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3GPP/PCG#1(99)15
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page 1 of 10

Source: **ETSI SMG2**

Title: **Status report of UMTS activities within SMG2**

Agenda item: **9.1**

Document for:

Decision	
Discussion	**X**
Information	

PCG should discuss the attached status report from SMG2 and in particular the section concerning harmonization and convergence of CDMA based RTTs

ETSI TC SMG   **Tdoc SMG 216/99**
Meeting #28   **Agenda item: 7.3**
Milan, Italy
8th - 12th February, 1999

Source: **SMG2 Secretary and Chairman**
Date: **5 February 1999**

ETSI STC SMG2 Status Report on UMTS to SMG#28

Abstract:

This document gives an overview of the status of the UMTS work within ETSI/STC SMG2 for the period between October 1998 (SMG#27) meeting and February 1999 (SMG#28).

The major issues to be noted are the following:

- UTRAN work to be transferred to 3GPP.

- UTRAN descriptions presented.

- Discussions on harmonisation and convergence of CDMA based IMT-2000 RTT proposals have taken place.

1   Background

Following the decision of SMG on the UMTS Terrestrial Radio Access (UTRA) given summarised in Tdoc SMG 39/98 (SMG#24bis), SMG2 has continued the work on the refinement of the selected concept. The goal for the work carried out by SMG2 was set to provide the standard for the Radio Access Network (UTRAN) part of UMTS and to provide UTRA as a candidate for IMT-2000 to ITU. For the work towards the UMTS standard SMG2 has followed a work plan consisting of the following events and phases:

- Finalise description of UTRA as RTT proposal for IMT2000 to be submitted before June 30, 1998.

- Finalise the evaluation report for submission to ITU before September 30, 1998

- A first phase is to elaborate technical descriptions and evaluate performance of the final solutions of UTRAN. This phase is concluded with a detailed description of UTRAN including the mobile station. This includes all radio protocols terminated in UTRAN, the UTRAN internal protocols and the Iu interface as well as descriptions of the functionalities required of the network nodes and in terminal. Descriptions to be provided for approval ultimo 1998 (SMG#28).

- A second phase would be to write the actual specifications/standards based on the material elaborated in the first phase. It should be the goal to freeze the specifications/standard ultimo 1999.

- The third phase is the iterative correction phase, where the specification/standard is corrected based on the experience gained with the standard during development and implementation of UMTS. This phase in principle never ends, but should considered done ultimo 2001.

- The fourth part would further development of UMTS towards the UMTS phase 2 to be introduced 2005. This work can be commenced primo 2002.

The detailed work have been carried out in the following four temporary expert groups, which have reported to SMG2 plenary and/or SMG2 UMTS ad-hoc meetings:

- Layer 1 Expert Group

- Layer 2&3 Protocol Expert Group

- UTRAN Architecture Expert Group

- ITU expert group

Generally the work on UTRAN have progressed according to schedule. Especially, alignment between the UTRA FDD and TDD modes has been an area requiring substantial work. Alignment of bandwidth, chip rates etc. has been obtained in order to maximise the commonalties of the two modes and thereby reduce implementation cost of dual mode (FDD/TDD) mobile stations. Also the work on the UTRAN architecture and protocol aspects have been progressing according to the planned schedule.

As result of the creation of 3GPP SMG2 believe that all work on UTRAN should be transferred from SMG2 to 3GPP. At the first meeting of 3GPP December 1998, SMG2 made the UTRAN documentation available for 3GPP. It is the understanding of SMG2 that the material has been well received by 3GPP TSG RAN and that the UTRAN documentation together with the material receive from the other partners in 3GPP are forming the basis for the work on Radio Access Network in 3GPP.

2   UTRAN Architecture

In the area of the UTRAN architecture the work have progressed with the elaboration of description documents covering the UTRAN architecture and functions, the Iu, Iur and Iub interfaces. Further a stable description of manifestations of hand-over and streamlining (SRNS relocation) has be elaborated.

It should be noted that the UTRAN architecture has a number of dependencies relative not completed parts of the UMTS architecture under responsibility of SMG12. Therefore it might be necessary to revisit some of this dependent issues, when open UMTS architecture issues are settled.

It is the suggestion of SMG2 that SMG forwards the UTRAN description to 3GPP for continuation of the work. The documentation including a cover note is provided in Tdoc SMG 75/99 – Tdoc SMG 81/99.

3   Radio Protocol aspects

Important progress has been made on the UTRAN protocol aspects and there are now a stable radio interface architecture, a stable description of the services expected by the physical layer, and a set of examples of RRC procedures with the inter-layer interactions. Further the architecture of the RRC, RLC and MAC layers is now agreed. All in all the overall work plan in the protocol area can be considered as fulfilled, except for the RLC procedures which still need to be defined.

It is the suggestion of SMG2 that SMG forwards the UTRA Layer 2 and Layer 3 description to 3GPP for continuation of the work. The documentation including a cover note is provided in Tdoc SMG 82/99 – Tdoc SMG 90/99.

4   Physical Layer

In the area of the UTRA physical layer the work has been progressing and a number of open items has been closed. The UTRA UE (User Equipment) power classes have been discussed, but consensus has only been reached for one power class for FDD mode, that is 0.125 W /21 dBm. Further power classes such as 33 dBm, 27 dBm, 24 dBm, 10 dBm and 0 dBm are still under discussion for FDD mode. For TDD mode similar power classes have been discussed, but consensus is not yet reached. One open question is whether or not a dual mode FDD-TDD mobile can have different power capabilities in the two modes, as it has been indicated that a lower power in TDD mode could simplify the dual mode mobile significantly.

As a result of the discussions on harmonisation and convergence of CDMA based RTT proposals, the CDMA2000 RF parameters of the CDMA2000 ITU submission have been studied. However, it was found that additional information exchange would be needed, to provide an understanding of the reasoning leading to the choice of parameters.

As earlier SMG2 has received liaison statements form ERC TG1 providing information about their work on spectrum issues for UMTS and requesting detailed information about the physical layer of UTRA. As a number of parameters are interrelated it has been difficult for SMG2 to provide a clear and direct answer to the questions raised by ERC TG1. Therefore a joint meeting of ERC TG1 and SMG2 was held December 1998 in order to have and informal discussion of the issues and obtaining a reciprocal understanding of the problems. One of the key issues in relation to spectrum allocation is flexibility. One topic raised by members of SMG2 as well as members of ERC TG1 is the possibility of UTRA to support both TDD and FDD in parts of the paired bands. On this topic several manufacturer have indicated that they believe that support of TDD as well as FDD in parts of the paired bands would significantly increase terminal complexity and potentially jeopardise availability of dual mode FDD-TDD terminals. Other

members of SMG2 do not feel that the support of TDD as well as FDD in parts of the paired band is a problem and that it has been proven to increase terminal complexity. On this background it has not been possible for SMG2 to obtain consensus on the issue and provide an SMG2 position to ERC TG1. Instead the delegates and organisations have been urged to ensure that ERC TG1 are made aware of their position.

It is the suggestion of SMG2 that SMG forwards the UTRA Physical Layer description to 3GPP for continuation of the work. The documentation including a cover note is provided in Tdoc SMG 91/99 – Tdoc SMG 113/99 and Tdoc SMG 141/99

5   Harmonisation and Convergence of CDMA based RTTs

At SMG#27 SMG confirmed that SMG wanted to continue harmonisation and convergence of the proposals for third generation RTTs. However, it was noted that the handling of the harmonisation and convergence issues on a per technical item basis, has shown not necessarily to be the optimum way forward. On this background, it was agreed that the following SMG2 plenary (16 - 20 November 1998) should have a separate agenda item on harmonisation and convergence, where an analysis of the whole field in a top down approach is done. Noting that this work as normally would be a contribution driven process. In line with this decision SMG2 has discussed harmonisation and convergence between CDMA based RTT proposals in the SMG2 plenary meetings #28 (16 - 20 November 1998) and #29 (25 - 29 January 1999).

At SMG2#28 discussed harmonisation and convergence of CDMA based RTT proposals (UTRA from ETSI, WCDMA from ARIB, cdma2000 from TIA, WP-CDMA from TIA/T1P1, CDMA I from TTA, CDMA II from TTA, TD-SCDMA from CATT). A first point which SMG2 feel is important to note is, that the UTRA RTT proposal is a radio access concept comprising two modes of operation, i.e., an FDD mode and a TDD mode. The harmonisation between these two modes of operation is a strong requirement in SMG2. This implies that all discussions regarding harmonisation and convergence where UTRA is involved should consider both modes (FDD and TDD) of operation.

SMG2 recognised the harmonisation and convergence work that has been done in different fora throughout the world. SMG2 appreciates the information received during the SMG2#28 meeting in Dresden about the harmonisation and convergence activities within Region 2 and Region 3. SMG2 also agreed that the conclusions from the ARIB co-ordination group (CG), including the conclusions from the Ad Hoc S and Ad Hoc CR groups, can provide useful input to the continuing discussions of harmonisation and convergence.

SMG2 came to the conclusion that the activities on harmonisation and convergence can be split into two areas: RF parameters and baseband issues. SMG2 believes that a harmonisation and convergence of the RF parameters is important, independent of the baseband issues.

It is the view of SMG that before the discussion regarding the baseband harmonisation and convergence can be concluded, it is very important to understand and discuss the requirements used in design of the different CDMA RTT proposals mentioned above. This discussion could give insight and understanding as to why the CDMA RTT proposals are different today. If a difference in the CDMA RTT proposals is caused by different requirements, it should be studied whether it is possible to align the particular requirements in questions. Further, SMG2#28 was of the opinion that the harmonisation and convergence discussions should use the ARIB Ad Hoc S and Ad Hoc CR conclusions as the basis for further discussions. It was also noted that there are ongoing discussions between ARIB and TIA.

Based on the discussion in SMG2#28, SMG2 agreed to work on harmonisation and convergence through its work on RF parameters, including a precise definition of the RF parameters and test methods of the RF parameters. This work has been continued in the SMG2 Layer 1 expert groups (see above section).

Further, SMG2 agreed to allocate sufficient time to discuss baseband harmonisation at the following SMG2 plenary meeting (SMG2#29).

During SMG2#28 SMG2 received a liaison statement from ITU-R TG8/1 related to harmonisation and convergence of 3G radio transmission technologies to which SMG2 responded indicating the above mentioned views (see Annex I)

The discussion of harmonisation and convergence was continued at SMG2#29. In the discussion backwards compatibility with 2nd generation systems was emphasised, although the meaning and absolute importance of this requirement was subject to discussion, especially in relation to the performance. However, the two main issues of backwards compatibility seemed to be the implementation of dual mode 2nd / 3rd generation terminals and the possibility for spectrum sharing between 3rd and 2nd generation systems. The technical discussion at SMG2#29 mainly focussed on the areas of Chip Rate, Mode of Operation (Asynchronous/Synchronous) and Downlink Pilot Structure.

Regarding chip rate SMG2 noted depending on the assumption of spectrum allocation, it would be possible to show advantages of different choices of chip rates. Even though SMG2 sees a desire in maximising the possible bit rate in a single 5 MHz carrier, SMG2 understand that their might be some desire to adjust the chip rate in order to ease the filter requirements and thereby implementation of dual mode equipment including multi-carrier options. On this background SMG2 feels that the chip rate could be evaluated in this light.

SMG2 received a number of contributions in relations to the mode of operations providing technical information about the performance of both synchronous and asynchronous mode. Noting that there is a strong requirement on avoiding the need of providing external synchronisation, it is the feeling of SMG2 that to provide both asynchronous and synchronous mode of operation as in UTRA would be the best way forward. SMG2 notes that this solution would allow the operator to freely choose the mode of operation they prefer. However, an option on the network side normally leads to the requirements that terminals need to support both options. SMG2 accept that there might be a need to further study the impact of this, before it is decided whether or not making support of both asynchronous and synchronous mode mandatory in all terminals.

On the subject of the downlink pilot structure SMG2 received some very detailed technical contributions providing performance analysis of the different methods used in the different RTTs. A first discussion of these took place, however it was clear that more time was needed in order to study and understand all the details. Therefore it was agreed to continue the technical discussion, e.g., on the SMG2 E-mail reflectors. It is therefore to early for SMG2 to come with firm statements on the feasibility of harmonisation and convergence in the area of the downlink pilot structure.

All in all SMG2 have dedicated a significant amount of time to discussion of the issues of harmonisation and convergence of CDMA based RTT proposals since SMG#27. SMG2 believes that it would be beneficial to continue the fruitful discussions on harmonisation and convergence in the fora taking over the responsibility for the UTRAN standardisation.

6   Request for decision from SMG

Advice and decision from SMG are requested on the following items:

- SMG is requested confirm the transfer of the UTRAN work from SMG2 to 3GPP and the closing of the UTRAN work in SMG2

- SMG is invited to forward the UTRAN documentation to 3GPP together with this status report

- SMG is invited to make the material forming the background for the performed work and ongoing discussions available for 3GPP.

ANNEX I

ETSI STC SMG2#28   **Tdoc SMG2 550/98**
Dresden, Germany   **Agenda Item: 6.13**
16-20 November 1998

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Title: SMG2 activities related to harmonization and convergence of 3G radio transmission technologies

Source: SMG2

To: ITU-R TG8/1

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1. Introduction

SMG2 thanks ITU-R TG8/1 for their interest in our work related to the IMT2000 specifications, and especially the interest in SMG2's view on the harmonization and convergence activities.

This liaison from SMG2 to ITU-R TG8/1 describes our view on harmonization and convergence of CDMA based RTT proposals (UTRA from ETSI, WCDMA from ARIB, cdma2000 from TIA, WP-CDMA from TIA/T1P1, CDMA I from TTA, CDMA II from TTA, TD-SCDMA from CATT). It also describes the planned activities in SMG2 regarding harmonization and convergence.

The UTRA RTT proposal is a radio access concept comprising two modes of operation, i.e., an FDD mode and a TDD mode. The harmonization between these two modes of operation is a strong requirement in SMG2. This implies that all discussions regarding harmonization and convergence where UTRA is involved should consider both modes (FDD and TDD) of operation.

SMG2 recognizes the harmonization and convergence work that has been done in different fora throughout the world. SMG2 appreciates the information received during the present SMG2#28 meeting in Dresden about the harmonization and convergence activities within Region 2 and Region 3. SMG2 also agrees that the conclusions from the ARIB coordination group (CG), including the conclusions from the Ad Hoc S and Ad Hoc CR groups, can provide useful input to the continuing discussions on harmonization and convergence within SMG2.

SMG2's view on harmonization and convergence is that work activities can be split into two areas: RF parameters and baseband issues. SMG2 believes that a harmonization and convergence of the RF parameters is important, independent of the baseband issues.

SMG2's view is that before the discussion regarding the baseband harmonization and convergence can be concluded, it is very important to understand and discuss the requirements used in design of the different CDMA RTT proposals mentioned above. This discussion could give insight and understanding as to why the CDMA RTT proposals are different today. If a difference in the CDMA RTT proposals stems from different requirements, the harmonization and convergence discussion should study whether it is possible to align the particular requirements at issue within the relevant standardization bodies (ETSI SMG, ARIB, CATT, T1P1, TIA, TTA). Further, SMG2's opinion is that the harmonization and convergence discussions should use the ARIB Ad Hoc S and Ad Hoc CR conclusions as the basis for further discussions.

2. Planned activities within SMG2

Based on the discussion above, SMG2 will contribute to work on harmonization and convergence through its work

on RF parameters in SMG2. This includes a precise definition of the RF parameters and test methods of the RF parameters. The detailed work on the RF parameters will be done with high priority in SMG2's Layer 1 Expert Group[*] which will consider all contributions equally. The intention is then to agree at the next SMG2 plenary meeting[*] on the RF parameter specification. This is also in line with the already existing time plan in SMG2. SMG2 encourages companies and standardization bodies from other regions to take part in these SMG2 and SMG2 Layer 1 Expert Group discussions.

SMG2 will allocate sufficient time to discussions on baseband harmonization at the next SMG2 plenary meeting. The discussion about the baseband differences at the next SMG2 meeting will be split into two parts:

- A discussion related to differences in requirements
- A discussion related to baseband parameters.

SMG2 encourages companies and standardization bodies from other regions to input papers about the requirements on the different CDMA RTT proposals and also information on the harmonization and convergence progress.

- The next SMG2 meeting will be in Sophia Antipolis, France, Jan, 25-29, 1999
- The next SMG2 Layer 1 Expert Group meeting will be in Espoo, Finland, Dec 14-18, 1998
- To get information on how to contribute to SMG2 meetings, please contact: Paulo Usai, SMG2 secretary email: paulo.usai@etsi.fr
- To get information on how to contribute to SMG2 Layer 1 Expert Group meetings, please contact: Frederic Gourgue, SMG2 Layer 1 Expert Group secretary email: Frederic.Gourgue@alcatel.fr

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ANNEX II – UTRAN documentation

	Cover Note for UTRAN Architecture Documents	Td P-99-075
ZZ.01	UTRAN Architecture Description	Td P-99-076
ZZ.02	UTRAN Functions: Examples on signalling procedures	Td P-99-077
ZZ.11	Description of Iu Interface	Td P-99-078
ZZ.12	Description of Iur Interface	Td P-99-079
ZZ.13	Description of Iub Interface	Td P-99-080
	Manifestations of Handover and Streamlining	Td P-99-081
	Cover page for the L23 documentation towards SMG	Td P-99-082
YY.01	MS-UTRAN Radio Interface Protocol Architecture	Td P-99-083
YY.02	Layer 1 : general requirements	Td P-99-084
YY.03	Description of UE states and procedures in connected mode	Td P-99-085
YY.04	Description of procedures in idle mode	Td P-99-086
YY.21	Description of MAC protocol	Td P-99-087
YY.22	Description of RLC protocol	Td P-99-088
YY.31	Description of RRC protocol	Td P-99-089
YY.40	Guidelines and principles for error handling and message description	Td P-99-090
	Cover Note for Layer 1 Documents	Td P-99-091
XX.01	UTRA physical layer documentation plan	Td P-99-092
XX.02	UTRA physical layer general description	Td P-99-093
XX.03	UTRA FDD, transport channels and physical channels	Td P-99-094
XX.04	UTRA FDD, multiplexing, channel coding and interleaving description	Td P-99-095
XX.05	UTRA FDD, spreading and modulation description	Td P-99-096
XX.06	UTRA FDD, radio transmission and reception	Td P-99-097
XX.07	UTRA FDD, physical layer procedures	Td P-99-098
XX.08	UTRA FDD, additional features	Td P-99-099
XX.09	UTRA TDD , transport channels and physical channels description	Td P-99-100
XX.10	UTRA TDD, multiplexing, channel coding and interleaving description	Td P-99-101
XX.11	UTRA TDD, spreading and modulation	Td P-99-102
XX.12	UTRA TDD, radio transmission and reception	Td P-99-103
XX.13	UTRA TDD, physical layer procedures description	Td P-99-104
XX.14	UTRA TDD, additional features description	Td P-99-105
XX.15	UTRA handover	Td P-99-106
XX.16	UTRA interoperability description	Td P-99-107
XX.17	UTRA radio frequency (RF) system scenarios	Td P-99-108
XX.18	UTRA layer 1 study items	Td P-99-109
XX.21	UTRA User Equipment (UE) physical layer capability classes	Td P-99-113
25.XX	Vocabulary for the UTRAN	Td P-99-144