Technical Specification Group, Radio Access Network
Meeting #2, Fort Lauderdale, 2-4 March 1999

TSGR#2(99)174

Source: **3GPP Support**

Title: **Draft report of 2nd TSG RAN meeting**

Document for: **Approval by correspondence**

Agenda Item:

1. Opening of the meeting

The second meeting of 3GPP TSG RAN was opened by Mr Don Zelmer, Senior Manager, Standards at Bell South Mobility. On behalf of the sponsoring companies, he welcomed the delegates to Fort Lauderdale and wished them a successful meeting.

The meeting was chaired by the convenor, Mr Akio Sasaki (ARIB). The Secretary was Dr Michael Sharpe (ETSI).

2. Approval of the agenda

The meeting considered document 001rev1. After discussion the agenda was modified. The agreed agenda is attached as annex A.

2 bis Working methods & document allocation

The meeting noted that elections for the Chairmen and Vice-Chairman of the TSGs would be held during the week, following a schedule decided by the PCG. Each TSG would recommend its Chairman and Vice-Chairmen; appointments would be made by the PCG.

3. Election of Chair and Vice Chairs

The meeting noted document 060 and document 122, explaining the vote procedure and the guidelines from the PCG on the election of Chairmen and Vice-Chairmen.

The following candidates presented themselves:

- For the position of Chairman, Mr Furuya (document 047).
- For the position of Vice-Chairman, Mr Pike (document 045), Mr Zelmer (document 049), Mr Courau (document 056).

The meeting noted that Mr Zelmer and Mr Courau had withdrawn their candidatures for the position of Chairman, and that Mr Fauconnier had withdrawn his candidature for the position of Vice-Chairman (document 050).

Decision:	Mr Yukituna Furuya was recommended as Chairman

A vote took place for the positions of Vice Chairman.

Decision:	Mr Donald Zelmer was recommended at Vice Chairman #1

Decision:	Mr François Courau was recommended as Vice Chairman #2

The results of the elections for all TSGs are contained in document 163.

Post-meeting note: The PCG appointed the Chairman and Vice-Chairmen of TSG RAN following these proposals.

4. Review of the 1st TSG meeting

The meeting noted document 051, the report of the first meeting.

5. Approval of modified Terms of Reference of TSG RAN

Terms of Reference of TSG RAN

The meeting considered document 051, annex A, the Terms of Reference of TSG RAN agreed at the first TSG meeting, and document 096, proposals to modify the Terms of Reference of TSG RAN.

It was noted that document 138 (Vodafone) on the division of responsibility on O&M activities between SA WG5 and RAN WG3, had been accepted by TSG SA.

After discussion, some amendments were made to the Terms of Reference of TSG RAN.

Decision:	The revised Terms of Reference for TSG RAN (Annex B) were agreed.

Project co-ordination with TSG SA

The meeting supported document 075, proposals for the co-ordination activities of TSG SA. Parallel to the meeting, TSG SA held a meeting to discuss co-ordination procedures, at which TSG RAN was represented by the Vice Chairman, Mr Courau. Mr Courau have a short report of the output of the TSG SA meeting, which were supported by TSG RAN.

The report of the TSG SA meeting will be circulated as a TSG RAN document.

6. Report from Working Groups Convenors and ITU Ad Hoc Contact Person

6.1 WG1

The meeting noted document 086, the report from WG1 including details of the elected Chairman (Mr Toskala) and Vice-Chairman (Mr Nakamura) and the meeting schedule.

The meeting noted document 87, the document structure, and document 89, the work plan and milestones

The meeting noted documents 90 to 93, liaison statements sent to other groups.

The meeting noted documents 123 to 133 and document 135 the draft deliverables of WG 1, presented for information. It is intended that they should be approved at TSG#3.

6.2 WG2

The meeting noted documents 140 to 149 from WG2. Documents 102 to 111 were withdrawn.

The report from WG2 is contained in document 140. The appointment of Chair, Vice-Chair and Secretary will be made at the next meeting.

The deliverables and work plan of WG2 are defined in document 141.

The deliverables intended to be produced by WG2 are contained within documents 142 to 149, presented for information. It is intended that they should be approved at TSG#3.

6.3 WG3

The meeting noted document 057, the status report of WG3. This document defines the work plan and the documents intended to be produced by WG3.

The following drafts were presented for information:

WG3 drafts presented to TSG RAN#2

WG3 deliverable	RAN#2 document number
I3.02	65
I3.03	58
S3.01	78
S3.10	64
S3.13	97
S3.14	66
S3.15	67
S3.20	94
S3.23	68
S3.24	73
S3.25	74
S3.27	95
S3.30	80
S3.32	81
S3.34	84
S3.35	79

6.4 WG4

The meeting considered document 112, the status report of WG4. It was noted that Mr Benn had been elected as Chairman; Mr Fukuda as Vice Chairman.

Document 112 proposes a document structure for WG4, including scope and editors of documents.

The meeting noted documents 113 to 119, the draft deliverables from WG4, for information. It was noted that document 063 is replaced by document 116.

The meeting noted for information document 052, a liaison statement to WG2 on signalling of frequencies of RF channels for UTRA.

6.5 ITU Ad Hoc

The meeting noted document 55, the status report of the ITU Ad-hoc group.

The meeting considered document 54, proposed guidelines on the activity of the ITU ad-hoc group.

The ITU ad-hoc group will act as a focus between 3GPP & ITU-R TG 8/1. It was discussed whether the group should also act as the focus between 3GPP and ITU-T. It was agreed that this would be discussed in the PCG.

Document 160 was drafted to propose a liaison procedure with ITU-T to the PCG. It was agreed to modify the guidelines in document 54 in line with the proposal of document 160.

It was proposed to extend the activity of the ad-hoc until end of 1999. Discussion on this point was postponed until TSG RAN meeting #3.

Mr Magnani was appointed as chair of the ad-hoc group on the ITU.

Decision:	Guidelines for the activity of ITU ad-hoc (document 54, modified by document 160) were agreed by TSG RAN.

7. Approval and common understanding of documents from working groups and ITU Ad Hoc, if any

UMTS documents

Documents 6 to 43 were noted for information - Working groups have taken them as input to their discussions.

The meeting noted document 44, SMG 2 status report to SMG#28, and document 69, a listing of ETSI UMTS deliverables, for information.

Documents from working groups

Documents from working groups were presented for information under the relevant points under agenda item 6. No working group documents were presented for approval.

ITU Ad-hoc group

UTRA key characteristics

The meeting considered document 53, proposing values for UTRA key characteristics, and document 139, which comments on document 53.

A revised version (document 153) was developed and presented, and finally agreed (document 168)

Decision:	3GPP endorsed the proposed contribution to ITU-R TG 8/1 (annex E) to be submitted to the ITU by a national administration.

Radio interface specification for IMT-2000

The meeting considered document 83, a draft radio interface specification for IMT-2000. After consideration, a revised version (document 154) was developed and presented.

The detail of the document structure will be checked by the WG Convenors/Chairmen. The final version was agreed (document 169).

Decision:	3GPP agreed that a contribution to ITU-R TG 8/1 (annex F) will be submitted to the ITU via a national administration.

8. Document structure and Numbering for TSG RAN and working methods

Document structure

The document structure of WG deliverables were presented under item 6 as follows:

WG1 (document 87); WG2 (document 141); WG3 (document 57); WG4 (document 112)

AHG ITU (document 83) reflects the above documents for proposal to the ITU.

Concern was expressed over the interaction between the RAN working groups in realising this document structure.

Document 061 (WG4), document 062 (WG4) and document 92 (WG1) indicate an overlap between documents of WG1 & WG4. document 161 proposes a working structure to avoid the issue.

Document 090 (WG1), indicates a possible overlaps with WG2, WG3 & WG4 on TDD DCA.

After consideration, document 162 was prepared in the methods of interaction between the working groups of TSG RAN. An ad-hoc group on radio resource management met to discuss the partition of work between the working groups. The report of the ad-hoc group was presented (**document 170**). After further discussion, a revised version of document 162 was produced including document 120, circulated as **document 173**.

Decision: TSG RAN adopted the principles contained in **document 173** regarding organisation of work within RAN and between RAN and the other TSGs.(Annex L)

Decision: The Terms of Reference of WG4 were modified to read: "Specifications for radio performance and RF system aspects ~~protocol aspects from a system point of view -~~ responsibility for specification of RF parameters"

Action (WG3): to reconsider whether S3.26 & S3.27 should have separate documents for the Iur & Iub interfaces and make a recommendation to TSG RAN#3

It was noted that there was a need for a numbering format across the TSGs. It was decided to follow the temporary scheme (SN.XX; RN.XX) for the time being.

Action (Chairman): to raise the issue of document numbering with the other TSG Chairmen to seek a common numbering scheme across the TSGs in PCG.

The agreed document structure is attached as annex D.

Working methods

The meeting noted documents 71 & 72 on working methods and document 156 on deliverable numbering. It was noted that the deliverable numbering system will be discussed with the other TSGs - some delegates expressed concern over the numbers to be allocated.

Decision: TSG RAN agreed to adopt the working methods shown in document 071.

Action (3GPP Support Team) to align the numbers of the RAN documents with the deliverable numbering scheme defined by the PCG.

Functionality for Release 99

The meeting noted document 76 (Ericsson), which proposed a functionality to included in Release 99 and proposes that working groups should maintain a document on study items for future releases. After consideration, document 167 was produced, proposing a procedure for deciding whether a feature is to be included in Release 99.

Document 167 was revised after discussion. The agreed text is reproduced at annex H.

Decision: TSG RAN adopted the procedures contained in annex H for deciding the features to be included in Release 99.

Drafting of 3GPP Deliverables

The meeting noted document 159, an extract from the 3GPP drafting rules on expressions of provisions in 3GPP deliverables.

9. Consideration and approval of TSG RAN working schedule

Meeting schedule

The meeting noted document 002, a proposed working schedule of the TSG.

Decision:	TSG RAN adopted the meeting schedule attached as annex C.

Work plan

The meeting considered document 70 and document 155, noting the timescales required for the introduction of commercial service in Japan, and document 77 (Ericsson), which proposed a work plan, containing a meeting schedule, a set of milestones and a version handling procedure. After consideration, a revised work plan was produced (document 166). This was further modified after discussion (see annex G).

Decision:	The project milestones within annex G were agreed in principle, subject to a review by the working groups.

Decision:	The version handling procedure contained in annex G was agreed in principle. A Draft specification does not need to be complete, but it should be clearly marked in the specification what is stable and agreed and what is not stable and agreed. For the items that are stable and agreed the change request procedure applies and indicated in the History sheet. It was agreed that the version numbering would be aligned with that used by other TSGs (see document 71).

It was noted that:

- deliverables agreed at Working Groups and presented to TSG RAN for information will be status 1.0.0. This implies a degree of stability.

- deliverables presented to TSG RAN for approval will be status 2.0.0

- deliverables approved at TSG RAN will be status 3.0.0, after which change control will apply.

It was agreed that all specifications were intended to be presented to TSG RAN#3 for approval.

Work plan format

The meeting considered document 157 - a format for the work plan of the TSGs.

Action (3GPP support):	to format the agreed work plan (annex G) according to document 157.

10 Other business

Liaison statements

The meeting noted the following liaison statements that were not taken under other agenda items:

- The meeting noted document 003 (liaison statement from SMG2 to ERC TG1) for information.

- The meeting considered document 004 (liaison statement from TSG-T WG2 to TSG T on service development process).

Decision:	to send the Liaison Statement (annex J) regarding the Service Development Process to TSG-T.

- Document 046 and document 005 on UMTS Simultaneous Mode were noted for information.

- Document 091 (WG1), a liaison statement to WG4 on closed loop power control. This item will be addressed at the next WG4 meeting.

- Document 093 (WG1), a liaison statement to WG2 on work split for random access procedures. The need for a joint meeting of experts from the two groups was identified to address this issue.

- Document 120, a liaison statement from ERC and document 121, an explanatory document on regulatory affairs in Europe.

It was noted that the ERC Decisions will be used as the basis of regulatory activity in Europe; the assumptions upon which the draft ERC is based may not be up-to-date.

Action (WG4):	to analyse the liaison statement from ERC (document 120) and propose a response to ERC.

WP-CDMA

The meeting received a detailed presentation on WP-CDMA technology (document 085). Delegates were invited to discuss the implications of this technology directly with the authors.

User Equipment Capabilities

The meeting noted document 59 and document 136 on the procedure for Definition of User Equipment Capabilities in 3GPP. It was noted that this issue was in an ad-hoc group of TSG-T, and a brief presentation of the output was presented. The report of the ad-hoc group will be circulated as a document if TSG-T.

Project Team support to 3GPP

The meeting noted document 99 - delegates were invited to make their opinions known to the Chairman

UMTS requirements documents for TSG RAN

The meeting considered document 158, a proposal to use UMTS 22.00 and 23.20 for the purpose of technical coordination among TSGs and WGs

Decision:	TSG RAN will take account of UMTS documents 22.00 and 23.20 in its work

Intellectual Property Rights

Document 152, an interim report of the UMTS IPR working group, was noted for information.

Documents not considered

Document 048 (T1) on deadlines for contributions was not presented.

Documents 98 and 134 (ARIB) on terminology was not presented.

Document 100 (Fujistu) was not submitted.

Document 137, a proposal to expand the Terms of Reference of 3GPP, was considered to be outside the Terms of Reference of TSG RAN.

Document 150, a proposal to form a 3GPP plenary, and document 151, a proposal to modify voting rights, were considered outside the Terms of Reference of TSG RAN.

Document 164, a liaison statement from SA on the adoption of baseline specifications, was not presented.

Closure of meeting

The incoming Chairman and Vice-Chairmen thanked the Convenor, Mr Sasaki, for his work in setting up TSG RAN.

The Convenor thanked the delegates for their positive contributions and declared the meeting closed.

Annex A: Approved Agenda

1. Opening of the meeting

2. Approval of the agenda

2bis. Working methods and document allocation

3. Election of Chair and Vice Chairs

4. Review of the 1st TSG meeting

5. Approval of modified Terms of Reference of TSG RAN

6. Report from Working Groups Convenors and ITU Ad Hoc Contact Person

   6.1 WG1

   6.2 WG2

   6.3 WG3

   6.4 WG4

   6.5 ITU Ad Hoc

7. Approval and common understanding of documents from working groups and ITU Ad Hoc, if any

8. Document structure and Numbering for TSG RAN and working methods

9. Consideration and approval of TSG RAN working schedule

10 Other business

Annex B: Terms of Reference of TSG RAN

TERMS OF REFERENCE
RADIO ACCESS NETWORK
Technical Specification Group
including revisions made at TSG#2, 2 to 4 February 1999

Background

Third generation mobile systems should be based on new wide band, multimode, flexible radio access. This approach will ensure that systems based on 3GPP specifications will be capable of rapid development and deployment of competitive service offerings while still enabling global roaming.

Terms of reference

The technical specification development work within 3GPP is accomplished by Technical Specification Groups (TSGs) according to the principles and rules contained in the Project reference documentation (Partnership Project Description, Partnership Project Agreement, Partnership Project Working Procedures).

In particular the TSGs report to the Project coordination Group (PCG), and may organize their work in Working Groups and liaise with other groups as appropriate.

Each TSG has the responsibility to develop, approve and maintain the specifications within its terms of reference.

The TSG **Radio Access Network** (TSG-R) is responsible for the radio access part, including its internal structure, of systems based on 3GPP specifications.

Specifically it has a responsibility for:

Terminal Equipment and UTRAN functions (FDD & TDD), requirements and interfaces. Management of work items placed under its responsibility.

More specifically, TSG-R will address the following areas of work:

- Radio Layer 1 specification;
- Radio Layer 2 specification;
- Radio Layer 3 RR specification;
- Iub specification (including logical O&M);
- Iur specification;
- Iu specification;
- UTRAN O&M requirements;
- Transport of implementation specific O&M between OMCB & node B
- Conformance test specifications for testing of all aspects of base stations;
- Specifications for radio performance and ~~protocol aspects from the system point of view~~RF system aspects.

Glossary of terms

CN	Core Network
FDD	Frequency Division Duplex
IP	Internet Protocol
O&M	Operations and Maintenance
QoS	Quality of Service
RR	Radio Resource
TDD	Time Division Duplex
UE	User Equipment
USIM	UMTS Subscriber Interface Module
UTRAN	Universal Terrestrial Radio Access Network
VHE	Virtual Home Environment

Annex C: Meeting schedule

TSG-RAN

1	December 7-8, 1998	Sophia Antipolis, France
2	March 2-4, 1999	Fort Lauderdale, USA
3	April 22-23, 1999 (may be extended)	Yokohama, Japan (may be changed)
4	June 30 – July 2, 1999	(may be changed)
5	September 29-October 1, 1999	(may be changed)
6	December 13-17, 1999	
(Joint TSG meeting is recommended to approve release 99 of the documents.)		

RAN WG1

1	January 21-22	Espoo, Finland
2	February 22-25	Yokohama, Japan
3	March 22-26	Host requested
4	April 19-21	same place with TSGR#3

RAN WG2

2	8 – 11 March 99	Stockholm, Sweden
3	13 – 16 April 99	Japan
4	25 – 28 May 99	TBD.
5	5 - 9 July 99	TBD.

RAN WG3

2	15-19 March	Stockholm, Sweden
3	26-30 April (Assuming RAN TSG meeting in the week before.)	Japan
4	31 May – 4 June	TBD
5	5 – 9 July	Helsinki, Finland
6	23 – 27 August	TBD

RAN WG4

3	29 - 31 March	Tokyo, Japan
4	10 - 12 May	Stockholm, Sweden
5	15 - 17 June	TBD
6	27 - 29 July	TBD
7	7 - 9 Sept	TBD
8	19 - 21 Oct	TBD
9	30 Nov - 2 Dec	TBD

Annex D: Agreed document structure

S0.01 Vocabulary for the 3GP RAN TSG

WG1 specifications

S1.01 Physical layer – general description

S1.02 UE capabilities

S1.11 Transport channels and physical channels (FDD)

S1.12 Multiplexing and channel coding (FDD)

S1.13 Spreading and modulation (FDD)

S1.14 Physical layer procedures (FDD)

S1.21 Transport channels and physical channels (TDD)

S1.22 Multiplexing and channel coding (TDD)

S1.23 Spreading and modulation (TDD)

S1.24 Physical layer procedures (TDD)

S1.31 Measurements

WG1 Technical reports

R1.01 Study Items

R1.02 Link level simulation results

R1.03 Items not considered for inclusion in Release 99

WG2 specifications

S2.01 Radio Interface Protocol Architecture

S2.02 Services provided by the physical layer

S2.03 UE functions and inter-layer procedures in connected mode

S2.04 UE procedures in Idle Mode

S2.21 Medium Access Control (MAC) protocol specification

S2.22 Radio Link Control (RLC) protocol specification

S2.31 Radio Resource Control (RRC) protocol specification

WG2 reports

R2.01 Guidelines and principles for protocol description and error Handling

R2.XX Radio Resource Management Strategies

WG3 specifications

S3.01 (UT)RAN Overall Description

S3.10 Iu Interface: General Aspects and Principles

S3.11 Iu interface Layer 1

S3.12 Iu interface signalling transport

S3.13 Iu interface RANAP signalling

S3.14 Iu interface data transport & transport signalling

S3.15 Iu interface CN-RAN user plane protocols

S3.20 Iur Interface: General Aspects and Principles

S3.21 Iur interface Layer 1

S3.22 Iur interface signalling transport

S3.23 Iur interface RNSAP signalling

S3.24 Iur interface data transport & transport signalling for CCH data streams

S3.25 Iur interface user plane protocols for CCH data streams

S3.26 Iur & Iub interface data transport & transport signalling for DCH data streams

S3.27 Iur & Iub interface user plane protocol for DCH data streams

S3.30 Iub Interface: General Aspects and Principles

S3.31 Iub interface Layer 1

S3.32 Iub interface signalling transport

S3.33 Iub interface RBAP signalling

S3.34 Iub interface data transport & transport signalling for CCH data streams

S3.35 Iub interface user plane protocols for CCH data streams

WG3 Reports

I3.01 (UT)RAN functions: Examples on signalling procedures

I3.02 Manifestations of handover and SRNS relocation

I3.03 WG3 Workplan and study items

WG4 Specifications

S4.01A MS Radio transmission and reception (FDD)

S4.01B BTS Radio transmission and reception (FDD)

S4.02A MS Radio transmission and reception (TDD)

S4.02B BTS Radio transmission and reception (TDD)

S4.03 RF parameters in support of Radio Resource Management

S4.11 Base station conformance testing (FDD)

S4.12 Base station conformance testing (TDD)

S4.13 Base station EMC

S4.14 Base station environmental (proposed)

WG4 Reports

R4.00 Introduction

R4.01 RF System scenarios

Annex E: Agreed input to ITU-R TG 8/1 on values for UTRA Key Characteristics

Technical Specification Group, Radio Access Network **TSGR#2(99)168**
Meeting #2, Fort Lauderdale, 2-4 March 1999 (Tdoc TSGR-AH1-99034)

Source: 3GPP TSG RAN
Title: Values for UTRA Key Characteristics
Document for: Approval
Agenda Item: 7

This document (revision of Tdoc TSGR#2(99)053) provides baseband and RF values for UTRA agreed by 3GPP TSG RAN WG1 and WG4 and subsequently discussed in TSG RAN for inclusion in the Key Characteristics of the IMT-2000 Radio Interface(s) being developed by ITU-R TG 8/1. The attached contribution is meant to be submitted to the next meeting of ITU-R TG 8/1 (Fortaleza, Brazil, 8-19 March 1999) by Individual Member.

[NATIONAL ADMINISTRATION OR ITU MEMBER][1]

UTRA BASEBAND AND RF KEY CHARACTERISTICS

1 INTRODUCTION

The formation of the Third Generation Partnership Project (3GPP) was reported to the last meeting of ITU-R TG 8/1 WG5 (Doc 8-1/WG5-028). This collaborative project is now fully operational. So far, five Organisational Partners have signed the Third Generation Partnership Project Agreement, namely: ARIB, ETSI, T1, TTA, TTC.

This document provides baseband and RF values for UTRA based on the current activity within 3GPP TSG RAN (which is the Radio Access Network Technical Specification Group whithin 3GPP responsible for the elaboration of the Specifications for the UTRA - Universal Terrestrial Radio Access).

[1] This contribution was developed in 3GPP TSG RAN

2 Baseband Key Characteristics

TABLE 2
Baseband Key Characteristics

#	Names of the Key Characteristics	Definitions	Values
1	**Multiple access technique**	**The multiple access technique allows multiple users to share transmission media without creating uncontrollable interference to each other. The multiple access techniques can be used individually or in a hybrid mode, for example, time, code and space multiplexing (TD/CD/SDMA).** Note: Different multiple access schemes usually employ different radio techniques. For example, CDMA commonly uses fast power control; and TD/CDMA typically uses joint detection. Similarly, SDMA generally employs adaptive beamforming.	FDD: DS-CDMA TDD: DS-CDMA/TDMA
2	**Chip rate**	**The rate at which information data is spread by pseudo random code modulation elements in a direct sequence CDMA system.** Notes: The transmitted signal bandwidth is a function of the chip rate. It has key impact on multipath signal delay resolution capability and the processing gain of DS-CDMA systems.	1.024, 4.096, 8.192, 16.384 Mcps Primary value: 4096 Mcps
3	**Frame structure**	Frame Structure is a specified portion of time slots. Frame structure has two important aspects, one of which is number of time slots in a frame and another one is frame length. • Number of time slots in a frame • Frame Length Note: The frame structure is a key characteristic of baseband system, since it may be affected by parameters such as multiple access scheme, duplexing scheme, power control, interleaver size and vocoder scheme.	**Number of time slots in a frame: 16** **Note: In FDD, a user normally transmits/receives on all 16 time slots.** Frame length: 10 ms
4	**Variable length**	A modification of a direct sequence spreading code that creates a family	FDD: UL 4-256, DL 4-512

	spreading factor	of orthogonal codes of variable length to support variable data rates in a DS-CDMA system. Notes: The use of orthogonal variable spreading codes enables implementation of data rates greater than 8-16 kbps with minimal complexity & performance impact.	TDD: 1-16 (Answers given for the 4.096 Mcps chip rate)
5	**Inter base station asynchronous/ synchronous operation**	System base stations whose relative time difference is determined and maintained to a very tight tolerance e.g., a chip period, by utilization of a common clock or timing source, are said to be synchronized. Asynchronous base stations may use a common timing source mainly for frequency stability purposes, but there is no requirement on the relative time difference between them. Notes: Synchronous systems are desirable for 2G/3G roaming within the same frequency band for existing 2G synchronized systems. Asynchronous systems facilitate multi-environment user roaming without accurate base station synchronization.	FDD: asynchronous or synchronous TDD: synchronous (at symbol level with respect to highest spreading factor), asynchronous possible
6	**Inter-user synchronization**	**A method used to synchronize all DS-CDMA user transmissions in a sector or cell at the base station receiver.** Notes: This can simplify many advanced DSP implementation requirements such as joint detection, beam-forming and software radio design. It can also decrease fast power control requirements and inter users interference with orthogonal codes. Inter-user synchronization is used only for CDMA.	Optional uplink synchronization
7	**Handover**	In general, handover is the process of transferring the mobile station's communication from one radio channel to another when the mobile is moving between sectors or between cells. Note: Handover is an essential element of a mobile telecommunications system as it permits mobility through the coverage area of the network. There are two types of handover - hard and soft, depending upon whether there are simultaneous connections to more than one base station during the handover process. . Soft handover has the benefit of allowing diversity combining of signals to enhance performance. Of particular importance when defining the handover mechanism are • the measurement method that triggers the handover, • whether the mobile station assists in the handover	**The following types of handover are supported:** - **Intra-system/intra-frequency handover:** **- Soft/softer handover** **- Hard handover** - **Intra-system/inter-frequency handover:** **- Hard handover** - **Inter-system handover:** **- Hard handover**

		process by performing measurements, or initiates the handover, and the messaging between the mobile station and base station during the course of the handover.	
8	**Channel coding and interleaving**	**Channel coding and decoding** is the process to introduce some redundancy in the information sequence in a controlled manner such that the redundancy can be used at the receiver to overcome the effects of noise and interference encountered in the transmission channel, thus increasing the reliability of the received data. Note: Channel coding techniques (e.g., convolutional codes, block codes, turbo codes) are essential in achieving low bit error ratios and/or coding gain. Turbo codes have recently been shown to improve system capacity and QoS for high data rate services. The components of a Turbo coder consist of recursive systematic coders and an interlever. The improvements resulting from Turbo codes are dependent on the design (generator polynomial) of the recursive systematic coders and interleaver matrix. **Interleaving and de-interleaving** is the process to permute the transmission sequences of coded bit stream prior to modulation and to reverse this operation following demodulation. It is used to separate and redistribute bursty errors over several codewords or constraint lengths for higher probability of correct decoding by codes designed to correct random errors. Note: Interleaving helps in randomizing error patters. The effectiveness of interleavers generally improves with size, representing a design trade-off with signal delay. The interleaver depth, to be effective, must be large compared with the mean duration of channel fades.	**Coding:** **Convolutional code with K=9, R=1/2, or 1/3** Turbo code with K=4 or K=3 **Interleaving:** Inter-frame interleaving (20/40/80 ms) Intra-frame interleaving (10 ms)
9	**Random access**	Random Access is the technique for multiple mobile stations to access radio channels without prior scheduling. Note: Because of the lack of pre-arrangement, collisions of the transmissions from different stations occur, at an average rate that depends on the traffic and re-transmission rules. An optimized random access design minimizes collisions among mobile stations, thereby throughput and reducing delay and interference.	FDD: Acquisition indication based random-access mechanism with power ramping on preamble followed by message TDD: Slotted ALOHA, 1 slot RACH (0.625 ms)
10	**Modulation**	The process of varying certain parameters of a digital code signal	FDD:

	(up-link and down-link)	(carrier), through digital signal processing, in accordance with a digital message signal, to allow transmission of the message signal through IF and RF channels, followed by its possible detection. Notes: Modulation is important because variation of the code signal parameters can impact QoS or lead to significant variations in system complexity.	Data modulation: UL dual channel QPSK, DL QPSK Spreading modulation: UL HPSK[2], DL QPSK TDD: Data modulation: QPSK Spreading modulation: QPSK
11	**Channelization code (up-link and down-link)**	Channelization codes are set of orthogonal codes used for spreading and identification of any other channels. Note: It is important in CDMA systems to minimize the interference between users and between channels in the cell in down-link and between channels of a user in up-link	Real OVSF (Orthogonal Variable Spreading Factor) codes
12	**Scrambling code (up-link and down-link)**	**Scrambling code is used in DS-CDMA systems to identify BTS or sector in down-link, and MS in up- link.** Note: It is important for multiple access system to correctly identify users.	FDD: DL: Complex code, 40960 chips (10 ms) segments from Gold codes. UL: Complex code, 40960 chips (10 ms) segments from Gold codes (long codes) or 256 chips extended S(2) codes (short codes). TDD: Complex codes, 16 chips long with phase-transition restrictions. (Answers given for the 4.096 Mcps chip rate)
13	**Pilot structure**	The system pilot is used for channel searching, estimation, acquisition, demodulation and can also be used to assist soft handover. It can also be used to implement fast power control and adaptive antenna technologies. The pilot can be continuous and code multiplexed, or periodic and time multiplexed. Notes: A pilot channel or pilot symbols provide a phase reference for coherent detection. It also provides a means for signal strength comparison between the base stations. This makes soft handover possible. The downlink pilot can either be common to all users in a cell or a sector, or dedicated to each traffic channel. The pilot channel structure can impact overall system capacity and performance.	FDD: Time-multiplexed dedicated pilot symbols, and time-multiplexed common pilot symbols on common control physical channel TDD: Time-multiplexed dedicated pilot sequence
14	**Detection (up-link and down-link)**	The process performed by the receiver to recover the original signal in the presence of channel degradation and to transform the detected signal back to a digital signal. Notes: There are two common methods of detection. Coherent	Coherent detection Joint-detection/Multi-user-detection supported

[2] In 3GPP Specifications HPSK is described as part of the scrambling.

		detection requires a reference waveform to be generated at the receiver that is matched in frequency and phase to the transmitted signal. When a phase reference can not be maintained, noncoherent detection is used. Most radio transmission technologies use coherent detection for both forward link and reverse link, which significantly increases the capacity for these systems and differentiates them from 2G systems. **Joint detection** is used to coherently detect the data in CDMA and TDMA time slots that are spread with a limited number of CDMA codes to cope with multipath propagation effects at the MS and BS and improve overall performance. **Multi-user detection** involves the joint detection of all users in a cell. This technique significantly helps in reducing intracell interference and thereby increases the capacity of the reverse link. The implementation of multiuser detection will have an impact on the base station receiver complexity and architecture.	
15	**Power control (up-link and down-link)**	The adjustment of the transmitted power in order to keep the received power from each station in a multiple-access communication system at the minimum power required to maintain a given QoS. Note: Such a strategy maximizes overall system capacity.	FDD: Closed loop power control on dedicated channels Open loop and optional closed loop power control for random-access channels TDD: Open or closed loop power control on dedicated channels Open loop power control for random-access channel
16	**Variable data rate (up-link and down-link)**	**A feature that adapts the instantaneous transmission rate on a specific traffic channel to the instantaneous amount of data to be transmitted in accordance with the demands of a data source or the propagation conditions.** **Symmetric/asymmetric data rate** The capability of a system to operate with equal (symmetric) or different (asymmetric) data rate on the downlink and uplink in order to support symmetric or asymmetric uplink/downlink traffic. Note: The efficient support of asymmetric rate allows for optimal usage of the radio resources, resulting in higher overall system capacity when the users' traffic is mixed, i.e., both symmetric and asymmetric.	-Different data rates supported with: - Variable spreading factor - Multi-code - Multi-slot (TDD only) - Code puncturing - Unequal repetition - DTX (FDD DL and TDD DL & UL) - Rate can change on frame-by-frame basis - UL/DL data-rate asymmetry supported - Overall UL/DL asymmetry supported with TDD
17	**Diversity**	**Diversity is the process by which several replicas of the same information-bearing signal are transmitted and received**	**– Time diversity**

		over multiple channels that exhibit independent fading. **Note: There is a good likelihood that at least one or more of the received signals will not be in a fade at any given instance in time, thus providing adequate signal level to the receiver with reasonable transmitted power. Diversity techniques seek to generate and exploit multiple branches over which the signal shows low fade correlation. To obtain the best diversity performance, the multiple access scheme, modulation, coding and antenna design must all be carefully chosen so as to provide a rich and reliable level of well-balanced, low correlation diversity branches in the propagation environment. Successful exploitation of diversity leads to:** reduced power requirements increased coverage improved battery life improved voice quality and handover performance.	**– Frequency diversity** **– Multi-path diversity** **– Antenna diversity** **– Transmit diversity, both open loop and closed loop, for FDD mode** **– Selective transmit diversity for TDD mode** **- Relaying diversity (ODMA in TDD)** **- Macro-diversity**
18	**Adaptive equalizer**	Time varying channel dispersion due to multipath propagation can cause inter-symbol interference, resulting in increased Bit Error Ratio (BER) or dropped calls on wireless communication systems. Active equalization is the process of reducing inter-symbol interference in a communication system by real-time adjustment of a filter that compensates for a time-varying multipath channel. Note: Adaptive equalization is essential for Time Division Multiple Access (TDMA) communication systems to meet the high data rate service requirements of IMT-2000, such as high spectral efficiency and reasonable costs for outdoor macrocellular environments. Adaptive equalization can also be utilized to increase TDMA system capacity. The effectiveness of adaptive equalization depends on the time-rate of change of the channel characteristics in comparison to the signal characteristics.	Not needed
19	**Dynamic Channel Allocation**	DCA is the assignment of channels in real-time, in accordance with observed traffic/interference conditions, as opposed to a prearranged	FDD: Supported (dynamic assignment to carriers) TDD:

		channel assignment. DCA avoids planning of the radio channels and is required for uncoordinated systems sharing the same frequency band.	- Supported (dynamic assignment to carriers/time-slots) - ODMA (Opportunity Driven Multiple Access)
20	**Duplexing Scheme**	The duplexing scheme is the method by which the transmitter and the receiver share the limited sources, such as time and frequency. This can be achieved through the use of frequency (Frequency Division Duplexing – FDD) and time (Time Division Duplexing – TDD).	FDD or TDD
21	**Multicarrier**	Muticarrier is a method to allow one transceiver to receive or transmit several carriers simultaneously. Note: Muticarrier can give flexibility of system planning and give backward compatibility, it also can help to easily use many new technologies.	Multi-carrier is not used

3. RF Key Characteristics

TABLE 1

RF Key Characteristics

	Name of Key Characteristic	Definition[3]	remarks[4]	List of proposed values[5]	
				Mobile Station Value	Base Station Value
	Transmitter characteristics	The transmitter characteristics are specified at the antenna connector of the equipment. If there is no antenna connector, appropriate measuring mechanism should be defined. For example antenna emission power can be measured at the test site or at the RFCD (Radio-Frequency Coupling Device) calibrated at the test site.	Modified definition		

[3] Editor's note: The columns 'Name of Key Characteristic' and 'Definition' are quite stable and are to be frozen.

[4] Editor's note: This column is for information purpose only and will be deleted at 16th TG8/1 meeting.

[5] Editor's note: The column 'List of proposed values' is a compilation of input contributions at WG-5 meeting in Malaysia. Some of the definition of 'RF key characteristics' were changed during the meeting. The listed values in these columns were proposed based on the definitions in Doc. 8-1/TEMP/126. Therefore, the listed values in this column may not be consistent to the revised definition of the 'RF key characteristics.'

	Transmit power				
1.1	Power classes (A1.2.16)[6]	The power classes define the maximum average output transmitter power level, measured over a unit time. The power classes together with the service type (bit rate, QoS etc.) define the coverage. An operator can use this for planning its network. For multi-standard terminals the highest power class level that needs to be supported will set the power amplifier requirements. The accuracy of the power may depend on appropriate regional regulations.	New definition	Power classes are being discussed in the range 0-33 dBm. One class of 21 dBm is identified.	<= 43 dBm
1.2	Dynamic range (A1.2.22.3)	The output power dynamic range is the difference between the maximum and the minimum transmitted power for a specified reference condition.	No change	the minimum specified transmit power is -44dBm/ 4.096 MHz	for FDD: >= 18 dB for TDD: >= 30 dB
1.3	Power Control Steps (A1.2.22.1)	The power control step is the minimum step change in the transmitter output power in response to a power control command.	No change	for FDD: 1 dB for TDD: 1-3 dB	for FDD: 1 dB for TDD: 1-3 dB
1.4	Frequency stability (A1.4.1)	The ability of mobile and base station to maintain the transmission frequency at the assigned carrier frequencies.	New definition	+/- 0.1 ppm (locked to the system)	+/- 0.05 ppm
	Output RF spectrum emissions				

[6] Editor's note: Notation (A1.X.Y.Z) indicates reference attribute of Annex-1 of Recommendation ITU-R M.1225. The reference would be deleted when draft new recommendation IMT.RKEY is finalized.

1.5	3 dB Bandwidth (A1.2.5)	Bandwidth is the frequency range of the transmitter power per RF channel measured at the 3 dB down points.	Modified definition	Exactly equal to chip rate: 4.096 MHz (8.192 MHz and 16.384 MHz for the higher chip rates)	Exactly equal to chip rate: 4.096 MHz (8.192 MHz and 16.384 MHz for the higher chip rates)
	Out of band emissions (A1.4.2)		Merged into item 1.7		
1.6	Adjacent Channel Leakage power ratio *[Editor's Note: Prior name was Adjacent Power Protection.]*	Adjacent channel leakage power is the interference power at adjacent channels that are outside the assigned channel and is defined as the power that is radiated within a specified bandwidth. Adjacent channel leakage power ratio is the ratio of the leakage power and total radiation power. Note: The modulation and power level switching spectra can produce significant interference in the adjacent channel bands. The effects on the spectrum due to continuous modulation spectrum and due to the switching transient spectrum do not occur at the same time.	New name New definition	ACLR= 30-40dBc (5MHz offset) Next ACLR=40-50dBc (10 MHz offset) (considering the 3dB bandwidth) (work is continuing to define a single value)	ACLR= 45-55 dBc (5MHz offset) Next ACLR= 55-65 dBc (10MHz offset) (considering the 3dB bandwidth) (work is continuing to define a single value)
1.7	Out of band and Spurious emissions (A1.4.2)	Out of band and Spurious emissions are the emissions at frequencies that are outside the assigned channel, as a function of frequency offset.	Merged item Modified definition [7]	Requirements will be based on applicable tables from Recommendation ITU-R SM.329. Local radio regulatory agencies would also establish emission limits (e.g. FCC in the U.S., ERC in Europe, Japanese regulatory Body)	Requirements will be based on applicable tables from Recommendation ITU-R SM.329. Local radio regulatory agencies would also establish emission limits (e.g. FCC in the U.S., ERC in Europe, Japanese regulatory Body)

[7] Editor's note: It should be noted that the draft new Rec. IMT.TERM would define this characteristic for mobile stations. In order to keep consistency among ITU Recommendations, the next TG 8/1 meeting should check this observation.

1.8	Transmit linearity requirements (A1.4.10)	Transmit linearity characterizes the linear and broadband transmitter power amplifier requirements to meet spurious and out of band emissions. This is primarily characterized by peak to average power ratio (A1.2.11) which dictates the power amplifier backoff from the saturation point.	Modified definition	Characterized by ACLR (see 1.6 above)	Characterized by ACLR (see 1.6 above)
1.9	Standby RF output power	Standby RF output power is the nominal Mobile Station RF power output while in idle state.	New item[8]	Emission limits established by local radio regulatory agencies generally apply (e.g. FCC in the U.S., ERC in Europe, Japanese regulatory Body)	N/A
	Receiver characteristics				

[8] Editor's note: Keep this item to invite contributions for next TG 8/1 meeting.

2.1	Reference sensitivity	The RF sensitivity is the minimum receiver power measured at the antenna port at which the FER/BER does not exceed the specified values. The parameter will therefore depend on the bit rate and QoS requirement, but also implementation factors such as Noise Figure (NF) according to the following equation: $P_{Rx\ Sens} = kT \cdot NF \cdot \frac{E_b}{N_0} \cdot R_b$ where kT is the thermal noise density –174 dBm/Hz, NF is the receiver noise figure, Eb/N0 is the receiver information bit energy to noise density threshold (at the given QoS) and Rb is the information bit rate. Since Eb/N0 and Rb (andf hence PRx Sens) will vary with the service, it is only NF that can be considered a key RF parameter. PRx Sens will set the coverage for an unloaded traffic case. If different noise figures are used in different radio interfaces, then the lowest noise figure applies for a multi-mode terminal implementation.	Modified name and definition	-117dBm for 12.2kbps measurement channel	Based on NF <= 5 dB (nominal) for normal BTS, higher NF for micro and pico BTS
2.2	Receiver dynamic range (A1.4.12)	The difference, in decibels, between the overload level and the minimum acceptable signal level in a transmission system.	Modified name and definition	Maximum level: –25 dBm	>= 30dB

2.3	Intermodulation sensitivity (A1.4.11)	The intermodulation sensitivity is the receiver's ability to receive a signal on its assigned channel frequency in the presence of two interfering RF signals. These RF signals are separated from the assigned channel frequency and from each other such that the third order mixing of the two interfering RF signals can occur in the non-linear elements of the receiver, producing an interfering signal in the band of the desired signal. The receiver performance is measured by the frame error rate or bit error rate. *[clarification to the definition: this applies to in-band interference signal]*	Modified name and definition was changed.	The level of the interfering signal : -46dBm	The exact specifications are yet to be defined.

2.4	Spurious response and Blocking	The spurious response and receiver blocking level are the signal level that causes the receiver to mute due to interferering RF signals. Receiver blocking level is generally not sensitive to frequency differences between the out of band signal and the receive center frequency.	Modified name and definition	In-band blocking: -44dBm (over 15MHz offset) (the coexistance with other systems should be considered)	(the coexistance with other systems should be considered)
2.5	Adjacent channel selectivity	Adjacent channel selectivity is the receiver ability to receive a desired signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the center frequency of the assigned channel. Receiver selectivity performance is measured at a specific frame error rate or bit error rate.	Modified definition [9]	>= 48dB for 12.2kbps measurement channel (the optimum value is currently under investigation)	>= 48 dB for 12.2kbps measurement channel (the optimum value is currently under investigation)
	Other characteristics				
3.1	Diversity techniques (A1.2.23)	[Diversity, as applied to the RF front-end, would imply combining or transmitting independent replicas of the same signal in space or time.] Note: IMT-2000 should not preclude the use of diversity schemes.	Modified definition	Time diversity Space diversity (optional) Frequency diversity ODMA can provide path diversity in TDD mode	Time diversity Space diversity Frequency diversity Macro diversity Transmitter diversity (optional) ODMA can provide path diversity in TDD mode

[9] Editor's note: Keep this item to invite contributions for next TG 8/1 meeting.

3.2	Smart antennas (A1.3.6)	[Smart antenna is an advanced antenna technology composed by an antenna array and beamformed in baseband data processing.] Note: IMT-2000 should not preclude the use of smart antennas. [Smart antenna is one of main features to enhance QoS and to reduce complexity.]	Modified definition	Supported both in the up- and down link through dedicated pilots (optional).	Supported both in the up- and down link through dedicated pilots (optional).
3.3	Minimum operating bandwidth (A1.2.1 & A1.2.4)	Minimum operating bandwidth is characterised by RF channel spacing (A1.2.4) and the minimum bandwidth for deployment (A1.2.1).	Modified name and definition	FDD: Uplink 1920-1980 MHz, Downlink 2110-2170 MHz TDD: 1900-1920, 2010-2025 MHz. Deployment of TDD in the 1920-1980 MHz band is an open item. Operation in other bands is not precluded. Operating bandwidth: FDD 2x5 MHz or more, TDD 1x5 MHz or more.	FDD: Uplink 1920-1980 MHz, Downlink 2110-2170 MHz TDD: 1900-1920, 2010-2025 MHz. Deployment of TDD in the 1920-1980 MHz band is an open item. Operation in other bands is not precluded. Operating bandwidth: FDD 2x5 MHz or more, TDD 1x5 MHz or more.

Annex F: Agreed input to ITU-R on Radio Interface Specifications for IMT-2000

Technical Specification Group, Radio Access Network **TSGR#2(99)169**
Meeting #2, Fort Lauderdale, 2-4 March 1999 (Tdoc TSGR-AH1-99035)

Source: TSG RAN
Title: Radio Interface Specifications for IMT-2000
Document for: Approval
Agenda Item: 7

The attached contribution is intended to be submitted to the next meeting of ITU-R Task Group 8/1 (Fortaleza, Brazil, 8-19 March 1999) by Individual Member.

Task Group 8/1 is defining the Recommendations for International Mobile Telecommunications 2000 (IMT-2000). The work of Task Group 8/1 is at a critical point. At its Brazil meeting it plans to finalise its Recommendation on "Key Characteristics for the IMT-2000 Radio Interfaces (IMT.RKEY)", and to lay the foundations for the detailed IMT-2000 radio interface specifications in its Preliminary Draft New Recommendation "Detailed Specifications of the Radio Interfaces of IMT-2000 (IMT.RSPC)", due for completion in November 1999.

This is therefore an opportune, perhaps unique, time for 3GPP to guide and steer the work of Task Group 8/1. Even material of a preliminary nature will be extremely valuable.

This contribution provides the draft radio interface specifications structure for UTRA, for submission to ITU-R Task Group 8/1 as an example to facilitate the development of the IMT-2000 Radio Interface Recommendation IMT.RSPC.

The contribution proposes that the 3GPP structure for the radio interface specifications be adopted as a basis for the structure of ITU-R's Preliminary Draft New Recommendation "Detailed Specifications of the Radio Interfaces of IMT-2000 (IMT.RSPC)".

3GPP is encouraged to support the work of ITU-R Task Group 8/1 by providing as much specification material as possible, perhaps extending to the scopes and even detailed content of the specification items included here.

[NATIONAL ADMINISTRATION OR ITU MEMBER][10]

RADIO INTERFACE SPECIFICATIONS FOR IMT-2000

1 INTRODUCTION

This document provides draft radio interface specifications for UTRA, based on the current activity within 3GPP TSG RAN. These are submitted to ITU-R Task Group 8/1 to facilitate the development of the Preliminary Draft New Recommendation "Detailed Specifications of Radio Interfaces of IMT-2000 (IMT.RSPC)".

It is recognized that not all Specifications listed in this document may be relevant for ITU-R TG 8/1. However, 3GPP TSG RAN believes it would be helpful as a basis for discussion in TG 8/1 to contribute with the complete set of Specifications structure. 3GPP is developping a complete set of Specifications for the Radio Access Network including signalling.

The information is preliminary, a more complete version will be available in April 1999.

The purpose of the contribution is to indicate the structure that 3GPP is using to develop its specifications for the radio interfaces, which has now been accepted by SDOs in all 3 regions. In Section 2 the 3GPP RAN TSG specification structure is shown, and in Appendix A the most recent version of the S1 and S2 specifications can be found. These specifications shows the present detailed level and status of the work performed in 3GPP RAN TSG today. It is proposed that this structure is adopted as a basis for the structure of the Preliminary Draft New Recommendation "Detailed Specifications of Radio Interfaces of IMT-2000 (IMT.RSPC)", with incorporation of material to an appropriate level of detail to be determined by ITU-R Task Group 8/1.

2 Radio interface specifications structure

S1

S1.01 Physical layer – general description

S1.02 UE capabilities

S1.11 Transport channels and physical channels (FDD)

S1.12 Multiplexing and channel coding (FDD)

S1.13 Spreading and modulation (FDD)

S1.14 Physical layer procedures (FDD)

S1.21 Transport channels and physical channels (TDD)

S1.22 Multiplexing and channel coding (TDD)

S1.23 Spreading and modulation (TDD)

S1.24 Physical layer procedures (TDD)

10 This contribution was developed in 3GPP TSG RAN

S1.31 Measurements

S2

S2.01 Radio Interface Protocol Architecture

S2.02 Services provided by the Physical Layer

S2.03 UE functions and Interlayer Procedures in Connected Mode

S2.04 UE functions related to Idle Mode

S2.21 Medium Access Control (MAC) Protocol Specification

S2.22 Radio Link Control (RLC) Protocol Specification

S2.31 Radio Resource Control (RRC) Protocol Specification

S3

S3.01 (UT)RAN Overall Description

S3.10 Iu Interface: General Aspects and Principles

S3.11 Iu interface Layer 1

S3.12 Iu interface signalling transport

S3.13 Iu interface RANAP signalling

S3.14 Iu interface data transport & transport signalling

S3.15 Iu interface CN-RAN user plane protocols

S3.20 Iur Interface: General Aspects and Principles

S3.21 Iur interface Layer 1

S3.22 Iur interface signalling transport

S3.23 Iur interface RNSAP signalling

S3.24 Iur interface data transport & transport signalling for CCH data streams

S3.25 Iur interface user plane protocols for CCH data streams

S3.26 Iur & Iub interface data transport & transport signalling for DCH data streams

S3.27 Iur & Iub interface user plane protocol for DCH data streams

S3.30 Iub Interface: General Aspects and Principles

S3.31 Iub interface Layer 1

S3.32 Iub interface signalling transport

S3.33 Iub interface RBAP signalling

S3.34 Iub interface data transport & transport signalling for CCH data streams

S3.35 Iub interface user plane protocols for CCH data streams

S4

S4.01A MS Radio transmission and reception (FDD)

S4.01B BTS Radio transmission and reception (FDD)

S4.02A MS Radio transmission and reception (TDD)

S4.02B BTS Radio transmission and reception (TDD)

S4.03 RF parameters in support of Radio Resource Management

S4.11 Base station conformance testing FDD

S4.12 Base station conformance testing TDD

S4.13 Base station EMC[11]

3 Proposals

- The ITU's Preliminary Draft New Recommendation "Detailed Specifications of the Radio Interfaces of IMT-2000 (IMT.RSPC)" should complement, not subsume, standards developed by external SDOs and partnership projects. RSPC should incorporate appropriate SDO and partnership project material, preferably by reference.

- Radio interface specifications based on material developed by the SDOs would seem to offer the best opportunity for the ITU. This would enable successful and timely completion of IMT.RSPC, bearing in mind the considerable amount of detailed specification already undertaken within the SDOs and partnership projects, the ambitious timescales for completion of RSPC, the availability of expert resources and the intention of some countries to deploy IMT-2000 by 2001.

- Task Group 8/1 is encouraged to review and adopt this radio interface specification structure as a basis for the Preliminary Draft New Recommendation "Detailed Specifications of the Radio Interfaces of IMT-2000 (IMT.RSPC)".

APPENDIX A:

The most recent version of the S1, S2, and S4 specifications developed within the 3GPP RAN TSG.

[www.3gpp.org/Documents/TSG_RAN/TSG_RAN/TSGR_02/Docs/pdfs

[11] This Specification does not include the antenna port immunity and emissions.

S1 docs: 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 135

S2 docs: 142, 143, 144, 145, 146, 147, 148

S4 docs: 114, 115, 119, 117]

Annex G: Agreed work plan for TSG RAN

1 Revision handling of the specifications

The specifications in this work plan are version numbered according to a three digit numbering system. The first digit is increased when a new version is approved by the RAN TSG. The second digit is increased when a new version is approved by a Working Group. The third digit is increased after every new version released by the editor. For example, version V0.0.1 is the first version of a specification created by the editor. Version V0. 1.0 is the first version approved by a Working Group and version V1.0.0 is the first version approved by the RAN TSG. For each new version the history sheet of the specification shall incooperate a list of the stable and agreed parts of the specification. We also propose that the first digit also has the following meaning:

- V1.0.0 is a Draft Specification. The Draft Specification should be approved by the RAN TSG. A Draft specification does not need to be complete, but it should be clearly marked in the specification what is stable and agreed and what is not stable and not agreed. For the items that are stable and agreed the change requst procedure applies.

- V2.0.0 is the First Complete specification. The First Complete Specification should be approved by the RAN TSG. For a First Complete Specification the change request procedure applies

- V3.0.0 is the Release 99 of the 3GPP RAN Specifications.

Note 1: According to the time plan agreed at the 3GPP RAN TSG#1 meeting all specifications should at least be in version V1.0.0 in April 1999.

Note 2: According to the time plan agreed at the 3GPP RAN TSG#1 meeting all specifications should be in version V3.0.0 in December 1999.

Note 3: It is not necessary to have a Specification in version V1.x.y before it becomes a version V2.0.0 Specification.

Note 4: It is not necessary to have a Specification in version V2.x.y before it becomes a version V3.0.0 (Release 99) Specification.

Note 5: The version number method should be aligned with the other 3GPP TSG, therefore the definitions above may change.

2 Specifications and Milestones

In the 3GPP RAN TSG#1 meeting we had an input on specification structure, TSGR#1(98)003. The working groups has more or less adopted that documentation structure. The list below is the specifications proposed by the working groups. We have added one specification, S0.01 – Vocabulary for the 3GPP RAN TSG, which we propose that the RAN TSG has the responsible for. The working groups has also made plans for detailed work for each specification. In the table below we have only included a proposal for when the RAN TSG should approve the specifications.

Responsible Group	**Specification and tasks**	**RAN#1**	**RAN#2**	**RAN#3**	**RAN#4**	**RAN#5**	**RAN#6**
RAN	S0.01 – Vocabulary for the 3GPP RAN TSG			1		2	3
WG1	S1.01 – Physical layer general description			1		2	3
WG1	S1.02 – UE capabilities			1		2	3
WG1	S1.11 – Transport channels and physical channels (FDD)			1		2	3
WG1	S1.12 – Multiplexing and channel coding (FDD)			1		2	3
WG1	S1.13 – Spreading and modulation (FDD)			1		2	3
WG1	S1.14 – Physical layer procedures (FDD)			1		2	3
WG1	S1.21 – Transport channels and physical channels (TDD)			1		2	3
WG1	S1.22 – Multiplexing and channel coding (TDD)			1		2	3

WG1	S1.23 – Spreading and modulation (TDD)			1		2	3
WG1	S1.24 – Physical layer procedures (TDD)			1		2	3
WG1	S1.31 – Measurements			1		2	3
WG2	S2.01 – Radio Interface Protocol Architecture			2			3
WG2	S2.02 – Services Provided by the Physical Layer			1	2		3
WG2	S2.03 – UE Functions and Inter-layer procedures in Connected Mode			2			3
WG2	S2.04 – UE procedures in Idle Mode			1		2	3
WG2	S2.21 – Medium Access Control (MAC) Protocol Specification			2			3
WG2	S2.22 – Radio Link Control (RLC) Protocol Specification			1	2		3
WG2	S2.31 – Radio Resource Control (RRC) Protocol Specification			1		2	3
WG3	S3.01 – RAN Overall Description			1		2	3
WG3	S3.10 – Iu Interface: General Aspects and Principles			1		2	3
WG3	S3.11 – Iu interface Layer 1			2			3
WG3	S3.12 – Iu interface signalling transport			2			3
WG3	S3.13 – Iu interface RANAP signalling			1			3
WG3	S3.14 – Iu interface data transport & transport signalling			2			3
WG3	S3.15 – Iu interface CN-RAN user plane protocols			1		2	3
WG3	S3.20 – Iur Interface: General Aspects and Principles			1		2	3
WG3	S3.21 – Iur interface Layer 1			2			3
WG3	S3.22 – Iur interface signalling transport			2			3
WG3	S3.23 – Iur interface RNSAP signalling			1			3
WG3	S3.24 – Iur interface data transport & transport signalling for CCH data streams			2			3
WG3	S3.25 – Iur interface user plane protocols for CCH data streams			1		2	3
WG3	S3.26 – Iur & Iub interface data transport & transport signalling for DCH data streams			2			3
WG3	S3.27 – Iur & Iub interface user plane protocol for DCH data streams			1		2	3
WG3	S3.30 – Iub Interface: General Aspects and Principles			1		2	3
WG3	S3.31 – Iub interface Layer 1			2			3
WG3	S3.32 – Iub interface signalling transport			2			3
WG3	S3.33 – Iub interface RBAP signalling			1			3
WG3	S3.34 – Iub interface data transport & transport signalling for CCH data streams			2			3
WG3	S3.35 – Iub interface user plane protocols for CCH data streams			1		2	3
WG4	S4.01A – MS Radio transmission and reception (FDD)			1		2	3
WG4	S4.01B – BTS Radio transmission and reception (FDD)			1		2	3
WG4	S4.02A – MS Radio transmission and reception (TDD)			1			3
WG4	S4.02B – BTS Radio transmission and reception (TDD)			1			3
WG4	S4.03 – RF parameters in support of radio resource management			1		2	3
WG4	S4.11 – Base station conformance testing (FDD)			1		2	3
WG4	S4.12 – Base station conformance testing (TDD)			1			3
WG4	S4.13 – Base station EMC			1		2	3

Table 1: List of RAN Specifications to be written by the 3GPP RAN TSG and its Working Groups. The 1st column indicate which group that has the responsiblity to write the specification (the RAN TSG should approve all specifications). The 2nd column is a list of all specifications to be written. The last columns are deadlines for the RAN TSG approval of the specifications, i.e., at which RAN TSG meeting the specification should be approved. In the last columns a "1" means that a version V1.0.0 (Draft Specification) should be approved, a "2" means that a version V2.0.0 (First Complete Specification) should be approved by RAN TSG, a "3" means that a version V3.0.0 (Release 99) should be approved by RAN TSG.

Annex H: Release 99 functionality

TSG-Radio Access Network meeting #2 *TSGR#2(99)167(modified)*
Fort Lauderdale, Florida, USA 2th - 4th January 1999

Source: Drafting Group
Title: Proposal of working procedures related to items for Release 99

To meet the milestone of a complete specification ready in 3GPP RAN in December 1999, i.e. Release 99, it is important to define detailed work plans including milestones. This has been done in the RAN Working Groups as well as in the RAN TSG. To be successful in fulfilling the milestones according to the work plans it may at times be necessary to move some functionalities from Release 99 to later releases (it is expected that the 3GPP RAN will produce yearly releases). However, the

B

items that may be moved to later release should not be part of functionalities necessary for a basic system to work. Therefore we propose the following procedure for the work in RAN TSG and its Working Groups:

1) When a Working Group comes to a milestone according to its work plan, two situations may arrise:
   1.1) The milestone is completed according to the work plan: Goto 3
   1.2) The milestone is not completed: Goto 2

2) Identify whether the missing item(s) to fulfil the milestone (note that for an internal Working Group Milestone, i.e. the X or * in the Working Group work plans, the milestone may be shifted under condition it does not delay the availibility of the RAN TSG specification completion milestones, that is approval of version V2.0.0 or version V3.0.0 Specifications).)[12] is essential for the basic functionlity of RAN or not, and:
   2.1) If the missing item(s) is not essential for the basic functionality, move the item(s) to a later release and put this information in a report "Study Items for Future Releases", keep the rest of the material related to the milestone: Goto 3.
   2.2) If the missing item(s) is essential to the basic functionality of RAN the working groups should as soon as possible resolve the situation. This can be done either by organising an Ad Hoc meeting for the identified subject or by having a vote (voting only in situations when two or three alternatives are competing and consensus cannot be found). Goto 3.

3) Approve the items related to the milestone

Annex J: Agreed Liaison statement to TSG-T regarding the Service Development Process

Technical Specification Group, Radio Access Network *TSGR#2(99)165*
Meeting #2, Fort Lauderdale, 2-4 March 1999

Source:	**TSG RAN**
Title:	**Answer to the LS regarding Service Development Process**
To:	**TSG-T**
Cc:	**TSG S, TSG N**

TSG RAN thanks TSG T for its liaison on Service Development Process. TSG RAN from its perspective has discussed the issue and came to an agreement with the current view detailed in the document because it is corresponding to the current working methodology applied in TSG RAN.

Annex K: Chairmen and Vice Chairmen of TSG RAN and its working groups

TSG RAN:

Chairman: Mr Yukituna Furuya (NEC Corporation)
Vice Chairmen:
Mr Donald Zelmer (BellSouth Cellular)
Mr François Courau (Alcatel)

RAN WG1

Chairman: Mr Antti Toskala (Nokia)
Vice-Chairman: Mr Takehiro Nakamura (NTT DoCoMo)

RAN WG2

Convenor: Mr Denis Fauconnier (Nortel Networks (Europe))

RAN WG3

Convenor: Mr Per Willars

RAN WG4

Chairman: Mr Howard Benn (Motorola)
Vice Chairman: Mr Fukuda

Annex L: Organisation of the work within RAN and between RAN and other TSGs

TSG-RAN #2 *TSGR#2(99)173*
Fort Lauderdale, USA, 2nd to 4th March 1999

Agenda Item: 8

Source: **RAN and RAN WG Chairmen and Convenors**

Title: Organisation of the work within RAN and between RAN and other TSGs

Document for: Approval

There has been discussions on how to handle subjects which are across several RAN Working Groups i.e. the RAN "system aspects". Also, the interactions with other TSGs e.g. TSG SA, need to be considered also. This document reflects the result of the discussions that took place between the Chairmen and Convenors of TSG RAN and TS RAN WGs.

The global principles which have been proposed are summarised below:

- The responsibility for the co-ordination of the work on UTRAN will be done in TSG RAN plenary meetings. Activities can take place between meetings using the e-mail reflector in order to progress between meetings, but actual technical discussions can also take place during TSG RAN plenary.
- The work will follow a top down approach, coming from service requirements, the into RAN system global requirements, and then go down the layers until physical layer requirements.
- Initial requirements being expressed from the highest level - i.e. service requirements - and will come typically from TSG SA that will input these requirements to RAN plenary. The conversion between service requirement into technical requirements for UTRAN will be done either by TSG RAN, or will be allocated by TSG RAN onto one WG. Whether TSG RAN keeps responsibility or whether this will be allocated to a WG depends on the type of subject: if it is clear that one WG has a leading role in one subject - e.g. EMC specification - then he should be handed responsibility for the progress on the work, whereas if the subject is equally spanning multiple WGs, then it should remain under the global responsibility of TSG RAN.
- When TSG RAN assumes global responsibility to one subject, it can allocate second responsibility to another WG where eventual between RAN meeting discussions can take place.
- It is possible that a subject shifts responsibility in time from one WG to another one because the necessary work in one WG has been basically completed, and the work must continue in another WGs.
- The documentation numbering should be independent on the WG in which the work was initiated, so as to allow evolution in terms of merging or deletion of WGs.

Based on these principles, the following changes or details on work organisation between the WGs are proposed to be endorsed:

<u>Radio Resource Management (RRM) specifications</u>

- RRM covers the following subjects:
  - Handovers (RRC connection mobility)
  - Dynamic Channel Allocation
  - Radio Link failure
  - Power management
- WG2 is responsible for defining the RRM strategies which need to be supported by the UTRA protocols. For this, WG2 will study the requirements coming from TSG SA. WG2 will produce an Technical Report titled "RRM strategies" which will describe the supported strategies for the UTRA protocols, and also describe examples of algorithms for these strategies.

- WG2 provides the results on the RRM strategies to the other TSG RAN WGs so that they specify the required functions in their specifications.
- WG1 is responsible for the necessary measurements in support of the upper layer procedures based on requirements from WG2.
- WG2 is responsible for defining the handover strategies and the necessary procedures which shall be defined as modular - i.e. tool box principle - . Handover strategies includes "rescue" handovers but also "traffic/capacity" handovers.
- WG3 is responsible for the network interfaces (Iu, Iub, Iur)
- WG4 is responsible for the study of RF scenarios. This study should identify typical scenarios with the associated relevant figures - e.g. number of cells which can/need be monitored, number of radio paths, speed of variation of the channel, usefulness of link adaptation, etc -. WG4 is also responsible for defining the RF measurements necessary accuracy.

Mandatory/optional features

- What is mandatory and what is optional as a support is written in the corresponding interface specifications - e.g. WG1 documents for physical layer specifications, in RRC protocol specification, in Iub interface specification for the minimum Node B support.

Inter-layer procedures and interactions between WG2 and WG3

- Inter-layer procedures are captured in S2.03 under the responsibility of WG2. It may be necessary to split S2.03 in two documents - i.e. one document on states and state transitions, and one document on inter-layer procedures -. This is addressing the procedural level, but does not address the protocol details - e.g. the measurement report parameters are not in S2.03, but should be in the RRC protocol specification and physical layer measurement document. S2.03 allows to ensure the consistency between the radio interface specifications under WG2 and the network interface specifications (Iu, Iub and Iur) under WG3.

Interactions between WG1 and WG2

- The process between WG1 and WG2 is iterative, WG2 placing requirements to WG1, but also WG1 guiding WG2 on what is reasonable to be expected from the physical layer.

More details on WG4 terms of reference

- WG4 is responsible for all the activities related to the RF aspects. This include pulse shaping that will be moved from WG1 to WG4.
- "Protocol aspects from a system point of view" will be removed from the ToR of WG4 and replaced by "RF system aspects".

More details on WG1 terms of reference

WG1 is handling radio transmission and reception aspects related to the physical layer, excluding RF aspects. As an example, fast power control layer 1 procedure is part of WG1, but the global tool box to use fast power control is part of the RRC protocol (outer loop power control, measurement reports, etc). WG1 should not be responsible for procedures, except those which do not interact with upper layers - e.g. TFI mapping -.

Random Access

- Random Access is a joint responsibility between WG1 and WG2. The size and contents of the RACH message are defined by WG2. WG1 defines the PRACH channel and the receiver performances of PRACH. Admission control of the RACH channel and the backoff mechanism in under control of WG2 (in the MAC protocol), with support from Transport channels supported by WG1.
- RACH pre-amble power-up was defined in WG1 based on the merits in the physical layer performances, but the work could be handed over to WG2 so that the necessary procedures are put in place in conjunction with admission and congestion control procedures. However, the principles of the pre-amble power-up as defined by WG1 should not be changed without consulting WG1.

Simulations

Whenever necessary, system level simulations would be carried under TSG RAN. Link level simulations will be performed under the responsibility of WG1, whereas RF simulations will be under the responsibility of WG4 based on inputs from WG1.

Changes on the documentation structure

- WG2 will be responsible for a new document "Radio Resource Management Strategies". This document will describe the RRM strategies which are supported by the UTRAN protocols. The document will also contain typical examples of algorithms for RRM strategies.

- Document S4.03 from WG3 will change into a document with the following title: "RF parameters in support of radio resource management". The scope will be to define RF parameters and requirements for the radio resource management.
- Sections of WG1 documents addressing procedures will be moved into WG2 documentation
- WG1 document "Transport Channels and Physical Channels" will be renamed into "Physical Channels and mapping of Transport Channels onto Physical Channels"