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TSG-RAN L123 Hooks and Extensions Workshop

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Source: **ETSI Mobile Competence Centre**

Dr David Williams

ETSI Mobile Competence Centre

F-06921 Sophia Antipolis Cedex

Tel +33 4 92944321

email: david.williams@etsi.fr

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This report includes comments received by 17.00 Central European Time on 3 September 1999.

1. Opening of the meeting

The TSG-RAN chairman, Yukitsuna Furuya from NEC, opened the workshop at 09.00 on 24 August 1999. He explained the background to the workshop which arose from decisions taken in the fourth TSG-RAN and TSG-SA meetings in Miami. This workshop is held under 3GPP TSG-RAN and will explore the hooks and extensions concept (as defined in Tdoc TSG RAN RP-99-398) for UTRA access to ANSI-41 networks. Mr Furuya handed the chair of the meeting to the TSG-RAN vice-chairman, François Courau of Alcatel.

2. Approval of the agenda

The agenda in tdoc 001 was approved.

3. Liaisons from other groups

Tdoc 002 (T1P1/99-166r1) 3GPP handling of the OHG Proposal. This open letter from the T1P1 chairman to the TSG-SA and TSG RAN chairmen was presented by Don Zelmer. This document is requesting that 3GPP experts shall attend the workshop organised by 3GPP2 on the study to allow the connection of MC RAN to an GSM-MAP core network. It was noted by the meeting.

4. Reference model of UTRA connection to ANSI41

4.1 Mapping of ANSI41 services onto UTRA

Tdoc 018 Proposal for DS-41 Reference Architecture and Way Forward

This contribution proposes a reference architecture to be used as the basis for the work that would need to be done by 3GPP and 3GPP2. It covers only DS mode connection to ANSI-41. It was presented by Ericsson.

It was asked if 3GPP has reviewed this reference architecture. The TSG-SA chairman Neils Andersen said that inclusion of this reference architecture in SA2 would depend on the outcome of this workshop.

It was agreed to use this reference model as a working assumption in the workshop for the architecture point of view.

Tdoc 011 ME and SE Model for Hooks and Extensions

This contribution was presented by Hyundai. It proposes some definitions for hooks and extensions. It also proposes an ME and SE reference model for DS + ANSI-41 interworking . The contribution proposes that this reference model should be included in Release 99.

After discussion, it was agreed that this proposed SE and ME could be considered as a part of the management entity. This was noted by the meeting. The proposal is extended in tdoc 007 under agenda item 6.2.

Tdoc 012 High Level Service and System Requirements for the Hooks and Extensions for G3G CDMA DS+ANSI-41

This contribution describes TTA and Korean ANSI-41 operators' high level requirements for interoperability between G3G CDMA DS and ANSI-41. TTA, and Korean ANSI-41 operators offer to work with 3GPP and Manufacturers' Harmonization Group (MHG) Ad-Hoc for more detailed service and performance requirements. The following proposals are made:

- All current and evolved ANSI-41 services and features including WIN service should be provided by CDMA DS+ANSI-41 specifications.

- G3G CDMA DS+ANSI-41 should provide seamless handover and transparent service transition for voice, circuit data and packet data calls.

- Common authentication algorithm and ciphering should be used in the 3G networks by both ANSI-41 evolved network and GSM MAP evolved network

- Support for multiple vocoder algorithms

- Changes and effects to the core network and A-interface should be minimized by the implementation of the Hooks and Extensions.

- Implementation of the Hooks and Extensions for G3G CDMA DS+ANSI-41 should not cause any degradation on the system performance, feature and capacity in the RAN and CN as below.

The third point (common authentication and ciphering) was questioned. There are already some backward compatibility issues for 2G systems such that an intersystem handover would invoke a change of ciphering. It was agreed that this should be a study item for security groups.

Tdoc 013 ANSI-664 Features to be Supported in DS/ANSI-41 Systems

This document originated in 3GPP2 TSG-S. It provides a summary of the services and features described in ANSI-664 in support of G3G. It was provided for information.

There followed a discussion about services. Most services listed reside in the core network. For most of them, only the capability to transport them on the RAN needs to be provided. Services which are directly associated with RAN need to be identified.

Tdoc 017 Support of ANSI-41 Services in DS RRC Layer

This contribution was presented by Motorola. It proposes that services and capabilities supported in CDMA2000/ANSI-41 networks be implemented in the proposed harmonised DS/ANSI-41 network. Services and capabilities supported in ANSI-41 networks are listed under the categories of Mobility Management/Network Services, Basic Services, Supplementary Services, Enhanced Services. Section 5 summarises the provisioning ANSI-41 services in DS/ANSI-41 networks from the perspective of the impact on the DS RRC layer.

The following points emerged from a discussion:

- The contribution is based on TS 25.331 version 3.0.0 and it was confirmed that no change requests since this version impact on the contribution.

- Synchronous to asynchronous DS handover is proposed to be an extension for later releases. This was re-discussed considering the requirement from Korean representatives.

- In CDMA 2000 networks there is an acknowledgement from the lower layer to the upper layer which is specified. It was agreed that this would have to be incorporated in the UTRA specification.

- It was questioned if handover to IS-95 is supported. It was clarified that item 7.4 (Handoff to/from MC (1X)) is a general requirement item 7.5 (Handoff to/from MC (3X)) is not for R99

because no operator in the 3GPP2 is requesting this to be supported immediately. This was further discussed under agenda item 6.1.

- Official definitions of "hooks" and "extensions" are those given in RP-99398. On Wednesday morning, Denis Fauconnier presented the document and the definitions were approved.

Tdoc 008 Call Origination Flow for UTRAN + ANSI-41

This document explains UE call origination flow in case of UTRAN + ANSI-41, and proposes this flow as a reference.

It became clear that in this case the message contents have to be studied to identify the hooks. Another document will be considered in agenda item 5.1.

Tdoc 022 Authentication Procedures in ANSI-41 Evolved G3G Network, Harmonised DS RAN+ANSI-41 CN.

This contribution was presented by the Electronics and Telecommunications Research Institutes, ETRI. It describes the authentication procedures for ANSI-41 evolved G3G network in the case that a harmonized DS RAN is overlaid on 2G IS-95 network.

Conclusion of this part of the meeting:

The document were presented and discussed. This will allow a more efficient analysis of the potential hooks and extension.

4.2 Handover between cdma2000, cdma2000 MC (including 1XRTT) and UTRA

Tdoc 005 CDMA2000 Access Entry, Access and Access Probe Handoff features.

This joint contribution from Ericsson and Motorola was presented by Motorola. It describes the cdma2000 Access Entry, Access and Access Probe Handoff features and discusses their relevance in a DS/ANSI-41 system. These features exist in CDMA2000 to improve quality of service. The paper concludes that, given the RRC connection establishment mechanism supported by the DS spec, the Access Entry Handoff, Access Handoff and Access Probe Handoff features as described in cdma2000 are not needed in the DS/ANSI-41 system.

This conclusion of the paper was agreed as a working assumption based on the fact that a dedicated channel is used.

Tdoc 014 Handover for DS/ANSI-41 Systems

This contribution, presented by Motorola, covers harmonisation aspects of DS/ANSI-41 handover for MS/UE operating on dedicated channels. The following hooks and extensions have been identified for DS/ANSI-41 RAN:

- An addition is needed in a neighbour list type message or the Measurement Control message to indicate to the UE the order, identity and associated search parameters of the MC/IS95/Analog neighbours to be measured prior to the mobile assisted handover.

- The Measurement Control and Report messages will have to be extended to support the relevant measurable RR parameters associated with the MC/IS95/Analog systems.

- The Handover Command and Inter-System Handover Command messages may have to be extended to allow for "urgent parameters" (e.g. vocoder type, ciphering state of the channel, etc.) as well as for the specification of other systems identities.

- The A1 interface employs 7 Handoff messages, some of which will need to be extended, to include RR parameters associated with the DS radio interface, if needed.

The impact on the Iur interface needs to be understood.

The document was noted.

Tdoc 016 Packet Data Dormant Handoff

This contribution illustrates the packet data handoff procedure for 3GPP2 and how it may be applied to DS mode over ANSI-41. The contribution concludes that there are no impacts to layer 1 and layer 2 of DS mode to support dormant handoff.

The contribution does not cover cases when not in dormant state. Suspended state has to be investigated.

The impact on layer 3 is unknown and needs investigation. The responsibility for this has to be assigned.

Tdoc 023 Handover between DS-mode system and MC-mode system including IS-95 A/B system

This contribution lists service, technical and performance requirements for handover. It examines hooks and extensions and impacts on the A-interface. It proposes more co-operation between 3GPP and 3GPP2.

It needs to be clarified which version of ANSI standards should be considered (assumption ANSI-41 rev D and rev E). It was agreed to refer only to ANSI.41 as generic terms because revision E has not yet an official status but it covers revision D plus all additions.

Handover between asynchronous DS to (synchronous) MC is an issue that has to be resolved.

5. Requirements from the reference model on UTRA L123

5.1 Services from UTRA Radio Interface Protocols L123

Tdoc 015 cdma2000 Signalling MM, CC, and RRC Layers (Stage 2 Working Document)

This document was presented by Nortel. It is a Stage 2 description working document. It describes impacts of layering the cdma2000 signalling into RRC and MM, CC, … layers for support of the OHG recommendation. MC and DS modes are considered but TDD mode was not considered.

Discussion notes:

- It was questioned if handover messages in cdma2000 can support non RRC fields? It was clarified that in this case the DS RNC has to be made aware of the information to be added in the case of handover from MC to DS.

- The transcoder may remain in the anchor MSC, so all of the services depend on the anchor MSC, not the relay MSC.

- The problem is similar for DS to GSM handover.

- Separation between handovers from radio perspective and relocation should be kept.

Tdoc 027 Requirements for the support of the EVRC vocoder in UTRA

This contribution from Nortel Networks and Nokia discusses requirements for the support of EVRC from the radio point of view. The meeting agreed on the requirements and these will be studied in TSG-RAN1.

It was agreed that study of these issues is required in RAN1.

On the issue of different codecs support, it was clarified that in the case of EVRC new radio bearers are created in a compatible manner for the other radio access bearers. This is the principal for all additions, not just codec.

Representatives from Vodafone AirTouch expressed operators' desire to have a common next generation vocoder for the three modes of G3G CDMA to facilitate roaming across countries, regions and systems. Subsequently, Vodafone AirTouch urged 3GPP and 3GPP2 to jointly define and develop such a vocoder in the desired timeframe. Other operators and manufactures supported this view.

Tdoc 009 Proposal for the usage of Tag field in System Information Message

This contribution from Hyundai proposes to insert a 'Tag' field in System Information Message on BCCH. This is a typical example of a hook.

This discussion will continue in RAN2.

DS and MS access should be regarded as different access modes. How to indicate this to the mobile should be studied. This will be done in RAN 2.

5.2   Handover mechanism

No contributions on this subject were discussed.

5.3   Preliminary list of extensions after UTRA release 99

There were no contributions for this agenda item but the following were identified which are remaining issues for Release 2000:

- completion of USCH and DSCH channels

- FAUSCH for uplink

- Use of hybrid ARQ

It was agreed that regular status reports are required for progress in 3GPP and 3GPP2.

6.   Necessary hooks in UTRA release 99

6.1   Identification of existing hooks

Tdoc 017 Support of ANSI-41 Services in DS RRC Layer

The discussion on this document continued on Wednesday morning.

Hooks and extensions are needed where stated in the last column of the table on section 4. It was decided to consider the table in detail and update it as necessary to provide guidelines to the

working groups on the work required. Broadly speaking, anything on the list related to UTRA L1-UTRA RRC should be dealt with by 3GPP and anything related to DS-41 CC&MM should be dealt with by 3GPP2.

For some messages a hook is needed for acknowledgement from lower layer to upper layer. This will be done by RAN 2 and incorporated in 3GPP specifications.

On the problem of ciphering and authentication, it was agreed that security experts in 3GPP and 3GPP2 shall be tasked to review the issue of key handling and ciphering mechanism. This is an urgent task.

In the first afternoon session the meeting was adjourned and a sub-group led by Denis Fauconnier developed the table in tdoc 017 into a list of hooks and extensions with indications who would do the work. In the second afternoon session, the meeting reconvened to consider the table. The principle was endorsed and some modifications were made. This was captured in tdoc 034. At 17.00 the meeting adjourned again but the sub-group continued into the evening to elaborate tdoc 034. This became tdoc 035.

On Thursday morning Denis Fauconnier presented tdoc 035. The TSG-RAN chairman reiterated that the most important goal of the workshop is to identify hooks and extensions for Release 99. Denis Fauconnier explained that there are many extensions but not many hooks and they are easy to provide. Item 9 in tdoc 035 identifies clearly required hooks. More may be identified in the future. Studies have to be performed before the RAN meeting (RAN#5) in October. It was clarified that Release 99 specifications may be modified during year 2000.

Hans van der Veen was introduced as the secretary of RAN 2 and the person responsible for maintaining RAN2 specifications. 3GPP2 need the very latest versions of the specifications and information about change requests to them. To this effect, Hans van der Veen produced a list of RAN2 change requests made after the RAN#4 plenary meeting in Miami. This is in tdoc 033. In the case of RAN2, many specs (notably RRC) are not yet approved at version 3 and therefore updated after each RAN2 meeting. For specifications under change control (ie version 3), Denis Fauconnier will ask the editors to keep an interim version of after each RAN2 meeting for the benefit of 3GPP2.

Tdoc 035 was agreed with minor modifications to become tdoc 036. Tdoc 036 was recognised as the main output of the meeting and is contained in annex C of this report (N.B. with an editorial clean-up).

Tdoc 019 Paging and Broadcast for DS/ANSI-41 Systems

This contribution analyses some aspects of paging and broadcast for DS/ANSI-41. The following have been identified as potential hooks and/or extensions for DS/ANSI-41:

· A hook may be required to support new formats in the paging record. This was considered as one potential candidate for a solution.

· Hooks and/or extensions may be required to support cdma2000-sized paging messages.

· Hooks and/or extensions may be required to support broadcast SMS. 3GPP2 agreed to review the new material which has been recently developed within 3GPP. RAN 2 will provide the necessary information.

· A hook is required to provide a common message type for the overhead messages between the DS spec and cdma2000.

· A hook and/or extension may be needed for overhead information update.

6.2   Additional hooks that would be necessary?

Tdoc 007 Identification of the Hooks & Extensions

TTA(Electronics and Telecommunications Research Institute, Hansol PCS, Hyundai Electronics, Korea Telecom Freetel, LGIC, LG Telecom, Samsung Electronics, Shinsegi Telecom, SK Telecom)

This contribution from the Korean consortium identifies some Hooks by describing the items that need to be included in 3GPP Release 99 specification.

The same functionality as the cdma2000 Channel Assignment into Soft Handoff feature is already supported in the DS spec. Therefore, no hook or extension will be required. Hooks and/or extensions may be needed to support cdma2000-sized paging messages. The ability to send ANSI-41 network related-messages on the DS broadcast channel is needed. It may be desirable to have a consistent way to indicate to the MS/UE if changes to the overhead messages.

There is a requirement from 3GPP2 to keep the upper layers of ANSI-41 untouched as far as possible.

Adapting MMCC layers of cdma2000 will be done by 3GPP2.

The elaboration of this document will be done by 3GPP2 and seen again in 3GPP.

7.   Liaison and output to other groups

There were no formal liaisons to other groups from this workshop.

8.   Any other business - the way forward

Tdoc 036 identifies work to be done in 3GPP TSG-RAN working groups and the WG chairmen will organise how this is done.

The preliminary result from 3GPP TSG-RAN working groups will be made available to the 3GPP2 workshop in LA 9-10 September.

Exchange of information will be made between 3GPP and 3GPP2 WG chairmen on an informal basis. Formal liaisons will also be sent from 3GPP to 3GPP2 - (3GPP2 contact person Alberto Gutierrez). 3GPP2 will be expected to direct them to the appropriate group. Mr Furuya asked Francois Courau to be the contact person in 3GPP TSG-RAN.

3GPP TSG-RAN plenary will be held in March 2000 (RAN#7) and June 2000 (RAN#8). The following targets were agreed.

- Specification of all hooks by December 1999,

- possible extensions by December 1999,

- all extensions by March 2000,

- necessary corrections by June of 2000.

Tdocs 006 and tdoc 032 were considered for information and not discussed in plenary.

9. Closing of the meeting

Francois Courau closed the meeting at 12.00 on Thursday 26 August 1999 and thanked the delegates for their participation. The TTA delegation thanked Francois Courau for the success of the workshop. The 3GPP TSG-RAN chairman, Mr Furuya added his thanks for the successful workshop.

Annex A: List of registered delegates

NAME	COMPANY	TELEPHONE	FAX	EMAIL
Ms. Midori Akao	INTERPRETER	+81 468 40 3191	+81 468 40 3840	akao@seeds.nttdocomo.co.j
Mr. Jean R. Alphonse	AMERITECH CELLULAR	+1 847 619 5416	+1 847 706 7854	jalphonse@ameritechcell.co
Mr. Niels Peter Skov Andersen	MOTOROLA A/S	+45 43 48 81 10	+45 43 48 82 76	npa001@email.mot.com
Mr. Gérard Auvray	ALCATEL France	+33 1 5566 33 90	+33 1 5566 43 91	gerard.auvray@alcatel.fr
Mrs. Mi-Sook Baek	HYUNDAI ELECTRONICS INDUSTRIE	+82 336 630 2758	+82 336 639 6175	msbaek@hei.co.kr
Mr. David Barnes	DTI	+44 1634 570 244	+44 1634 572 360	dbarnes3@compuserve.com
Mr. Per Beming	ERICSSON L.M.	+46 8 404 4681	+46 8 757 5720	per.beming@era.ericsson.se
Dr. Howard Benn	MOTOROLA Ltd	+44 1 793 566266	+44 1 793 566225	bennh@ecid.cig.mot.com
Mr. Stephen Blust	Bellsouth Cellular	+1 404 249 5058	+1 404 249 5157	stephen.blust@bscc.bls.com
Mr. Phillip Brown	ERICSSON	+1 770 414 9680	+1 770 414 9556	phil.brown@cisr.com
Dr. Jongsuk Chae	ETRI	+82 42 860 6280	+82 42 860 6500	jschae@etri.re.kr
Mr. Sharat Chander	Lucent Technologies, Inc.	+1 630 713 1921		sharat@lucent.com
Mr. Colin Chandler	QUALCOMM EUROPE S.A.R.L.	+33 4 92 38 82 20	+33 4 92 38 82 30	colinc@qualcomm.com
Mr. Gyu Tae Chang	SHINSEGI TELECOM, Inc	+82 2 3708 1418	+82 2 3708 1409	gtchang@shinsegi.com
Mr. Kim Chang	Nortel Networks	+ 972 684 1346	+1 972 684 3775	kimchang@nortelnetworks.c
Dr. Stanley Chia	AirTouch Belgium S.A.	+1 925 210 3470	+1 925 210 3485	stanley.chia@airtouch.com
Mr. Yongsun Cho	SK TELECOM	+82 342 710 5146	+82 342 710 5199	ycho@sktelecom.com
Dr. Mooho Cho	ETRI	+82 42 860 5624	+82 42 860 6500	mhcho@etri.re.kr
Mr. Jin-Sung Choi	LGIC	+82 343 450 2082	+82 343 450 2944	jschoi@iginfocomm.com
Mr. Ian Corden	Lucent Technologies N. S. UK	+44 1793 886 201	+44 1793 883 815	icorden@lucent.com
Mr. François Courau	ALCATEL France	+33 1 30 77 94 68	+33 1 30 67 94 30	francois.courau@alcatel.fr
Mr. Neerav Dalal	SAMSUNG Electronics	+1 972 761 7923	+1 972 761 7909	ndalal@telecom.sna.samsun
Mr. Jean-Jacques Davidian	DoCoMo Europe S.A.	+33 1 5688 3030	+33 1 5688 3045	davidian@docomo.fr
Mr. Mohamad Dawood	Motorola Inc.	+1 847 632 6317	+1 847 435 9069	dewoodma@cig.mot.com
Mr. Steven Dennett	Motorola Inc.	+1 847 523 6868	+1 847 523 0375	qa1404@email.mot.com
Mr. Harald Dettner	SIEMENS AG	+49 6621 169 169	+49 6621 169 122	harald.dettner@icn.siemens.
Mr. Michael Dolan	Lucent Technologies	+1 630 979 1033	+1 630 713 1921	mfdolan@lucent.com
Mr. Guillaume du Roscoat	France Telecom	+33 1 45 29 68 02	+33 1 45 29 50 99	guillaume.duroscoat@cnet.f lecom.fr
Mr. Per Ernström	TELIA AB	+46 8 713 8134	+46 8 713 8199	per.v.ernstrom@telia.se

Mr. Jean-Aicard Fabien	Motorola Inc.	+1 602 732 6203	+1 602 732 6350	p28842@email.mot.com
Mr. Michael Färber	SIEMENS AG	+49 89722 24935	+49 89722 24450	michael.faerber@icn.siemen
Mr. Denis Fauconnier	NORTEL NETWORKS (EUROPE)	+33 1 39 44 52 87	+33 1 39 44 50 12	dfauconn@nortelnetworks.c
Mr. Frank Favichia	Lucent Technologies, Inc.	+1 973 386 4147		f2@lucent.com
Mr. Kenneth Felix	Motorola Inc.	+1 847 632 5046	+1 847 632 2574	cell06@email.mot.com
Mr. Mel Frerking	Bellsouth Cellular	1404 2494566	1404 2495157	mel_frerking@bscc.bls.com
Mr. Yukitsuna Furuya	NEC Corporation	+81 42 333 1061	+81 42 333 1083	furuya@pccrd.fc.nec.co.jp
Mr. Hari Garg	PHILIPS E.G.P.	+1 510 445 5558	+1 510 445 5600	hari.garg@philips.com
Mr. Thomas Gee	Hewlett-Packard	+1 619 655 3333	+1 510 505 5560	tom_gee@hp.com
Mr. Aleksandar` Gogic	VODAFONE Group Plc	+1 925 210 3427	+1 925 210 3419	alex.gogic@airtouch.com
Mr. Francesco Grilli	QUALCOMM EUROPE S.A.R.L.	+33 4 92 38 82 27	+33 4 92 38 82 30	fgrilli@qualcomm.com
Mr. Mikael Gudmundson	ERICSSON L.M.	+46 8 404 2583	+46 8 757 5720	mikael.gudmundson@era.er se
Mr. Roger Guenther	Lucent Technologies, Inc.	+1 973 386 4555		rdguenther@lucent.com
Dr. Alberto Gutierrez	NORTEL NETWORKS (EUROPE)	+1 972 685 5586	+1 972 684 3775	algutier@nortelnetworks.cor
Mr. Sungsoo Han	SK TELECOM	+82 2 732 2277	+82 2 732 2278	sshan@sktelecom.com
Mr. Hans Hauser	Deutsche Telekom MobilNet	+49 228 936 1200	+49 228 936 3309	hans.hauser@t-mobil.de
Mr. Frédéric Heurtaux	SAGEM Group	+33 1 45 82 31 89	+33 1 45 82 65 55	frederic.heurtaux@sagem.co
Dr. Volker Hoehn	MANNESMANN Mobilfunk GmbH	+49 211 533 3637	+49 211 533 2834	volker.hoehn@d2privat.de
Mr. Gottfried Holzmann	ROHDE & SCHWARZ GmbH & Co.KG	+49 89 4129 3332	+49 89 4129 3443	gottfried.holzmann@rsd.rsd
Mr. Harri Honkasalo	NOKIA Corporation	+358 40 565 4604	+358 1050 55707	harri.honkasalo@nokia.com
Mr. Mark Hosford	LGIC	+1 619 635 5322	+1 619 635 5399	mhosford@lginfocomm.con
Ms. Woonhee Hwang	HYUNDAI ELECTRONICS INDUSTRIE	+82 2 580 5396	+82 2 580 5390	whhwang@hei.co.kr
Mr. In-Tae Hwang	LGIC	+82 343 450 2964	+82 343 450 2965	hit3558@lgic.co.kr
Mr. Phil Hyman	BT	+44 1 473 605392	+44 1 473 623683	phil.hyman@bt.com
Mr. Shinobu Ikeda	ETSI	+ 81 3 37 98-5991	+ 81 3 3798 4623	sikeda@cse.dnp.fc.nec.co.jp
Mr. Kenji Ito	Siemens K.K	+81 3 5423 8520	+81 3 5423 8728	kenji.ito@skk.siemens.co.jp
Mr. James Jiang	Nortel Networks	+1 972 684 5885	+1 972 684 3775	jjiang@nortelnetworks.com
Mr. Llyod Johnson	Motorola Inc.	+1 480 441 8037	+1 480 441 6073	p23042@email.mot.com
Mr. Gary Jones	Omnipoint Corporation	+1 301 951 2524	+1 703 715 2365	gjones@omnipoint-corp.con
Mr. Jeong-Woo Jwa	KOREA TELECOM FREETEL	+82 016 201 1633	+82 344 909 0664	lcr@mail.pcs016.co.kr

Mr. Nilesh Kamdar	Hewlett-Packard	+1 509 921 3319	+1 509 921 3991	kamdar@spk.hp.com
Mr. Toshihito Kanai	MOTOROLA JAPAN LTD	+81 3 5463 3850	+81 3 5463 4137	kanai@cig.nml.mot.com
Mr. Heewon Kang	Samsung Electronics Co., Ltd	+82 342 779 6624	+82 342 779 6699	hkang@metro.telecom.sams .kr
Dr. Makis Kasapidis	PANASONIC Europe	+44 1635 875528	+44 1635 873638	makis.kasapidis@mci.co.uk
Mr. Masashi Kawamura	DDI	+81 3 3221 9682	+81 3 3221 9694	kawamura@ddi.co.jp
Mr. Shigeru Kida	DDI	+81 3 3221 9682	+81 3 3221 9694	kida@ddi.co.jp
Dr. Youn Kwan Kim	LG TeleCom., Ltd	+1 619 871 8894	+1 858 350 8894	ykkim@lginfocomm.com
Mr. Kwang Sik Kim	ETRI	+82 42 860 4914	+82 42 860 6500	kskims@etri.re.kr
Mr. Seong-Keun Kim	SK TELECOM	+82 2 3709 0264	+82 2 3709 0239	kimsk64@sktelecom.com
Mr. Hiroshi Komatsu	Japan Telecom Co. Ltd	+81 355408420	+81 355 408485	hkomatsu@japan-telecom.c
Mr. Yeon-sang Koo	HYUNDAI ELECTRONICS INDUSTRIE	+82 2 580 5398	+82 2 580 5390	hwkoo@hei.co.kr
Mr. Joe Kwak	Golden Bridge Technology Inc.	+1 732 728 9615	+1 732 870 9008	joekwak@mcs.net
Mr. Hyeon Woo Lee	Samsung Electronics Co., Ltd	+82 342 779 6613	+82 342 779 6699	woojaa@samsung.co.kr
Mr. Xiaoyang Lee	Matsushita Communication	+1 609 734 7583	+1 609 987 0201	lee@research.panasonic.con
Dr. Sang Yun Lee	SK TELECOM	+82 342 710 5120	+82 342 710 5177	ysl@sktelecom.com
Dr. Kyeong Soo Lee	KOREA TELECOM FREETEL	+82 344 909 0601	+82 344 909 0661	lks@pcs016.co.kr
Mr. Andrea Leonardi	Hewlett-Packard	+1 509 921 3415	+1 509 921 3991	anleonar@spk.hp.com
Mr. Yong-Jin Lim	LG TeleCom., Ltd	+82 2 3466 0507	+82 2 3466 0523	yjlim@lgtel.co.kr
Mr. Zhongrong Liu	Deutsche Telekom MobilNet	+49 228 936 1406	+49 228 936 1245	zhongrong.liu@t-mobil.de
Mr. Michael Luddy	SONY INTERNATIONAL (EUROPE)	+49 711 5858 221	+49 711 5858 468	luddy@sony.de
Mr. Pertti Lukander	NOKIA Corporation	+358 9 5113 8444	+35 89 51 13 84 52	pertti.lukander@nokia.com
Mr. Yutaka Maeda	ARIB	+81 33 55 10 85 94	+81 33 59 21 103	maeda@arib.or.jp
Mr. Brian Marchent	FUJITSU Europe Telecom R & D C	+44 181 606 4670	+44 181 573 3602	b.marchent@fujitsu.co.uk
Mr. Jürgen Merkel	ALCATEL SEL AG	+49 711 821 45369	+49 711 821 46068	jmerkel@alcatel.de
Mr. Behzad Mohebbi	FUJITSU Europe Telecom R & D C	+44 1 81 60 64 841	+44 1 81 606 4539	b.mohebbi@fujitsu.co.uk
Mr. Yoshinao Nakada	Lucent Technologies Japan Ltd.	+81 3 5561 5845	+81 3 55 61 9011	ynakada@lucent.com
Mr. Isao Nakajima	SONY Corporation	+81 3 5782 5195	+81 3 5782 5213	nakajim2@wtlab.sony.co.jp
Mr. Jae Kook Nam	KOREA TELECOM FREETEL	+82 344 909 0611	+82 344 909 0661	namjk@pcs016.co.kr
Mr. Markus Nasshan	SIEMENS AG	+49 2871 9127 46	+49 2871 9133 87	markus.nasshan@bch.sieme

Mr. Syed H. Niaz	Motorola Inc.	+1 847 632 6474	+1 847 632 6999	syed_niaz-QA4327@email.mot.com
Mr. Markku Nieminen	Finnet Group	+35 89 60 64 282	+35 89 60 63 798	markku.nieminen@hpy.fi
Mr. Leo Nikkari	UWCC	+1-425 372 8923		Leo.Nikkari@uwcc.org
Mr. Mats Nilsson	ERICSSON L.M.	+46 8 757 0602	+46 8 751 2309	
Mr. Byungki Oh	HANSOL PCS	+82 2 3488 0423	+82 2 3488 1900	belix@hansol.co.kr
Dr. Hakan Ohlsén	ERICSSON L.M.	+46 8 757 0656	+46 8 58533064	hakn.ohlsen@lme.ericsson.s
Mr. Sadaatsu Okasaka	Hitachi Ltd	+81 45 865 7120	+81 45 865 7122	sadaatsu_okasaka@cm.tcd.h co.jp
Mr. Hideo Okinaka	KDD	+81 3 3347 6306		hi-okinaka@kdd.co.jp
Mr. Nobutaka Okuyama	LSI LOGIC	+81 354637822	+81 354637823	nicko@lsil.com
Mr. Seizo Onoe	NTT DoCoMo	+81 468 40 3190	+81 468 40 3840	onoe@wsp.yrp.nttdocomo.c
Mr. Val Oprescu	Motorola Inc.	+1 847 435 0053	+1 847 435 9970	a10289@email.mot.com
Mr. Edwards Ornelas	TIA	+1 703 907 7476		eornelas@tia.eia.org
Mr. Jin-Young Park	LGIC	+82 343 450 2945	+82 343 450 2944	jinyougp@lgic.co.kr
Mr. Jaehong Park	HYUNDAI ELECTRONICS INDUSTRIE	+82 2 580 5399	+82 2 580 5390	parkjh@hei.co.kr
Mr. Kyutae Park	ETRI	+82 42 860 1276	+82 42 860 6789	ktpark@etri.re.kr
Mr. Kourosh Parsa	GOLDEN BRIDGE TECHNOLOGY INC	+1 732 870 8088	+1 732 870 9008	kpgbt@aol.com
Mr. Girish Patel	Nortel Networks	+1 972 684 2491	+1 972 685 3574	grpatel@nortelnetworks.con
Mr. Eric Pité	SAGEM Group	+33 1 30 73 72 61	+33 1 30 38 65 55	heurtaux@sagem.fr
Mr. Bob Plunkett	FUJITSU Network Communications	+1 972 479 2084	+1 972 479 6973	bobplunkett@sprintmail.con
Mr. Dean Prochaska	SPRINT	+1 913 664 8301	+1 913 664 8440	dprocho01@sprintspectrum
Mr. Roberto Procopio	TELECOM ITALIA S.p.A.	+39 011 228 5061	+39 011 228 7056	roberto.procopio@cselt.it
Mr. Chris Pudney	VODAFONE Group Plc	+44 1 635 673 397	+44 1 635 523 615	chris.pudney@vf.vodafone.c
Mr. Paul Reid	ETSI Secretariat	+33 4 92 38 52 19		paul.reid@etsi.fr
Mr. Kari Rikkinen	NOKIA Corporation	+358 10 50 51	+358 10 505 57 07	kari.rikkinen@nokia.com
Mr. Mikko J. Rinne	NOKIA Corporation	+358 9 4376 7295	+358 9 4376 6856	mikko.j.rinne@nokia.com
Mr. Richard Robinson	SPRINT	+1 913 664 8321	+1 913 664 8440	rrobin01@sprintspectrum.cc
Ms. Carole Rodriguez	ETSI	+33 4 92 94 42 62	+33 4 93 65 28 17	carole.rodriguez@etsi.fr
Mr. Giovanni Romano	TELECOM ITALIA S.p.A.	+39 011 228 7069	+39 011 228 7078	giovanni.romano@cselt.it
Mr. Chang-Ho Ryoo	ERICSSON KOREA	+82 2 732 2641	+82 2 732 2913	changho.ryoo@ekk.ericsson
Mr. Antun Samukic	ETSI	+33 4 92 94 43 52	+33 4 93 65 28 17	antun.samukic@etsi.fr
Mr. Akio Sasaki	ARIB	+813 5510 8594	+813 3592 1103	sasaki@arib.or.jp
Mr. Erik Schön	Nippon Ericsson	+81 3 5216 9086	+81 3 5216 9047	Erik.Schon@nrj.ericsson.se
Mr. Normon Secord	NORTEL NETWORKS	+1 613 765 3198	+1 613 765 2592	nsecord@nortelnetworks.co

	(EUROPE)			
Mr. Toshiro Shikama	MITSUBISHI Electric	+33 2 99 84 21 10	+33 2 99 84 21 15	shikama@tcl.ite.mee.com
Mr. Sang Rim Shin	LGIC	+82 343 50 2937	+82 343 50 2944	srshin@lge.co.kr
Mr. Masakazu Shirota	DDI	+81 3 3221 9682	+81 3 3221 9694	shirota@ddi.co.jp
Mr. Dong Jye Shyy	CCL/ITRI	+886 3 591 7384	+886 3 582 0204	dshyy@m300.ccl.itri.org.tw
Mr. Paul Simmons	NORTEL NETWORKS (EUROPE)	+33 1 34 52 55 95	+33 1 34 52 50 12	Paul.simmons@nortelnetwo m
Mr. Pyeong Jung Song	ETRI	+82 42 860 1276	+82 42 860 6789	pjsong@amadeus.etri.kr
Mr. Sang Hoon Song	RADIO RESEARCH LABORATORY	+82 2 750 235	+82 2 750 2394	sanghoon@mic.go.kr
Mr. Timothy Stone	Motorola Inc.	+1 847 632 2818	+1 847 435 2352	ats005@email.mot.com
Mr. Katsumasa Sugiyama	Fujitsu Limited	+81 44740 8112	+81 44740 8182	sugiyama@msd.ts.fujitsu.co
Mr. Richard Sweet	Nokia Mobile Phones, Inc.	+1 619 455 1747		richard.sweet@nmp.nokia.c
Mr. Keith Ten Brook	Motorola Inc.	+1 847 632 2308	+1 847 632 2574	qa0025@email.mot.com
Mr. Kazuhiko Terashima	SONY Corporation	+81 3 5782 5199	+81 3 5782 5213	tera@wtlab.sony.co.jp
Mr. Edward Tiedemann	QUALCOMM EUROPE S.A.R.L.	+1 619 658 4438	+1 619 658 2113	etiedemann@qualcomm.con
Mrs. Nathalie Ting	NORTEL NETWORKS (EUROPE)	+33 1 39 44 50 89	+33 1 39 44 50 12	nting@nortelnetworks.com
Ms. Marina Tomasin	TELITAL S.p.A.	+39 040 4192353	+39 040 25111	marina.tomasin@rs1.telital.i
Mr. Antti Toskala	NOKIA Corporation	+358 9 511 38221	+358 9 511 38452	Antti.Toskala@nokia.com
Mr. Michael Vakulenko	QUALCOMM EUROPE S.A.R.L.	+972 4 850 6506	+972 4 850 6508	michaelv@qualcomm.com
Mr. Hans van der Veen	ETSI	+31 53 450 5309	+31 53 450 5550	Hans.vander.Veen@emn.eri e
Dr. Lorenzo Vangelista	TELITAL S.p.A.	+39 040 4192 244	+39 040 251 257	lorenzo.vangelista@telital.it
Mr. Willy Verbestel	MOTOROLA Ltd	+1 480 732 2339	+1 480 732 6350	p26458@email.mot.com
Mr. Vino Vinodrai	Bell Mobility	+1 905 282 3302	+1 905 282 3337	cvinodra@moblity.com
Mr. Kunio Watanabe	Fujitsu Limited	+81 44 754 3850	+81 44 754 3880	watanabe@mcws.ts.fujitsu.
Mr. Serge Willenegger	QUALCOMM EUROPE S.A.R.L.	+41 244 363 541	+41 244 363 542	c_sergew@qualcomm.com
Mr. Dan Willey	Motorola Inc.	+1 847 632 2900	+1 847 632 2900	qa1364@email.mot.com
Dr. David Williams	ETSI	+33 4 92 94 43 21	+33 4 93 65 28 17	david.williams@etsi.fr
Mr. Howard H. Xia	VODAFONE Group Plc	+1 925 210 3474	+1 925 210 3469	howard.xia@airtouch.com
Mrs. Wang Xiaoyun	RITT	+86 10 63 604877	+86 10 63604879	mcbtech@public3.bta.net.cr
Mr. Shinhyun Yang	HYUNDAI ELECTRONICS INDUSTRIE	+82 2 580 5398	+82 2 580 5390	yangsh@hei.co.kr
Mr. JungHwa Ye	HYUNDAI ELECTRONICS INDUSTRIE	+82 2 580 5397	+82 2 580 5437	jupiter@hei.co.kr

Mr. Mitsuru Yokoyama	Hewlett-Packard Japan, Ltd	+81 78 993 2763	+81 78 993 2683	yoko@kobe.hp.com
Mr. Ho Kwon Yoon	DACOM Corporation	+82 42 220 4143	+82 42 220 4444	idealcom@halla.dacom.co.k
Mr. Gordon Young	Lucent Technologies N. S. UK	+44 1793 883 308	+44 1793 883 815	gyoung1@lucent.com
Mr. Chan Ho Yun	KOREA TELECOM FREETEL	+82 2 2016 1083	+82 2 2016 1078	chyun@pcs016.co.kr
Mr. Donald E. Zelmer	Bellsouth Cellular	+1 404 249 3689	+1 404 249 5157	don_zelmer@bscc.bls.com

Annex B: List of documents

NUMBER	TITLE	SOURCE	AGENDA ITEM	REVISED BY
WHE-99001	Proposed Agenda	Chairman		
WHE-99002	3GPP handling of the OHG Proposal	T1P1		
WHE-99003	Unused	Motorola Inc		
WHE-99004	Unused	Motorola Inc		
WHE-99005	cdma2000 Access Entry, Access and Access Probe Handoff features	Motorola Inc		
WHE-99006	Requirements for Interoperability between Multi-Carrier CDMA and GSM MAP	Vodafone		
WHE-99007	Identification of the Hooks & Extensions	Hyundai		
WHE-99008	Call Origination Flow for UTRAN + ANSI-41	Hyundai		
WHE-99009	Proposal for the usage of Tag field in System Information Message	Hyundai		
WHE-99010	Message conversion for CC/MM message	Hyundai	withdrawn	31
WHE-99011	ME and SE Model for Hooks and Extensions	Hyundai		
WHE-99012	High Level Service and System Requirements for the Hooks and Extensions for G3G CDMA DS + ANSI-41	SK Telecom		
WHE-99013	ANSI-664 Features to be supported in DS/ANSI-41 Systems	3GPP2 members		
WHE-99014	Handover for DS/ANSI-41 Systems	3GPP2 members		
WHE-99015	cdma2000 signalling MM, CC and RRC layers	3GPP2 members		
WHE-99016	Packet Data Dormant handoff	3GPP2 members		
WHE-99017	Support of ANSI-41 Services in DS RRC Layer	3GPP2 members		
WHE-99018	Proposal for DS-41 Reference Architecture and Way Forward	3GPP2 members		
WHE-99019	Paging and Broadcast DS/ANSI-41 Systems	3GPP2 members		
WHE-	not used	3GPP2		

99020		members		
WHE-99021	not used	3GPP2 members		
WHE-99022	AUTHENTICATION PROCEDURES IN ANSI-41 EVOLVED G3G NETWORK, HARMONIZED DS (HDS) RAN+ANSI-41 CN	ETRI		
WHE-99023	Handover between DS-mode system and MC-mode system including IS-95 A/B system	TTA		
WHE-99024	Reference model for the DS mode connected to ANSI-41 Core Network	Nokia		
WHE-99025	Need of hooks in harmonized DS-mode connected to ANSI-41	Nokia		
WHE-99026	Non-radio-technologie-related 3G-3G interoperation aspects	Siemens AG		
WHE-99027	Requirements for the support of ERVC codec in UTRA	Nokia, Nortel Networks		
WHE-99028	ANSI-634 parameter categorization and relationship to RRC protocol	Ericsson	withdrawn	32
WHE-99029	Spare			
WHE-99030	Spare			
WHE-99031	Message conversion for CC/MM message	Hyundai		
WHE-99032	ANSI-634 parameter categorization and relationship to RRC protocol	Ericsson		
WHE-99033	RAN WG2 Change Requests	ETSI MCC		
WHE-99034	Identification of hooks and responsibilities	Sub-group		35
WHE-99035	Revised Identification of hooks and responsibilities	Sub-group		36
WHE-99036	Agreed Identification of hooks and responsibilities	Meeting		

Annex C: Main output of the meeting

High level principles

An extension is necessary to add a confirm primitive from RRC when Direct Transfer was completed.

3GPP2 must review all CC/MM procedures and in particular timers based on the identified corresponding RRC procedure.

3GPP will provide information on parameters which can be configured and influence the timing of RRC procedures.

CN type is on BCCH.

Based on CN type, RRC messages can have different format (e.g. page record format).

Information cause in RRC connection request may need to be extended.

User plane needs to be reviewed i.e. that all ANSI41 services can be mapped on 3GPP L2 and L1. Action on 3GPP2 and RAN1/RAN2 to provide support.

Handover

Handoff between DS41 and 1X/3X is a hard handoff from the radio interface point of view. In the network, it corresponds to an inter-BSC hard handoff involving the support from the Core Network. This may not preclude optimisations for equipment having both RNC and BSC functions which could perform the hard handover autonomously, but this needs further work.

Extensions of RRC are necessary in support of handover. This includes neighbour lists, radio parameters, the control of the measurements and the measurement reporting, etc.

Extensions of the 3GPP2 IOS are necessary in support of handover.

Extensions of 3GPP2 radio interface signalling are necessary in support of handover.

Extensions of ANSI41 are necessary in support of inter-MSC handover.

The following handover scenarios are considered:

- sync DS-41 to sync MC-41 handover need means to convey neighbour cells information similar to cdma2000 in the DS-41 cells. Extensions to RRC are necessary.

- sync MC-41 to sync DS-41 handover need means to convey neighbour cells information in 3GPP2 cell. Extension in 3GPP2 signalling is necessary.

- sync MC-41 to async DS-41 handover uses 3GPP async handover mechanism. It requires means to convey neighbour cells information in 3GPP2 cell. Extension in 3GPP2 signalling is necessary.

- async DS-41 to sync MC-41 handover needs further analysis. Extensions to 3GPP and/or 3GPP2 are necessary depending on the technical solution. Preliminary work would be first in 3GPP RAN WG1.

- DS-41 to analog handover need means to convey neighbour cells information similar to MC-41 to analog case. Extensions to RRC are necessary

The handling of terminal capabilities needs work. RAN2 and 3GGP2.

Idle handoff will be analysed by 3GPP2. It means analysis of the current 3GPP algorithms, in view of alignment with ANSI41 current algorithms.

Generic RRC procedures

Support of CC/MM signalling

Procedure 1a

Request from upper layers in network

Paging *Alternative 1+ CC/MM message*

RRC connection setup

Alternative 2: Direct transfer of the CC/MM message from network on radio

Direct transfer of the CC/MM message from terminal on radio

Set up of A interface connection

transfer of CC/MM to MSC

RRC connection is released when A int connection is released by MSC

Procedure 1b

Request from upper layers in network

Paging *Alternative 1+ CC/MM message*

RRC connection setup

Alternative 2: Direct transfer of the CC/MM message from network on radio

Direct transfer of the CC/MM message from terminal on radio

transfer of CC/MM to MSC

Upper layers in RNC release RRC connection

Note: RAN WG2 will evaluate whether alternative 1 or alternative 2 is most optimised. 3GPP2 will provide the list of initial CC/MM messages which need to be sent in that procedure.

Procedure 2a

Request from upper layers in terminal

RRC connection setup

Direct transfer of the CC/MM message from terminal on radio

Set up of A interface connection

transfer of CC/MM to MSC

RRC connection is released when A int connection is released by MSC

Procedure 2b

Request from upper layers in terminal

RRC connection setup

Direct transfer of the CC/MM message from terminal on radio

transfer of CC/MM to MSC

Upper layers in RNC release RRC connection

Procedure 3

Notification broadcast with terminal identity (similar to paging)

If answer is necessary, procedures 1a and 1b apply

Procedure 4

RRC connection exists

Direct transfer message is send from or towards the network to or from the terminal

Procedure 5

SMS Cell Broadcast

Support of Radio Mobility

Procedure 6

Information about the neighbour cells is provided to the terminal

Terminal performs measurements

Measurements are provided to the network

Networks makes a handover decision

Source RNC or BSC sends handover required message on A interface

Handover request is sent from MSC to target BSC or RNC

Target BSC or RNC checks availability of resources

Handover request ack is sent back to MSC with the commited resources

Handover command is sent from MSC to source RNC or BSC

Handover command is sent on the radio interface by source RNC or BSC. This may imply a change of the service provided to the terminal.

Handover commenced message may be sent by source BSC to the MSC. Triggering point is L2 ack. Handover commenced is not sent by a source RNC.

Handover complete is sent from terminal to target RNC or BSC

target RNC or BSC relays Handover complete to MSC

Clear command is sent from MSC to source RNC of BSC. That triggers the release of the radio resources under the old BSC or RNC.

Clear complete is sent to the MSC.

Note that the name of the messages on the radio interface are different on the 3GPP radio and 3GPP2 radio.

Additional study is necessary for the handover of Packet Data connections. 3GPP2 will carry the initial analysis.

Service	Group responsible	RRC procedure + *eventual specific hook with responsible group*
1.1 Registration		2a
1.2 Deregistration		2a or 4
1.3 Authentication		1b or 4
1.4 Signalling Message Encryption	RAN2, 3GPP2 and AHAG SA3	Needs complete analysis on ciphering to provide the extentions. No hooks are necessary for rel 99.
1.5 Voice Privacy	RAN2, 3GPP2 and AHAG SA3	Needs complete analysis on ciphering to provide the extentions. No hooks are necessary for rel 99.
1.6 Numbering and Identity: IMSI support		RRC extensions. No hook necessary.
1.7 Numbering and Identity:TMSI support		RRC extensions. No hook necessary.
1.8 TMSI assignment		1a or 1b or 4
1.9 support for ESN		RRC extensions. No hook necessary.
2.1 Origination		2a, 4
2.2 Call Delivery/Mobile Terminated calls		1a, 4
2.3 Call clearing by MS		4
2.4 Call Clearing by Network		4
2.5 DTMF Transmission Using In-band tones		4
2.6 Priority Access (PACA)		2a, 1a, followed by 4
2.7 Emergency Services (E911)		2a
2.8 Emergency Services callback		1a

2.9 Emergency Services reconnect		1a
2.10.1 Vocoder support EVRC and IS733		L1 extension necessary for rel 99 for EVRC. No hooks or extensions expected on IS733. This needs to be confirmed.
2.10.2 vocoder bypass		No impact on radio interface.

Item #	Category and Service/Capability	Responsible	Comments (mechanism for support in DS/ANSI-41)
1.0	**Mobility Management/Network services**		
1.1	Registration		
1.2	Deregistration		
1.3	Authentication		
1.4	Signalling Message Encryption		
1.5	Voice Privacy		
1.6	Numbering and Identity:IMSI Support		
1.7	Numbering and Identity:TMSI Support		
2.0	*Voice Services*		
2.1	Origination		
2.2	Call Delivery/Mobile Terminated Calls		
2.3	Call Clearing by MS		
2.4	Call Clearing by Network		
2.5	DTMF Transmission Using In-band Tones		
2.6	Priority Access (PACA)		
2.7	Emergency Services (E911)		
2.8	Emergency Services Callback		
2.9	Emergency Services Re-connect		
2.10	*Vocoder Support*		
2.10.1	EVRC		

2.10.2	Multiple vocoder support		
2.10.3	Vocoder bypass (Vocoder Tandem Free Operation)		
3.00	*Supplementary Features*		
3.01	3 Way Calling		4
3.02	Answer Hold		4
3.03	Call Forwarding after Call Delivery		4
3.04	Call Forwarding before Call Delivery		1a
3.05	Call Forwarding on Busy		1a, 4
3.06	Call Forwarding on No Answer		1a,4
3.07	Call Forwarding on Not Reachable		1a,4
3.08	Call Forwarding Unconditional		1a,4
3.09	Call Transfer		4
3.10	Call Waiting		4
3.11	Called Party Number		4
3.12	Called Party Subaddress		4
3.13	Calling Number Identification Presentation		4
3.14	Calling Number Identification Restriction		1a,4
3.15	Calling Party Number		4
3.16	Calling Party Subaddress		4
3.17	Conference Calling		4
3.18	Connected Number		4
3.19	Connected Party Subaddress		4
3.20	Country Specific Codes		4
3.21	Display		1b, 3, 4
3.22	Do Not Disturb		1a,4
3.23	DTMF Transmission		4

3.24	Extended Display		1b, 3, 4
3.25	Feature Notification		1b, 3
3.26	Flexible Alerting		4
3.27	Keypad Facility		4
3.28	Message Waiting Notification		1b, 3
3.29	Meter Pulses		4
3.30	Mobile Access Hunting		4
3.31	Parametric Alerting		4
3.32	Password Call Acceptance		NA
3.33	Position Location Finding		See later
3.34	Preferred Language		NA
3.35	Redirecting Number		4
3.36	Redirecting Number Subaddress		4
3.37	Rejection of Undesired Calls		4
3.38	Selective Call Acceptance		4
3.39	Subscriber PIN Access		NA
3.40	Subscriber PIN Intercept		NA
3.41	User Selective Call Forwarding to a number stored in the mobile station		4
3.42	User Selective Call Forwarding to network-based voice mail		4
3.43	User Selective Call Forwarding with a pre-registered number		4
3.44	User Zone Reject		1b, 3, 4 System info to be broadcast
3.45	User Zone Update		4 System info to be broadcast
3.46	Voice Message Retrieval		4
4.0	***Short Message Service***		
4.1	SMS Delivery on Control Channel		1b, 2b
4.2	SMS Delivery on Traffic Channel		4

4.3	Broadcast of SMS		5
4.4	Multiple Character Set		4
5.0	***Data Services***		
5.1	High Speed Ckt Data		2a
5.2	Circuit Switched Data Call		2a
5.3	Group 3 Fax		2a
5.4	IS-95-B High Speed Packet Data		1a, 2a
5.5	IS-2000 High Speed Packet Data		1a, 2a
5.6	Combined Voice and Data		4
6.0	***Subscription Management***		
6.1	Advice of Charge		4
6.2	Tiered Services/Flexible Charging		1b, 3, 4 System info to be broadcast
6.3	WIN Prepaid Services		NA
6.4	OTASP		1a, 2a
7.0	***Radio Mobility***		
7.1	Handoff to/from 2G Voice Call		6
7.2	Handoff to Analog		
7.3	Handoff to/from 2G Data/Fax Call		6
7.4	Handoff to/from MC (1X)		6
7.5	Handoff to/from MC (3X)		6
7.6.1	Handoff Active Packet Call		6
7.6.2	Handoff Dormant Packet Call		MC to DS 2a DS to MC 3GPP2 procedure DS to DS: current 3GPP mechanism in RRC Extension in RRC for packet zone Id
7.7	Handoff Sync to/from Async		6
7.8	Idle handoff (Cell selection/reselection)		To be analysed first in 3GPP2 Extensions necessary in RRC for broadcast of paramaters

8.0	Location Services		
			4 for GPS case 4 for radio interface information measured by terminal IOS interface for RNC measurements 3GPP2 will provide PN 4535 for analysis by RAN WG2.
9.0	Overhead messages (Broadcast)		
			RRC extensions Hook is CN type. Analysis from RAN WG2. Requirements provided by 3GPP2.
10.0	Paging		
			RRC extensions Analysis from RAN WG2. Requirements provided by 3GPP2.
11.0	Access Classes		
			Definition of Access Classes differs. Some impacts on RRC specification expected.

Note:

All service items except for the items 7.2 Handoff to Analog and 7.5 Handoff to/from MC(3X) are of the highest priority and the Hooks & Extensions for those items shall be included in Release 99. For item 7.5, Hooks & Extensions shall be included in Release 2000.

Regarding the Handoff, it is agreed that the item 7.7 Handoff Sync to/from Async shall have a high priority and the Hooks and Extensions to support such handoff shall also be included in Release 99.

An implementation schedule for Hooks and Extensions to support other items (e.g. async DS to sync MC-41 handover, vocoder support for EVRC, idle handoff, system broadcast message, paging, authentication & encryption, handling of terminal capabilities, etc.) shall be presented by 3GPP (with cooperation of 3GPP2) for approval at 3GPP2's L.A. Workshop on September 10, 1999.