2.3 Random access payload size and usage

Td 121 (Nokia): Contents of RRC Connection Request, Connection Setup and Connection Reject messages

Td 132 (Sony): Need for segmentation/Reassembly when using the RACH transport channel

Comments and clarifications:

- Segmentation/reassembly was proposed at the RLC layer.
- The mechanism for implementing this functionality was not finalised.

Ericsson: If it is accepted that Segmentation/reassembly is at the RLC layer the functionality (except for the CCCH) is already there.

Chairman: If the proposal is to adopt Segmentation/reassembly for CCCH then the document contains some inconsistencies

The document was noted. A revised version was necessary in order to consider the proposal.

Discussion:

- What could be a hard limit for the size of the first access message. This could be related to the TDD payload of 42 bits.

- Potentially the RACH for FDD and TDD could be different and it might not be beneficial to necessarily adopt the same limitation on the size.

Send a LS to RAN WG1 listing different options for the size of the initial access payload and ask for an urgent reply.

8.3 Interaction between RLC, MAC and L1

8.3.1 Size of RLC blocks

Summary of assumptions from the last RAN WG meeting

Chairman: Padding of known size on RLC level
Use a fixed size payload unit
Adjust the number of payload units per transmission time interval.

Ericsson: Two methods for adjusting the length
Small PDU short transmission time interval
Big PDU long transmission time interval

Nokia: WG1 should check out the impact of long transmission time interval on the physical layer.
The transmission time interval can be only semi-static, not dynamic.

Starting point:
A number of RLC PDU-s fixed size per transmission time interval with a possibility to change the length of the interval.

Td 115 (Nokia): Method for RLC-PDU Header Compression
Compilation of previous contributions to SMG2 L23 EG, RAN WG2 #1 and to TTC/ARIB LAC ad hoc.

Comments and clarifications:
- LI = "padding" was expected to provide optimisation in some cases.
- The size of the PU should be determined on the basis of the lowest transmission rate for given transmission interval.

Ericsson: The two solutions presented in the document (Figure 1) could have problem with out-of-sequence PDU-s. The third case, which had not been presented in the paper, would not have problems with out-of-sequence PDU-s.

Alcatel: Concerned about the proposal being based only on 10ms time interval. The results for longer transmission intervals should be taken into account, as the physical layer considers 10, 20, 40 and 80ms time intervals. The depth of interleaving improves radio performance.

Nokia: The proposed solution can be considered applicable to the common channels as well as dedicated channels.

Summary of the scheme:
- Multiple payload units per PDU and multiple PDU-s per transmission interval
- Ability to compress the headers for certain low data rates to increase efficiency

Summary of discussion:

Chairman: The scheme is an addition to the existing one. Needed to decide whether it should be mandatory.
Nokia: Preferred the scheme to be mandatory for the UE
Philips: Preferred the scheme not to be mandatory for the UE

The proposal was approved with the presented scheme being mandatory for the UE and its use negotiated at RAB setup. The presented changes (td 117) were agreed in principle. The Editor of the RLC protocol spec will ensure that the modifications introduced to S2.22 are consistent.

Td 171 (DACOM): Proposal for New Parameters of RLC PDU
The proposal was to provide indication of the occurrence of concatenation and padding together.

Nokia: The present structure of the protocol supports entirely the proposal in the document

The document was noted.

8.3.2 Repetition mechanism (hybrid ARQ, ARQ mechanism)

Td 85 (Siemens): Proposal for RLC operation for the Packet Data Service when in Dedicated Channel Active State and Type II ARQ is employed
Presented for information.

Td 83 (Siemens): Impacts on network elements for the use of Hybrid ARQ II / III in the UTRAN

Td 84 (Siemens): Overview of ARQ techniques
Proposed to adopt Hybrid ARQ type II for TDD retransmission RLC protocol and to extend the applicability to FDD.

Discussion of td 83 and td 84:
Interdigital: How does the RLC coordinate the retransmission of the frames, for example if one frame is corrupted.
Siemens: Frame identification is done on every frame.
Interdigital: This could lead to significant overhead increase.
Chairman: There are other issues, mainly in using the scheme in the UL, e.g. round trip delay, impact on the Iub and Iur interfaces, which should also be taken into account. Two possibilities could be considered.
1) Accept the proposed HARQ in DL and something different for the UL.
2) Either have the scheme for both DL and UL or not at all.

Siemens: Expected that coding, CRC and buffering at L1 in Node B should allow the HARQ scheme to be implemented in the UL.
Ericsson: The Siemens simulations are only for TDD. There are no results to show how the scheme performs for FDD. There are also problems with increase in complexity (e.g. separating PDU header from payload). Ericsson preferred to use 'stop and wait' instead.
Siemens: Proposed to make the scheme mandatory for TDD and optional for FDD.

Motorola: This could have some difficulties with some terminals, as the requirements on the amount of buffering could be very high.

Ericsson: WG1 should be consulted, as the proposed scheme would require increasing redundancy on retransmission, therefore needing to use a new channel code. This would require a new transport channel.

Chairman: Start by adopting the proposed Hybrid ARQ in the DL for both TDD and FDD. UL is more difficult since the impact on the Iub, Iur interfaces could be significant. The scheme could be used as an incremental part of the protocol and implemented only with some terminals, which need to have such scheme.

Ericsson: Preferred the scheme to be FFS for FDD, as it might not be sufficiently developed for Release 99.

For the DL:
The development of the protocol will be started with the Hybrid ARQ as an incremental feature of the RLC protocol. The scheme will be mandatory for TDD and optional for FDD. WG1 will be consulted on the channel coding implications.

For the UL:
More contributions were required before the Hybrid ARQ could be accepted. More study is needed regarding delay, impact on the Iub and Iur and complexity.

Td 149 (Ericsson): The estimated PDU counter

Comments and clarifications:
- The proposed scheme works for DCH only.
- The difference between the proposed scheme and HDLC was not clear.
- The EPC counts the number of PDU-s based on the TFI.

The document was noted.

Td 155 (NTT DoCoMo): Explanation of RLC retransmission scheme proposed by TTC/ARIB

Comments and clarifications:
- UE and the network both use 'T_Prohibit'.
- The scheme could be applied to both control and dedicated channels.

Chairman: There is no need for 'T_Prohibit' timer in the network as it is an implementation aspect. It is not necessary for the standard.

NTT DoCoMo: The timer is used in the network to reduce excessive status report requesting. NTT DoCoMo did not insist on standardising it for the network.

Philips: Is the proposal compatible with the Ericsson scheme.

Ericsson: Should be possible, perhaps not at the same time.

The proposed mechanism was approved. The scheme should apply to the UE. The respective part from the Annex in S2.22 to be moved to section 9.7.

8.3.3 Service multiplexing

8.4 Downlink shared channels

Td 123 (Alcatel): Proposal for new sub-states in cell Connected state of S2.03

Comments and clarifications:

Chairman: The removal of RACH/DSCH could remove one of the benefits of DSCH, i.e. possibility to avoid decoding all channels.

Alcatel: With the proposed addition of DCH/DSCH+DSCH Ctrl the power control is on the DSCH control channel. The provision of TPC could be found in S1.11 of RANG WG1.

Ericsson: The decision on power control provision had not been finalised and this should be reflected in the proposal.

Add the proposed DCH/DSCH+DSCH Ctrl sub-state with a note (including an indication in the figure) that it is conditional on the availability of power control on the DSCH control channel. The proposal for removal of RACH/DSCH was not accepted. More clarification is needed.

8.5 Uplink shared channels

Td 127 (Motorola ECID): Comparison of RRC and MAC based methods of dynamic scheduling between users on the uplink

Also included in the proposal was that the USCH should be scheduled by the CRNC MAC.

Comments and clarifications:

Motorola: Functions in the RNC could be identified with respect to whether the RRC is UE specific or cell specific (across the network).

Ericsson: It is not clear that the delay over the Iur could be used as a strong argument in support for moving resource arbitration from SRNC to CRNC.

Chairman's summary of the relevance of the conclusions in the section 7 of td 127:

1. acceptable
2. could be debated
3. relevant
4. not very critical
5. applicable
6. applicable

Td 122 (Alcatel): MAC multiplexing on uplink for packet users

Comments and clarifications:

Motorola: The Motorola USCH proposed centralised MAC. Is it the same with the Alcatel proposal?

Alcatel: Also support centralised MAC. The main difference between the two is that in the Motorola proposal there is explicit allocation for each UE, while in

the Alcatel proposal there is only one allocation for all UE-s of the same class.

Ericsson: What bit rate would be required for the ACCH and how does it compare with BCCH as a type of broadcast channel?

Alcatel: For USCH the overhead is 7 bits per frame per access class

Motorola: For USCH – 7 bits per frame per UE. No comparison had been done of ACCH and BCCH.

Chairman: The proposed scheme could be summarised as a way to arbitrate the uplink access of the DCH-s on cell level. The main difference is that the Alcatel proposal used code multiplexing and fast power control, while in the Motorola scheme time multiplexing is also suggested.

Alcatel: More precisely it is fast access arbitration.

Td 95 (Golden Bridge Technology Inc.): UL CPCH

Slides explaining the main concept of the Common Packet Channel (CPCH). The proposal was presented by GPT but the source is T1P1.5.

Td 96 (Golden Bridge Technology Inc.): draft text UL CCCH

Companion document to td 95

Comments and clarifications:

Motorola: There could be problems with arbitration of resources at cell boundaries since control is away from RNC.

Alcatel: Having all the control in Node B is good for fast reaction but removes the ability to arbitrate capacity at RNC level. Another main difference in handling capacity: the GBT scheme reduces and removes allocation if capacity limit is reached, while the Alcatel and Motorola schemes do not allocate resources to stop exceeding capacity limits.

Td 134 (Siemens): Outline of a Proposed Resource Allocation Methodology for TDD

Presented considerations on ways of using TDD resources for dedicated and shared channels.

Td 135 (Siemens): Adoption of the USCH and DSCH for Channels for TDD

Companion contribution to td 134.

Comments and clarifications:

Alcatel: There could be limitations with code allocation in the proposed scheme.

Chairman: As all the adressing is in the ACCH, would it be possible to use Hybrid ARQ.

Siemens: The main assumption is to use FACH for addressing and thus remain compatible with the proposed retransmission. ACCH is only an option.

Chairman: The proposal is closest to the Motorola scheme. From ‘protocol architecture’ point of view it is the same.

Alcatel: USCH and DSCH are suitable for TDD as it requires more explicit resource allocation while with FDD power allocation has to be accounted for.

Td 131 (Philips): Further options for using the FAUSCH", Source: Philips

Discussion of the above contributions on shared channel schemes.

The Chairman summarised the shared channel proposals as follows:

Alcatel
Provides fast resources arbitration for DCH channels (usage of power in UL by using a DL broadcast channel), performed on cell basis by the CRNC.

Golden Bridge Technologies (T1P1.5)
CPCH could be viewed as a further advanced RACH mechanism with an addition of FPC to allow longer payload messages and higher bit rates. The scheme is based on power rump up and channel acquisition indication.

Motorola and Siemens
The schemes allowing UL capacity to be allocated on a fine granularity basis, typically time multiplexed with associated DL control channel (ACCH). May or may not have fast power control done on cell basis (CRNC)
Equivalent to DSCH in the UL

Comments and clarification:

GBT:	The CPCH also includes collision detection (CD).
Chairman:	If the proposed CD is similar to the MAC ACK then there is not much benefit of having the field.
GBT:	The number of different values for the CD field is 16 (4 bits).
Chairman:	If the CD field is only to mirror what is happening on the UL there is no need for a protocol and it becomes an implementation issue.
Ericsson:	A LS should be WG1 should consider the proposal for having longer RACH payload messages and indicated what is the feasibility.
Telia:	Supported the Ericsson suggestion.
GBT:	The proposal had been presented in RAN WG1. There have been no comments about problems with the feasibility of closed loop power control. WG1 had suggested the concept to be presented in WG2.

The meeting clarified the working procedures involving the interaction between the TSG RAN WG-s and the mechanisms of approving contributions.

Decision on the T1.P1.5 scheme: Send a LS to RAN WG1 regarding the feasibility and the limitations regarding extension of RACH and the use of fast power control.

Decision on the Alcatel scheme: The principle was agreed in terms of functionality as resource arbitration at CRNC level, obtained by the broadcast information sent by RRC. S2.01 will be updated accordingly. The technical details will be left FFS.

Further discussion of the USCH proposals (Motorola and Siemens):

Motorola:	USCH can be viewed as equivalent to DSCH. Could be used with time multiplexing or code multiplexing.

Ericsson: Open issues exist, which depend on the physical layer. These include the need for timing advance; need of a long code or not; should each UE have a code. Compared to the Alcatel proposal the benefit is not so clear and there is possibility for very high complexity. Also too tight scheduling would be required, compared to the more relaxed scheduling of the Alcatel scheme. Ericsson preferred the Alcatel proposal.

Chairman: Is it achievable to finish the USCH for Release 99?

Siemens: The scheme could be simplified if it is adapted for TDD only.

Chairman: Suggested to set up an e-mail discussion to improve the understanding of the protocol aspects associated with the USCH.

Motorola presented the following companion paper, intended to clarify some protocol aspects:

Td 126 (Motorola ECID): Operating the USCH in SHO

Comments and clarifications:
- For SHO fast signalling over Iur is envisaged.
- The use of Hybrid ARQ with the scheme had not been studied.

Ericsson: It was not clear how collisions could be avoided The asynchronous BS operation could cause problems, which was not been represented in Figure 1.

Motorola: For unsynchronised base sites the CRNC need to know the framing alignment of the UE-s and the UE scheduling should also be known.

Chairman: The Figure 1 presentation seemed to refer to the ideal case

Vodafone: timing alignment to different BS could still be a problem even if the BS are time-alignment, due to different delays.

Ericsson: What is the mechanism for time alignment of the BS-s?

Motorola: The information should be available in the RNC.

Chairman: Two flavours of the USCH could be identified:
- 'Pure' USCH with time multiplexing close to the Siemens scheme.
- USCH of the DSCH type, closer to the Alcatel proposal with capability for control per UE

  Regarding time alignment:

  Alignment of UE-s has physical layer implications

  When UE-s are not aligned the scheme is similar to DSCH.

Siemens: Requested to conclude on the USCH for the TDD mode as a working assumption as it is simpler to finalise (no SHO, possibility of hybrid ARQ)

Chairman: Better not to diverge the solutions for FDD and TDD.

Decision on the USCH: Continue the e-mail discussion for further clarification of the USCH scheme (for TDD and FDD together). Motorola will report on the outcome.

8.6 Synchronisation mechanism and procedures

Td 90 (Nokia):
Presented for information about the status of the work on this issue in RAN WG3.

Summary (Chairman):
- Existence of frame counter in the UE and the SRNC for the DCH
- UE reports the observed time difference based on SCH and reports to SRNC
- SRNC uses the information to align the 'Node B'-s to control SHO on the DL

8.7 Ciphering/security mechanism and procedures

Td 124 (Alcatel): Ciphering function in UTRAN

Comments and clarifications:
The proposal is common for the user and control plane.
One implication from the proposal was to have transparent mode also for DCH.

Vodafone: Some concern had been expressed by SA WG3 delegates that effectively less than 32 bits would be available if the proposal was accepted.

Td 146 (Ericsson): Ciphering models

Comments and clarifications:
Chairman: Model 1 has more drawbacks, including preventing blind detection, which is a L1 feature.
Ericsson: Did not favour any one of the three models. Confirmed that the second model (section 4) is close to the Alcatel proposal.

Td 111 (Nokia): Radio Interface Ciphering

Comments and clarifications:
Nokia: Ciphering in MAC-c could be possible but was not a preferred solution.
Vodafone: The Kc should be changed on switching from PS to CS connection.
Nokia: This was acceptable and should be resolved when technical details are decided in future.
Nokia: Model for common channels could be provided in future. Preferably the same as the one for dedicated channels but might have to be different.
Alcatel: There is possibility to bring the Alcatel and Ericsson proposals at MAC level.
Ericsson: Different possibilities could be considered as long as the principle of not ciphering the RNC number was applied.
Vodafone: Preferred to have the ciphering as far back in RAN as possible. Therefore the third model (with 'ciphering layer') should remain in the discussion.
Chairman: The proposals do refer to ciphering in the RNC as a working assumption.
Alcatel: Agreed to keep the ciphering at MAC level but preferred it to be above the split of common and dedicated channels.

Continue the discussion via e-mail. Nokia will report on the outcome.

8.8 Location/positioning mechanism and procedures

Td 153 (Nortel Networks): Work package for position service feature
Proposed to start a work item (Technical Report) to be initiated by Nortel Networks on UTRAN position service.

Comments and clarifications:

Ericsson: The discussion seemed more appropriate for the SA WG-s

Chairman: The UMTS 22.XX series documents had been approved as 3GPP documents. Hence those and UMTS 22.05 in particular is now relevant. RAN WG1 is responsible for the measurements. RAN WG2 should also consider the position service issues. In the context of radio resource management the subject is relevant to all groups. Since the work had to be started somewhere the Technical Report was proposal in this group.

Vodafone: Is it proposed for Release 99.

Chairman: Yes.

Start the work on Technical Report covering position services based on e-mail discussion. Nortel will be the Editor.

Td 154 (Nortel Networks): Framework for technical requirements for position service feature
The document contains requirements from UMTS 22.05 with some additions.

Comments and clarifications:
The work will start as an e-mail discussion and will be brought to the meetings as necessary.
The intention was to refer to 'other UTRAN-s', not other networks in general.

Nokia: In T1P1 the consensus is for 120m uncertainty. Perhaps it is not necessary to specify a particular number at all.

Nortel: The T1P1 number (120m) has been requested by the US government, for emergency services. The 50m had been taken from 22.05.

Ericsson: There is no possibility to decide anything on the contribution before the experts of individual companies could study the proposal.

The document was noted.

8.9 Other items

Td (NTT DoCoMo): Proposed Introduction of BCCH-C and BCCH-V

Comments and clarifications:

Alcatel: In the UMTS specifications UTRAN decides what are the target cells for the HO. What is the case with the ARIB specifications?

NTT DoCoMo: The ARIB specifications allow both UTRAN and UE to decide target cells.

Chairman: Not clear what is the reason for having the split of BCCH. The standard does not need to specify the scheduling on BCCH.

NTT DoCoMo: The BCCH-c and BCCH-v are time multiplexed and should be standardised for the benefit of the UE.

Chairman: It is an implementation issue to decide about the frequency of changing information. The issue should be progressed by inviting contributions on BCCH scheduling.

Siemens: The contribution could be viewed as proposing one possible way of structuring the information on BCCH.

Chairman: In order to continue the discussion a number of issues need to be considered. These include throughput, classifying broadcast information, etc.

The document was noted.

Td 92 (NORTEL NETWORKS) Procedures in Connected mode

Comments and clarifications:
Receiving BCH in RACH/FACH state had not been considered.

Ericsson: what is the meaning of UE listens to the BCH

Nortel: The UE should be able to get information on BCH, which is changing.

The proposal was approved with FFF note.

Td 93 (NORTEL NETWORKS) Mobility in Connected mode

Comments and clarifications:
The S2.04 could be seen as common reference for cell reselection procedures, but having different threshold and parameters, are not precluded.

Nokia: UE location procedures could be a misleading term (regarding MM procedures). Preferred to use different term.

Nortel: The intention was to cover URA updating and cell updating with UE location procedures, so that UE location is included.

Nokia: Preferred to use different term.

The changes in Section 4.1.1.1.1 and 4.1.1.2 were approved (with some editing) The issues on handover required further discussion

Td 179 (Vodafone): ODMA routing with procedures for Mobile Originated Calls, Mobile Terminated Calls and Location Update

Comments and clarifications:

- Regarding the RRC connection request (Figure 8) it is for UEA and assumes that UEC already has an RRC connection.
- A new RRC connection has to be established if the UEB disappears (Figure 8).
- There is a concept of local connectivity, which allows having a number of available routs, which could be selected, if some of the relays disappear.

R2-99180 Routing controlling information in an ODMA relay node vodafone

Comments and clarifications:

Frequency of upgrading routing tables and probing based on 5 nearest neighbours and local activity levels. This could be optimised for particular environments.

The two documents 179 and 180 will be used to initiate a Technical Report (ODMA procedures), edited by Vodafone. The discussion will start first via e-mail.

9. Protocol specifications

Td 69 (Nokia): Change request for R2.01: Use of ASN.1 for definition of abstract syntaxes of protocol messages. Specification of default and special encoding

Comments and clarifications:

T. Modus:	How should proprietary extensions be handled?
Nokia:	Such extensions are not relevant, as the protocols concerned here are low level. New information elements can be added to the end of the data field.
T. Modus:	Such an approach appears to favour use of CSN.1.
Chairman:	CSN.1 allows for other than end extensions and provides for optimisation.
Nokia:	The discussion in the document should also cover the other encoding rules as much as CSN.1. Tabular format should be included in Section 11.2.
TM:	The property of CSN.1 belongs to M. Mouly and this is a matter of concern, as M. M. will control the language. Other companies could make only their own compilers.
Motorola:	Shared the same concern (i.e. that CSN.1 is not standardised).

Td 108 (Telecom Modus): Encoding rules and their suitability for the RRC protocol
The document could be viewed as a change request to td 69.

Document td 69 was approved in principle with changes section 10 and section 11 to be included in a revised version. Section 11 will include Tabular format and more detail on ANS.1 u-BER and ANS.1 PER. The criteria table to be added to section 11 according to the TM proposal in td 108.

Td 81 (Nokia): Descriptive SDL and its use in 3GPP standards
The contribution recommended the use of Descriptive SDL. The ETSI Guide, DEG/MTS-00050 V1.5: Methods for Testing and Specification; Guidelines for the of formal SDL as a descriptive tool, was submitted to the meeting for information as td 82

The proposal as in Section 3 of document td 81 was approved.

Td 87 (Nokia):Change request for R2.01: Use of ASN.1 for definition of abstract syntaxes of protocol messages. Specification of default and special encoding

Comments and clarifications:

TM:	Item 3 in the overview should not suggest preference to CSN.1 if it is included in the document. In section 11.1.1 the statement that CSN.1 is not standardised and publicly available did not provide enough assurance that the language could be evolved if found necessary.

Chairman: There have been no problems with the use of the language so far. Mr. M. Mouly (owner of the copyright) had attended the ad hoc on specification methodology and had not indicated any restrictions or reasons for concern.

TM: It had not been made clear if the owner of CSN.1 had agreed to allow changes to the language. TM would like to have formal assurances that no restrictions would be placed to the possibilities of evolving the language in order to accept the use of CSN.1 in the standard.

Philips: Proposed to add to the table in section 11.1.2 automatic extensibility as a criteria item.

Chairman: It was not clear what this item would reflect and automatic extensibility was a feature for all languages by default.

The document was approved with a note reflecting the TM opinion on the use of CSN.1 being conditional on the possibility to evolve the language.

9.1 MAC (S2.21)

Td 125 (Alcatel): TFC selection function in MAC-d

Comments and clarifications:

Ericsson: Supported the proposal

Chairman: Indicate that the proposed operation (as described in the modified bullet point) is performed at Node B.

The proposal was approved with the above addition.

Td 78 (NEC, Telecom-MODUS, NEC Tech. UK) Restructure of S2.21

The document was not available to all delegates. The Chairman pointed out that the presentation of the proposed changes was not done with respect to the agenda items. There were a very large number of issues proposed for discussion at the same time, which would make decision very difficult.

The contribution was withdrawn.

Td 114 (Nokia Research Center): MAC-PDU Formats

Comments and clarifications:

- Strong preference to combine C/T and T fields into one.
- Four bits for the T field per DCH was viewed as sufficient.

Td 152 (Ericsson Radio Systems AB): Proposal of refinement of MAC data PDU formats

Comments and clarifications:

- Main issues compared with td 114
- Combined C/T and T fields
- Variable size C/T field: Nokia proposed 1,2,3 and 4 bits but could accept having 1 and 4 bits.

Chairman: the complexity of having variable size of the C/T field is not big and could be beneficial to have 1-4 bits instead of 1 and 4 only.

Td 79 (NEC, Telecom-MODUS, NEC Tech. UK): Change requests related LID table in S2.21

Clarifications and discussion of td 114, td 152 and td 79
Ericsson proposed MAC PDU not integral number of octets
Both Nokia and Ericsson propose mandatory C/D field of length 1 bit for RACH and FACH.

The proposed changes to S2.21 were based on the Annex of td 152
- Modifications were made to UE-ID definition:
- s-RNTI + RNC-ID used on DCCH [FFS]
- Addressing for initial access on CCCH is FFS, possible use of Random id / CN id used for initial access FFS.
- Editor's note in 9.2.1.2 removed with clarifying text added.

(Capture from td 114)
- Add text indicated that variable size for the C/D field was adopted.
- Reflect appropriately the FFS status of the FACK-ACK concept.
- Remove LID field.

9.2 RLC (S2.22)

Td 156 (NTT DoCoMo): RLC ESTABLISH/RELEASE

Comments and clarifications:
Chairman: Could the document be interpreted as proposing to make the SDL diagrams normative for the RLC protocol?
NTT DoCoMo: The contribution did not intend to discussed whether normative or informative but that descriptive SDL is used for RLC and each mode of RLC. [Statement through interpreter + Chairman's interpretation]
Chairman: It was not proposed to discuss at this time whether it should be informative or normative.

The proposal was approved: Descriptive SDL will be used for each mode of RLC.
Whether it should be informative or normative will be discussed at a later stage.

Td 140 (Nortel): Adaptive Radio Link Protocols
The document was presented for information. Feedback was invited on the subject.

Comments and clarifications:
- Not proposed to multiplex different bearers on one RLC, but to have different RLC profiles for one connection.
- Possible way is to look at packet headers, such as IP headers in order to decide about the RLC profile.
- It is still one entity per bearer but a distribution function could be added on top of that, which could be operational or not.
- The document would be submitted to SA WG2 for consideration.
- The proposal is not to have link adaptation.

Ericsson: Could not see big difference with setting up different bearers. The opinion of SA WG2 should be considered before anything could be decided.

The document was noted.

Td 187 (Ericsson, NTT DoCoMo and Philips): Primitive naming convention

The proposal was approved and will be reflected in S2.01.

Td 137 (Siemens): A Proposal for RLC Architecture model

Comments and clarifications:
Regarding Figure 4: ACK and data can be transferred on different logical channels
Transparent mode and unacknowledged mode are assumed possible to operate as bi-directional instances in order to keep the protocol design uniformly structured.

DACOM: Regarding Figure 4 why do UM and AM co-exist.
Siemens: Different bearers with the same RRC connection are possible.
Ericsson: It is confusing to have in fig 3 only UM and in fig 4 both UM and AM. It is not clear why.
Siemens: Useful to synchronise the protocol machine.
Chairman: It is necessary to justify why the change of the existing RLC model was proposed, which is not sufficiently clear in the contribution.

Td 147 (Ericsson Radio Systems AB): Model of RLC

- One RLC entity for each mode, as no need is seen for having multiplexing at RLC level.
- No need for explicit signalling for setting up the RLC link in acknowledged mode.
- The model would require at least two DCCH-s if both UM and AM were required on the same RRC connection.

Comments and clarifications:

- No need for piggybacking of higher layer information with BEN and BGN ACK.
- D/C field is 1 bit in the PDU
- R/S field is mapped on another field in the PDU.
- In the proposed model Tr and UM modes are unidirectional.
- More than one RLC entity per RAB is possible.

Chairman: The text below Figure 4 describes the protocol and perhaps should not be part of the model

Ericsson: The detailed description of the PDU-s is provided separately and the two documents are complementary

The following was approved: • Figure 1 representing the model overview • Sections 2.1 and 2.2.

- Section 2.3 approved with R/S and D/C combined in a functional box for the time being. The details will be reinserted after the approval of the protocol description of these entities.

Td 136 (Siemens) A Proposal for RLC protocol states

Proposed the states and the transitions between the states for use in the description of the RLC protocol.

Td 148 (Ericsson Radio Systems AB): RLC Protocol states

The proposed protocol state model differs from the current model in S2.22.

Discussion of td 136 and td 148

The Ericsson State diagram is simpler as no BGN, BGN ACK, etc. and separated for the different modes.

The two proposals were for balanced (as opposed to Master/Slave) protocol.

Ericsson: Suspend/Resume is for further study.

Siemens: Use of Suspend/Resume is not precluded.

Ericsson: Use of RESET and RESET ACK has not been studied but is envisaged for error cases.

Siemens: Separate Establish and Release had been introduced to improve the protocol structuring.

Chairman: The approved model could be based on the Ericsson model which is more simply structured and closed to the current RLC understanding.

Siemens: Synchronisation pending to be renamed as Recovery. Remove RESET/RESET ACK.

Ericsson: Agree that resetting at RRC level could be investigated.

The following was approved:
Td 148, Section 2.1, 2.2, 2.3 (with modifications to Figure 3, renaming synch. to recovery and the RESET/RESET ACK as FFS)

Td 150 (Ericsson Radio Systems AB): RLC PDU types and formats

Comments and clarifications:

It was proposed to accept the list of RLC PDU types in td 150, with a note that RESET/RESET ACK has already been agreed as FFS in the discussion of td 148 above.

NTT DoCoMo pointed out that such a decision would contradict the outcome of an earlier discussion.

The Chairman explained that there was no contradiction, as companies have the right to propose modifications to parts of the permanent documents, which had been agreed.

NTT DoCoMo expressed their surprise that Ericsson were making a proposal, which had not taken into account the agreements reached earlier in the meeting.

NTT DoCoMo: A proposal had been made during an earlier discussion (td 155) as a result of which the ARIB/TTC proposal for retransmission scheme was agreed and moved from an Annex in S2.22 into section 9 of the document. This included the use of USTAT PDU-s. NTT DoCoMo insisted on leaving this

PDU type in the list and taking into account the agreed material on retransmission when approving the proposals in td 150.

Ericsson: Explained that the RLC model, agreed in the discussion of the previous documents (td 136 and 148), was not consistent with the TTC/ARIB retransmission scheme included in the S2.22, including the USTAT PDU. Therefore the Ericsson proposal could be viewed as proposing modifications to the approved text on retransmission in order to align it with the approved model.

The point of confusion could be identified as the adoption of an RLC model, which, due to time constraints, was not checked for consistence with proposals agreed earlier in the meeting. The discussion was postponed due to lack of time and need of further clarification.

9.3 RRC (S2.31)

The contributions on RRC were not treated due to lack of time. The delegates were asked to discuss these documents via e-mail in order to avoid resubmitting the same documents at the next meeting.

10. Liaison and output to other groups

Td 89 (Siemens): Proposed LS to TSG RAN WG1

Chairman: Having Hybrid ARQ mandatory for TDD was not agreed.
Ericsson: It should be indicated that Hybrid ARQ is an extension of the normal ARQ.
Chairman: It sufficed to reflect this in the RAN WG2 documents. WG1 would not be concerned with this issue.
Ericsson: The question about the payload should be changed to ensure more useful reply, i.e. would it be possible to have a bigger payload for TDD.
Nokia: Specify that the Hybrid ARQ is type II/III.

The LS was approved as td 185 with modifications reflecting the comments above.

Td 103 (Ericsson): Proposed LS to RAN WG3, SA WG2, SMG2, SMG12 regarding HO between UMTS and GPRS

Proposed modifications

- Include the state diagram for section 2.2.
- Add SMG2 WPA as a recepient.

The document was approved as td 186 [?] with the above additions.

Td 188 (LGIC): Proposed LS to TSG SA WG1 and TSG SA WG2 on multicast

The document was approved as td 189.

Td 104 (Telecom Modus): Proposed LS to WG3 concerning transmission delay over Iub and Iur

The document was resubmitted with modifications as td 190. The LS to WG3 was approved as td 196.

Td 191 (Nokia): Proposed reply to liaison from WG3 on definition and usage of RNTI
The document reflected the discussion of td 67 above.

The Liaison Statement was approved with a minor change as td 192.

Td 193 (Ericsson): Proposal for LS to RAN WG1 on clarifying FACH requirements

Siemens: Add a note that the clarification was applicable to both FDD and TDD.

The proposal was approved as LS in td 194.

11. Any other business

Future Meetings:

13 – 16 April 1999 Yokohama, Japan (NTT DoCoMo)
25 – 28 May 1999 Berlin, Germany (Siemens)
5 – 9 July 1999 (possibly ETSI)
16 – 20 August 1999
20 – 23 September 1999, Malmo (Tele Logic)
2 – 5 November 1999
6 – 9 December 1999

12. Closing of the meeting

The Chairman thanked Ericsson for providing facilities and hospitality and closed the meeting.