

Source: TSG RAN
Title: Radio Interface Specifications for IMT-2000
Document for: Approval
Agenda Item: 5.6

The text in the Annex is a proposed contribution to be submitted to the 17th Meeting of ITU-R Task Group 8/1 (Beijing, May 31 to June 11) by an Individual Member. Please note that it is also intended that this document will be presented to the Joint Experts Group meeting between ITU-R Task Group 8/1 and ITU-T Study Group 11, and to ITU-T Study Group 11.

Task Group 8/1 is defining the Recommendations for International Mobile Telecommunications 2000 (IMT-2000). Task Group 8/1 is expected to complete its work with the finalisation of the Recommendation on “Detailed Specifications of the Radio Interfaces of IMT-2000 (IMT.RSPC)”. The meeting to be held in Beijing is an important intermediate step in this process and will set the direction of the work for the final TG8/1 meeting to be held in Helsinki, October 25 to November 5, 1999.

The liaison sent from TG8/1 to different SDOs, Partnership Projects, and RTT proponents, gives a unique opportunity for 3GPP to facilitate the work of Task Group 8/1. The timing is very well suited since the 3GPP workplan is to approve a draft specification at this TSG RAN#3 meeting. It is very important that the draft specification resulting from the intense 3GPP activity is submitted to the TG8/1 meeting.

This contribution provides the response to the liaison sent from TG8/1 to 3GPP and in addition includes the draft radio interface specifications structure for UTRA 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 for direct inclusion into ITU-R’s Preliminary Draft New Recommendation “Detailed Specifications of the Radio Interfaces of IMT-2000 (IMT.RSPC)”, as a dedicated section dealing with UTRA.

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.

ANNEX

[ITU MEMBER]¹

RADIO INTERFACE SPECIFICATIONS FOR IMT-2000

1 INTRODUCTION

This document provides a response to the liaison statement sent from ITU-R TG8/1 to SDOs, Partnership Projects, and radio interface proponents on the topic of radio interface specifications. It contains information about the approved draft radio interface specifications developed by 3GPP TSG RAN. These specifications 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 recognised that not all specifications listed in this document may be relevant to ITU-R TG 8/1. However, 3GPP TSG RAN is developing a complete set of Specifications for the Radio Access Network. It includes signalling protocols between nodes located at the network side as well as signalling over the radio interface, and believes it would be of assistance to TG8/1 during the discussions of the RSPC structure. Specifically, the 25.200, 25.300 and 25.100 series of specifications should be relevant for TG8/1 since they describe the physical layers up to the radio resource management layer which are seen as radio technology dependent parts.

The purpose of the contribution is to indicate the structure and content that 3GPP is using to develop its specifications for the radio interface, which has now been accepted by SDOs in all 3 regions.

In Appendix A the 3GPP RAN TSG specification structure is shown.

In Appendix B the draft series of specifications named 25.200, 25.300 and 25.100 can be found. These specifications show the present detailed level and status of the work performed in 3GPP RAN TSG. It is proposed that this structure is adopted for direct inclusion into a dedicated section on the radio interface developed by 3GPP, in 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.

The current thinking within 3GPP is that the complete radio interface from L3RR to physical layer should be handled in TG8/1.

¹ This contribution was developed in 3GPP TSG RAN

2 RESPONSE FROM 3GPP TO THE LIAISON FROM TG8/1

2.1 REQUEST FOR INFORMATION ON RADIO INTERFACES

In the TG8/1 document 8-1/TEMP/176-E “LIAISON STATEMENT TO SDOs, PARTNERSHIP PROJECTS, AND RADIO INTERFACE PROPONENTS”, TG8/1 asks for the following information from 3GPP on its radio interface development:

- “radio interface information in a format similar to that in the draft RSPC structure document (see Attachment 1)”;

Response: See the specification structure in general in Appendix A that is rather well suited for inclusion in the attachment 1 “structure of RSPC”.

- “a high level summary of the radio interface including explanation of the specification structure”;

Response: See 25.201 Physical layer – general description for an overview of, and introduction to, the physical layer; and 25.301 Radio Interface Protocol Architecture which contains a general description of L2 and L3 protocols.

- “a table of contents of their radio interface specification structure”;

Response: See Appendix A.

- “sufficient reference pointers to more detailed material (e.g. document, section, paragraph)”.

Response: See Appendix B.

2.2 REQUEST FOR COMMENTS ON INCORPORATION OF EXTERNALLY DEVELOPED MATERIAL

In the TG8/1 document 8-1/TEMP/176-E “LIAISON STATEMENT TO SDOs, PARTNERSHIP PROJECTS, AND RADIO INTERFACE PROPONENTS”, TG8/1 asks for comments on the following topics from 3GPP.

“ITU-R is considering the use of “references to” or “direct incorporation of” external material in Recommendation ITU-R M.[IMT-RSPC]. TG 8/1 seeks guidance from the external organizations on the following issues. The response should address both approaches (“references to” and “direct incorporation of”)”:

- “approval of an ITU-R Recommendation incorporating externally developed and maintained specifications”;

Response: RAN TSG is not aware of any problem concerning the approval of an ITU-R Recommendation incorporating externally developed and maintained specifications. If specifications are incorporated completely and directly into an ITU-R Recommendation, this Recommendation will have to be updated regularly, typically around once a year. It is

therefore better to use either a direct reference to where the detailed material can be found or use a general introduction describing the radio interface, its structure and how further detailed information can be found (e.g. a reference).

- *“copyright and licensing aspects of non-ITU specifications, including ownership and change authority”*;

Response: Since 3GPP is not a legal entity such a question can not be answered by 3GPP but rather by the Partner Organisations that have signed the Partnership Agreement. The Partners have a meeting planned for May 27-28 and this question will be forwarded to that meeting from the RAN TSG.

- *“publication and distribution aspects”*;

Response: Since 3GPP is not a legal entity such a question can not be answered by 3GPP but rather by the Partner Organisations that have signed the Partnership Agreement. The Partners have a meeting planned for May 27-28 and this question will be forwarded to that meeting from the RAN TSG.

- *“maintenance of the RSPC Recommendation, including frequency of updates, version control and approval procedures”*;

Response: See answer on the first question above. It is expected that during the first year after the specifications are approved, i.e. during the year 2000, that there will be quite a lot of change requests since the first implementations will be made during that time period. This is based on the experience from GSM. It is believed that the RF parts of the specifications will be the most stable ones and change very little after they are settled. The protocol messages and bit allocations could require more updates, at least in the beginning. An approach with a descriptive part including essential parameters of RF and base band including references to where to find the detailed specifications including message structures and protocols will not require too many updates of RSPC. This will provide sufficient information for world-wide compatibility and operation of equipment as being required in [IMT.RSPC]

- *“comments on the respective advantages/disadvantages of each approach”*;

Response: RAN TSG does not identify any reason for a direct incorporation of text into RSPC. Advantages of the use of references are outlined above.

- *“other comments relevant to the development of RSPC”*.

Response: The RAN TSG makes the following comments and proposals to the development of the RSPC in TG8/1:

1. That 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. RAN TSG thinks that

the structure of RSPC identified in Attachment 1 of the received liaison is in line with this approach.

2. That 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 time scales for completion of RSPC, the availability of expert resources and the intention of some countries to deploy IMT-2000 by 2001.
3. That Task Group 8/1 is encouraged to review and adopt the 3GPP RAN TSG radio interface specification structure for direct inclusion (preferably by reference) into a dedicated section of Preliminary Draft New Recommendation “Detailed Specifications of the Radio Interfaces of IMT-2000 (IMT.RSPC)”, in line with the structure contained in Attachment 1 of the received liaison.

APPENDIX A

RADIO INTERFACE SPECIFICATIONS STRUCTURE

25.200 Series

25.201 Physical layer – general description

This specification describes the documents being produced by the 3GPP TSG RAN WG1 and first complete versions expected to be available by end of 1999. This specification gives also general description of the physical layer of the UTRA air interface,

The S1 series specifies Um point for the 3G mobile system. This series defines the minimum level of specifications required for basic connections in terms of mutual connectivity and compatibility.

25.211 Physical channels and mapping of transport channels onto physical channels (FDD)

This specification describes the characteristics of the Layer 1 transport channels and physical channels in the FDD mode of UTRA. The main objectives of the document are to be a part of the full description of the UTRA Layer 1, and to serve as a basis for the drafting of the actual technical specification (TS).

25.212 Multiplexing and channel coding (FDD)

This specification describes the documents being produced by the 3GPP TSG RAN WG1 and first complete versions expected to be available by end of 1999. This specification describes the characteristics of the Layer 1 multiplexing and channel coding in the FDD mode of UTRA.

The S1 series specifies Um point for the 3G mobile system. This series defines the minimum level of specifications required for basic connections in terms of mutual connectivity and compatibility.

25.213 Spreading and modulation (FDD)

The present document describes spreading and modulation for UTRA Physical Layer FDD mode.

25.214 Physical layer procedures (FDD)

This document specifies and establishes the characteristics of the physical layer procedures in the FDD mode of UTRA.

25.221 Physical channels and mapping of transport channels onto physical channels (TDD)

25.222 Multiplexing and channel coding (TDD)

This 3GPP Report describes multiplexing, channel coding and interleaving for UTRA Physical Layer TDD mode.

Text without revision marks has been approved in the previous TSG-RAN WG1 meetings, while text with revision marks is subject to approval.

25.223 Spreading and modulation (TDD)

This document establishes the characteristics of the spreading and modulation in the TDD mode. The main objectives of the document are to be a part of the full description of the Layer 1, and to serve as a basis for the drafting of the actual technical specification (TS).

25.224 Physical layer procedures description (TDD)

25.231 Physical layer - Measurements

This 3GPP Telecommunication Specification TS contains the description of the measurements done at the UE and network in order to support operation in idle mode and connected mode.

As far as the measurements in idle mode are concerned, this TS described the following :

- measurements for the cell selection for a UE supporting FDD and/or TDD

- measurements for cell reselection for a UE camping on an FDD or TDD cell

As far as the measurements in connected mode are concerned, this TS describes measurements when the UE is connected to an FDD cell or cells (in Soft handover) or a TDD cell for the cell connected state (see reference [8]), or camping on an FDD cell for the UTRA connected state. This TS provides the minimum requirements for the UE and networks. Some explanatory text is also contained in the TS but it is more of a descriptive nature than normative.

As far as the measurements for the handover preparation, this specification defines the requirements to the UE and UTRAN, as well as parametrisation rules for the compressed mode in order to accommodate idle periods. This latter aspects may need to be moved to some other specifications. The description of the compressed mode (different type of compressed frames define by the compressed mode A/B, the number if idle slots and the position of such transmission gap) is outside the scope of this specification and is covered in S1.11 and S1.12.

25.300 Series

25.301 Radio Interface Protocol Architecture

The present document shall provide an overview and overall description of the UE-UTRAN radio interface protocol architecture as agreed within the 3GPP TSG RAN working group 2. Details of the radio protocols will be specified in companion documents.

25.302 Services provided by the Physical Layer

The present document is a technical specification of the services provided by the physical layer of UTRA to upper layers.

25.303 UE functions and Interlayer Procedures in Connected Mode

This document defines the UE States and the principal tasks undertaken by the UE when in Connected Mode. It includes informative interlayer procedures for the UE to perform the required tasks.

This document attempts to provide a comprehensive overview of the different states and transitions within the connected mode of a UMTS terminal. The applicable set of states for a given service may be a subset of the total set of possible states.

In addition to describing the states and related transitions, this document describes all procedures that assign, reconfigure and release radio resources. Included are e.g. procedures for transitions between different states and substates, handovers and measurement reports. The emphasis is on showing the combined usage of both peer-to-peer messages and interlayer primitives to illustrate the functional split between the layers, as well as the combination of elementary procedures for selected examples. The peer-to-peer elementary procedure descriptions are described in the related protocol descriptions /1, 2, 3/ and they are thus not within the scope of this document.

25.304 UE procedures in Idle Mode

The present document shall describe the overall idle mode process for the UE and the functional division between the non-access stratum and access stratum in the UE. The UE is in idle mode when the connection of the UE is closed on all layers, e.g. there is neither an MM connection nor an RRC connection.

This document presents also examples of inter-layer procedures related to the idle mode processes and describes idle mode functionality of a dual mode UMTS/GSM UE.

25.321 Medium Access Control (MAC) Protocol Specification

The scope of this description is the specification of the MAC protocol.

The following lists the contents for the specification of the MAC protocol:

1. list of procedures
2. logical flow diagrams for normal procedures
3. logical description of message

4. principles for error handling
5. some exceptional procedures which are felt criteria
6. It should, as far as possible, have the same format and outline as the final specification
7. exact message format
8. all scenarios

25.322 Radio Link Control (RLC) Protocol Specification

The scope of this description is to describe the RLC protocol. A description document is intermediate between a stage 2 document and a protocol specification. Once completed, it should be sufficient for manufacturers to start some “ high level design ” activities. It should allow as well to assess the complexity of the associated protocol. After the completion of a description document, the drafting of the protocol specification should not have to face difficulties which would impact the other protocols i.e. the radio interface protocol architecture should be stable. This means that some procedures which are felt critical in terms of complexity will need to be studied in more details in the description document so that no problem is faced in the writing of the final protocol.

The following lists typical contents for a description document :

1. list of procedures
2. logical flow diagrams for normal procedures
3. logical description of message (where it should be possible to guess roughly the size of the various information elements)
4. principles for error handling
5. some exceptional procedures which are felt critica
6. It should, as far as possible, have the same format and outline as the final specification

The following is not covered

1. exact message format
2. all scenarios

25.331 Radio Resource Control (RRC) Protocol Specification

The scope of this specification is to describe the Radio Resource Control protocol for the 3GPP radio system.

25.400 Series

25.401 UTRAN Overall Description

This document describes the overall architecture of the UTRAN, including internal interfaces and assumptions on the radio and Iu interfaces.

25.410 UTRAN Iu Interface: General Aspects and Principles

25.411 UTRAN Iu interface Layer 1

25.412 UTRAN Iu interface signalling transport

The present document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers.

25.413 RANAP Specification

25.414 UTRAN Iu interface data transport & transport signalling

The present document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers.

25.415 Iu interface CN-UTRAN user plane protocols

This Technical Specification defines the protocols being used to transport and control over the Iu interface, the Iu User Data Streams.

25.420 UTRAN Iur Interface: General Aspects and Principles

25.421 UTRAN Iur interface Layer 1

25.422 UTRAN Iur interface signalling transport

The present document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers.

25.423 RNSAP Specification

25.424 Iur interface data transport & transport signalling for Common Transport Channel data streams

This document shall provide a description of the UTRAN RNS-RNS (Iur) interface Data Transport and Transport Signalling for Common Transport Channel data streams as agreed within the TSG-RAN working group 3.

25.425 UTRAN Iur interface user plane protocols for Common Transport Channel data streams

This document shall provide a description of the UTRAN RNS-RNS (Iur) interface user plane protocols for Common Transport Channel data streams as agreed within the TSG-RAN working group 3.

25.426 Iur & Iub interface data transport & transport signalling for DCH data streams

25.427 Iur & Iub interface user plane protocol for DCH data streams

25.430 UTRAN Iub Interface: General Aspects and Principles

25.431 Iub interface Layer 1

25.432 UTRAN Iub interface signalling transport

25.433 NBAP Specification

25.434 UTRAN Iub interface data transport & transport signalling for Common Transport Channel data streams

This document shall provide a description of the UTRAN RNC-Node B (Iub) interface Data Transport and Transport Signalling for CCH data streams as agreed within the TSG-RAN working group 3.

25.435 Iub interface user plane protocols for Common Transport Channel data streams

This document shall provide a description of the UTRAN RNC-Node B(Iub) interface user plane protocols for Common Transport Channel data streams as agreed within the TSG-RAN working group 3.

25.100 Series

25.101 UE Radio transmission and reception (FDD)

25.104 BTS Radio transmission and reception (FDD)

This document establishes the Base Station minimum RF characteristics of the FDD mode of UTRA.

25.102 UE Radio transmission and reception (TDD)

This document establishes the minimum RF characteristics of the TDD mode of UTRA for the User Equipment (UE).

25.105 BTS Radio transmission and reception (TDD)

This document establishes the minimum RF characteristics of the TDD mode of UTRA.

25.103 RF parameters in support of Radio Resource Management

This Technical Specification shall describe RF parameters and Requirements for the Radio Resource Management.

25.141 Basestation conformance testing (FDD)

This specification describes the documents being produced by the 3GPP TSG RAN WG4 and first complete versions expected to be available by end of 1999. This specification gives also general description of the physical layer of the UTRA air interface,

The S4 series specifies.

For each test, two conformance requirements are specified:

- essential conformance requirements;
- complete conformance requirements.

Essential conformance requirements are those which are required:

- a) to ensure compatibility between the radio channels in the same cell;
- b) to ensure compatibility between cells, both co-ordinated and unco-ordinated;
- c) to ensure compatibility with existing systems in the same or adjacent frequency bands;
- d) to verify the important aspects of the transmission quality of the system.

Essential conformance requirements are sufficient to verify the performance of the equipment for radio type approval purposes, in countries where this is applicable.

Complete conformance requirements may be tested to verify all aspects of the performance of a BSS. These requirements are intended to be used by manufacturers and operators to allow conformance and acceptance testing to be performed in a consistent manner; the tests to be performed should be agreed between the parties.

In some tests there are separate requirements for micro-BTS and BTS. If there is no separate requirement for a micro-BTS, the requirements for the BTS apply to a micro-BTS.

In the present document, the reference point for RF connections (except for the measurement of mean transmitted RF carrier power) is the antenna connector, as defined by the manufacturer. This EN does not apply to repeaters or RF devices which may be connected to an antenna connector of a BSS, except as specified in subclause 4.10.

25.142 Basestation conformance testing (TDD)

25.113 Basestation EMC²

² This Specification does not include the antenna port immunity and emissions.

APPENDIX B

DRAFT RADIO INTERFACE SPECIFICATIONS

The 25.200, 25.300, and 25.100 series of draft specifications as developed within the 3GPP RAN TSG. Some of them were approved or endorsed during the RAN TSG#3 meeting.

[www.3gpp.org/Documents/TSG_RAN/TSG_RAN/TSGR_03/Docs/pdfs

25.200 series: 233, 234 , 235, 236, 237, 238, 239, 240, 241, 242

25.300 series: 259, 260, 261, 262, 263, 264, 265

25.100 series: 222, 223, 224, 225, 226, 227]