

EXHIBIT 1

UNITED STATES DISTRICT COURT

for the

Southern District of New York

Nokia Corporation
Plaintiff
v.
Apple Inc.
Defendant
Civil Action No. 09-cv-791-GMS
(If the action is pending in another district, state where:
District of Delaware)

SUBPOENA TO TESTIFY AT A DEPOSITION IN A CIVIL ACTION

To: Ericsson Inc., The Grace Building, 1114 Avenue of the Americas, Suite #3410, New York, New York 10036

Testimony: YOU ARE COMMANDED to appear at the time, date, and place set forth below to testify at a deposition to be taken in this civil action. If you are an organization that is not a party in this case, you must designate one or more officers, directors, or managing agents, or designate other persons who consent to testify on your behalf about the following matters, or those set forth in an attachment:

Place: Wilmer Cutler Pickering Hale & Dorr
399 Park Avenue, New York, New York 10022
Date and Time:
04/15/2011 9:00 am

The deposition will be recorded by this method: Video and Stenographer

Production: You, or your representatives, must also bring with you to the deposition the following documents, electronically stored information, or objects, and permit their inspection, copying, testing, or sampling of the material:

See Attachment A to Notice of Deposition

Please produce documents responsive to the attached requests by no later than March 17, 2011 at Wilmer Cutler Pickering Hale & Dorr, 399 Park Avenue, New York, New York 10022

The provisions of Fed. R. Civ. P. 45(c), relating to your protection as a person subject to a subpoena, and Rule 45 (d) and (e), relating to your duty to respond to this subpoena and the potential consequences of not doing so, are attached.

Date: 02/14/2011

CLERK OF COURT

OR

Signature of Clerk or Deputy Clerk
Bryan Conley
Attorney's signature

The name, address, e-mail, and telephone number of the attorney representing (name of party) Apple Inc.

, who issues or requests this subpoena, are:
Bryan Conley, Wilmer Cutler Pickering Hale and Dorr LLP, 60 State Street, Boston, Massachusetts 02109.
Telephone: 617-526-6765. Fax: 617-526-5000. bryan.conley@wilmerhale.com

Federal Rule of Civil Procedure 45 (c), (d), and (e) (Effective 12/1/07)

(c) Protecting a Person Subject to a Subpoena.

(1) Avoiding Undue Burden or Expense; Sanctions. A party or attorney responsible for issuing and serving a subpoena must take reasonable steps to avoid imposing undue burden or expense on a person subject to the subpoena. The issuing court must enforce this duty and impose an appropriate sanction — which may include lost earnings and reasonable attorney’s fees — on a party or attorney who fails to comply.

(2) Command to Produce Materials or Permit Inspection.

(A) Appearance Not Required. A person commanded to produce documents, electronically stored information, or tangible things, or to permit the inspection of premises, need not appear in person at the place of production or inspection unless also commanded to appear for a deposition, hearing, or trial.

(B) Objections. A person commanded to produce documents or tangible things or to permit inspection may serve on the party or attorney designated in the subpoena a written objection to inspecting, copying, testing or sampling any or all of the materials or to inspecting the premises — or to producing electronically stored information in the form or forms requested. The objection must be served before the earlier of the time specified for compliance or 14 days after the subpoena is served. If an objection is made, the following rules apply:

(i) At any time, on notice to the commanded person, the serving party may move the issuing court for an order compelling production or inspection.

(ii) These acts may be required only as directed in the order, and the order must protect a person who is neither a party nor a party’s officer from significant expense resulting from compliance.

(3) Quashing or Modifying a Subpoena.

(A) When Required. On timely motion, the issuing court must quash or modify a subpoena that:

(i) fails to allow a reasonable time to comply;

(ii) requires a person who is neither a party nor a party’s officer to travel more than 100 miles from where that person resides, is employed, or regularly transacts business in person — except that, subject to Rule 45(c)(3)(B)(iii), the person may be commanded to attend a trial by traveling from any such place within the state where the trial is held;

(iii) requires disclosure of privileged or other protected matter, if no exception or waiver applies; or

(iv) subjects a person to undue burden.

(B) When Permitted. To protect a person subject to or affected by a subpoena, the issuing court may, on motion, quash or modify the subpoena if it requires:

(i) disclosing a trade secret or other confidential research, development, or commercial information;

(ii) disclosing an unretained expert’s opinion or information that does not describe specific occurrences in dispute and results from the expert’s study that was not requested by a party; or

(iii) a person who is neither a party nor a party’s officer to incur substantial expense to travel more than 100 miles to attend trial.

(C) Specifying Conditions as an Alternative. In the circumstances described in Rule 45(c)(3)(B), the court may, instead of quashing or modifying a subpoena, order appearance or production under specified conditions if the serving party:

(i) shows a substantial need for the testimony or material that cannot be otherwise met without undue hardship; and

(ii) ensures that the subpoenaed person will be reasonably compensated.

(d) Duties in Responding to a Subpoena.

(1) Producing Documents or Electronically Stored Information.

These procedures apply to producing documents or electronically stored information:

(A) Documents. A person responding to a subpoena to produce documents must produce them as they are kept in the ordinary course of business or must organize and label them to correspond to the categories in the demand.

(B) Form for Producing Electronically Stored Information Not Specified. If a subpoena does not specify a form for producing electronically stored information, the person responding must produce it in a form or forms in which it is ordinarily maintained or in a reasonably usable form or forms.

(C) Electronically Stored Information Produced in Only One Form. The person responding need not produce the same electronically stored information in more than one form.

(D) Inaccessible Electronically Stored Information. The person responding need not provide discovery of electronically stored information from sources that the person identifies as not reasonably accessible because of undue burden or cost. On motion to compel discovery or for a protective order, the person responding must show that the information is not reasonably accessible because of undue burden or cost. If that showing is made, the court may nonetheless order discovery from such sources if the requesting party shows good cause, considering the limitations of Rule 26(b)(2)(C). The court may specify conditions for the discovery.

(2) Claiming Privilege or Protection.

(A) Information Withheld. A person withholding subpoenaed information under a claim that it is privileged or subject to protection as trial-preparation material must:

(i) expressly make the claim; and

(ii) describe the nature of the withheld documents, communications, or tangible things in a manner that, without revealing information itself privileged or protected, will enable the parties to assess the claim.

(B) Information Produced. If information produced in response to a subpoena is subject to a claim of privilege or of protection as trial-preparation material, the person making the claim may notify any party that received the information of the claim and the basis for it. After being notified, a party must promptly return, sequester, or destroy the specified information and any copies it has; must not use or disclose the information until the claim is resolved; must take reasonable steps to retrieve the information if the party disclosed it before being notified; and may promptly present the information to the court under seal for a determination of the claim. The person who produced the information must preserve the information until the claim is resolved.

(e) Contempt. The issuing court may hold in contempt a person who, having been served, fails without adequate excuse to obey the subpoena. A nonparty’s failure to obey must be excused if the subpoena purports to require the nonparty to attend or produce at a place outside the limits of Rule 45(c)(3)(A)(ii).

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

NOKIA CORPORATION,)
)
 Plaintiff,) C.A. 09-791-GMS
)
 v.)
)
 APPLE, INC.,)
)
 Defendant.)
 _____)
)
 AND RELATED COUNTERACTION)
 _____)

APPLE INC.'S NOTICE OF DEPOSITION TO ERICSSON INC.

PLEASE TAKE NOTICE that Apple Inc. (“Apple”) will take the deposition of Ericsson Inc. (“Ericsson”), commencing on Friday, April 15, 2011 at 9:00 a.m. at the offices of Wilmer Cutler Pickering Hale and Dorr LLP, 399 Park Avenue, New York, New York 10022, and continuing day-to-day until completed.

Ericsson is required to designate, pursuant to Rule 30(b)(6) of the Federal Rules of Civil Procedure, one or more of its officers, directors or managing agents, or other persons with knowledge of the matters set forth in Attachment A of this notice, to appear and testify on its behalf at the deposition. The persons so designated shall testify as to matters known or reasonably available to Ericsson. Ericsson is requested to provide Apple’s counsel, as soon as reasonably possible, but no later than ten (10) business days before the deposition, written notice of the following: (a) the name and employment position of each designee who has consented to testify on behalf of Ericsson in response to this Notice, and (b) all matters set forth below as to which each such designee has agreed to testify on behalf of Ericsson.

The examination will be taken before a Notary Public or other person authorized to administer oaths and will be recorded stenographically and by video. Testimony derived pursuant to this Notice of Deposition shall be used for any and all appropriate purposes permitted by the Federal Rules of Evidence.

You are invited to attend and cross-examine.

OF COUNSEL:

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Dated: February 14, 2011

*Attorneys for Defendant and
Counterclaim-Plaintiff Apple Inc.*

ATTACHMENT A

DEFINITIONS

The following definitions are applicable herein:

1. “3GPP” means the Third Generation Partnership Project.
2. “The ‘135 Patent” means United States Patent No. 6,694,135, issued on February 17, 2004, and entitled “Measurement Report Transmission in a Telecommunications System,” and any foreign counterparts.
3. “The ‘178 Patent” means United States Patent No. 5,862,178, issued on January 19, 1999, and entitled “Method and Apparatus for Speech Transmission in a Mobile Communications System,” and any foreign counterparts.
4. “The ‘465 Patent” means United States Patent No. 5,802,465, issued on September 1, 1998, and entitled “Data Transmission in a Radio Telephone Network,” and any foreign counterparts.
5. “The ‘548 Patent” means United States Patent No. 6,775,548, issued on August 10, 2004, and entitled “Access Channel for Reduced Access Delay in a Telecommunications System,” and any foreign counterparts.
6. “The ‘651 Patent” means United States Patent No. 5,946,651, issued on August 31, 1999, and entitled “Speech Synthesizer Employing Post-Processing for Enhancing the Quality of the Synthesized Speech,” and any foreign counterparts.
7. “The ‘672 Patent” means United States Patent No. 7,092,672, issued on August 15, 2006, and entitled “Reporting Cell Measurement Results in a Cellular Communication System,” and any foreign counterparts.
8. “The ‘878 Patent” means United States Patent No. 7,123,878, issued on October

17, 2006, and entitled Apparatus, "Method and System for Connectivity Tool in Bluetooth Devices," and any foreign counterparts.

9. "The '904 Patent" means United States Patent No. 6,359,904, issued on March 19, 2002, and entitled "Data Transfer in a Mobile Telephone Network," and any foreign counterparts.

10. "Alcatel-Lucent" means Alcatel-Lucent and any of its predecessors, successors, corporate parents, direct or indirect subsidiaries, divisions, affiliated Entities, officers, directors, employees, consultants, agents, representatives, servants, and all other Persons acting on its behalf, specifically including Alcatel and Lucent Technologies.

11. "And" and "or" shall be construed conjunctively or disjunctively, whichever makes this subpoena more inclusive.

12. "Any," "all," and "each" shall be construed as each and every.

13. "ANSI" means American National Standards Institute.

14. "AT&T" means AT&T Inc. and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures.

15. "ATIS" means the Alliance for Telecommunications Industry Solutions.

16. "Bellcore" means Bell Communications Research, Inc. and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, including without limitation, Telcordia Technologies.

17. "Bluetooth" shall mean the Bluetooth protocol and specification delineated by the Bluetooth Special Interest Group ("SIG").

18. “Bluetooth Special Interest Group” or “Bluetooth SIG” shall mean the privately-held, not-for-profit trade association with its global headquarters in Kirkland, Washington, USA.

19. “Bluetooth Device Address” shall mean a unique 48 bit address used to identify each Bluetooth enabled device.

20. “British Telecom” means British Telecom (BT) and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, including without limitation, Concert Communications Services and BT Group PLC.

21. “Committee T1” means the Committee T1 that was sponsored by the American National Standards Institute.

22. “Communication” means the transmittal of information (in the form of facts, ideas, inquiries or otherwise).

23. “Concerning” means relating to, referring to, describing, evidencing, referencing, discussing, or constituting.

24. “Document” and/or “Thing” has the broadest definition of document under the Federal Rules of Civil Procedure and the cases interpreting those rules, and includes all tangible things, all originals (or, if originals are not available, identical copies thereof), all non-identical copies of a document, all drafts of final documents, all other written, printed, or recorded matter of any kind, and all other data compilations from which information can be obtained and translated if necessary, that are or have been in your actual or constructive possession, custody or control, regardless of the medium on which they are produced, reproduced, or stored (including without limitation computer programs and files containing any requested information), and any recording or writing, as these terms are defined in Rule 1001 of the Federal Rules of Evidence.

Any document bearing marks, including without limitation, initials, stamped initials, comments, or notations not a part of the original text or photographic reproduction thereof, is a separate document.

25. "EDGE" means Enhanced Data Rates for GSM Evolution.
26. "EIA" means Electronic Industries Alliance.
27. "Entity" or "Entities" includes natural Persons, proprietorships, partnerships, firms, corporations, public corporations, municipal corporations, governments, including foreign national governments, the government of the United States or any state or local government, and all departments and agencies thereof, political subdivisions, groups, associations, or organizations.
28. "Essential" means necessary for implementation of any Wireless Standard such that the standard, or some part of the standard, could not be practiced without infringing the patent or technology to which "essential" refers.
29. "ETSI" means the European Telecommunications Standards Institute.
30. "France Telecom" means France Telecom S.A. and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, including without limitation, CNET (Centre national d'études des télécommunications).
31. "FRAND" means "fair, reasonable, and non-discriminatory terms and conditions" as those terms are used in the ETSI Intellectual Rights Policy contained in Annex 6 of the ETSI Rules of Procedure.
32. "GPRS" means GSM Packet Radio Services.
33. "GSM" means Global System for Mobile communications.

34. "Hughes" means Hughes Aircraft Company and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, including without limitation, Hughes Electronics Corporation, Hughes Network Systems, General Motors Company, and DirecTV Group.

35. "Identify," when referring to a person, means to give, to the extent known, the person's full name, present or last known address and when referring to a natural person, additionally, the present or last known place of employment. When referring to documents, "identify" means to give, to the extent known, the (i) type of document, (ii) general subject matter; (iii) date of the document, (iv) author(s), addressee(s), and recipient(s).

36. "IEEE" means the Institute of Electrical and Electronics Engineers and the Institute of Electrical or Electronics Engineers Standards Association (IEEE-SA).

37. "IPR" means intellectual property rights, including patents and patent applications.

38. "IS-54" means EIA/TIA Interim Standard – Cellular System Dual-Mode Mobile Station-Base Station Compatibility Standard IS-54.

39. "IS-95A" means EIA/TIA Mobile Station-Base Station Compatibility Standard for Dual Mode Wideband Spread Spectrum Cellular System Standard IS-95A.

40. "Mercury" means Mercury Communications and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, including without limitation, Mercury One2One.

41. "Motorola" means Motorola, Inc. and all of its predecessors, successors, corporate parents, direct or indirect subsidiaries, divisions, affiliated Entities, officers, directors, employees, consultants, agents, representatives, servants, and all other Persons acting on its

behalf.

42. “NEC” means NEC Corporation and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, including without limitation, Nippon Electric Company, Limited.

43. “Nokia” means plaintiff Nokia Corporation and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, divisions, affiliated or controlled companies or joint ventures, its respective current or former directors, officers, employees, agents, attorneys, accountants and any other person who acted or purported to act on their or any of their behalf.

44. “Nortel” means Nortel Networks Corporation and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, including without limitation, Northern Telecom Limited.

45. “OKI” means Oki Electric Industry Co., Ltd. and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures.

46. “Omnipoint” means Omnipoint Communications, Inc. and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, including without limitation, VoiceStream Wireless.

47. “Patents” means the ‘135 Patent, the ‘178 Patent, the ‘465 Patent, the ‘548 Patent, the ‘651 Patent, the ‘672 Patent, the ‘878 Patent, and/or the ‘904 Patent, and/or any foreign counterparts.

48. “Person” means any natural person, legal entity, governmental entity, or business entity, including without limitation any corporation, partnership, unincorporated association,

joint venture, sole proprietorship, or any and/or all other organizations or groups of individuals together with the employees, agents, consultants and attorneys thereof.

49. "PCS SSO" means any standards body concerned with PCS 1900, which includes, without limitation, Committee T1, ATIS, TIA, EIA, or ANSI.

50. "Qualcomm" means Qualcomm Inc. and all of its predecessors, successors, corporate parents, direct or indirect subsidiaries, divisions, affiliated Entities, officers, directors, employees, consultants, agents, representatives, servants, and all other Persons acting on its behalf.

51. "RAND" means "reasonable terms and conditions that are demonstrably free of unfair discrimination" as those terms are used in the IEEE Standards Association Standards Board By-Laws, Operations Manual, and Letter of Assurance Form.

52. "Related Patents" means all patents and patent applications (whether rejected, abandoned, or pending) in any country of the world (a) to which the '135 Patent, the '178 Patent, the '465 Patent, the '548 Patent, the '651 Patent, the '672 Patent, the '878 Patent, and/or the '904 Patent, or their corresponding patent applications directly or indirectly claims priority or (b) that, directly or indirectly, claim priority to the '135 Patent, the '178 Patent, the '465 Patent, the '548 Patent, the '651 Patent, the '672 Patent, the '878 Patent, and/or the '904 Patent, or their corresponding patent applications.

53. "Relating to" means, without limitation, concerning, alluding to, referring to, constituting, describing, discussing, evidencing, or regarding.

54. "Samsung" means Samsung Electronics and all of its predecessors, successors, corporate parents, direct or indirect subsidiaries, divisions, affiliated Entities, officers, directors, employees, consultants, agents, representatives, servants, and all other Persons acting on its

behalf.

55. “Siemens” means Siemens AG and all of its predecessors, successors, corporate parents, direct or indirect subsidiaries, divisions, affiliated Entities, officers, directors, employees, consultants, agents, representatives, servants, and all other Persons acting on its behalf.

56. “Standards Setting Organization” or “SSO” means an organization that adopts standards governing an industry or technological field, and includes without limitation, ETSI, 3GPP, and IEEE.

57. “Technology” means any software, apparatus, hardware, or method.

58. “TeleDenmark” means Tele-Denmark Communications (a.k.a. TDC A/S) and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, including without limitation, TDC Solutions, TDC Mobile International, and Sunrise Communications AG.

59. “Texas Instruments” means Texas Instruments Inc. (a.k.a. TI) and includes, without limitation, each of its predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures.

60. “The Litigation” means and refers to the above-referenced action, entitled *Nokia Corporation v. Apple Inc., et al.*, C.A. 09-791-GMS.

61. “TIA” means Telecommunications Industry Association.

62. “UMTS” means Universal Mobile Telecommunications System.

63. A “Wireless Standard” means each of the following standards: (i) the following ETSI and 3GPP standards: (1) GSM; (2) GPRS; (3) EDGE; and (4) UMTS; and (ii) the following IEEE standards: (1) 802.11; (2) 802.11a; (3) 802.11b; (4) 802.11g; and (5) 802.11n.

64. “You,” “Your,” or “Your Company” refers to Ericsson Inc. and Telefon AB LM Ericsson, collectively and individually, and includes, without limitation, each of their predecessors, present or former parents, subsidiaries, affiliated or controlled companies or joint ventures, their respective current or former directors, officers, employees, agents, attorneys, accountants and any other person who acted on or purported to act on their or any of their behalf, including without limitation, Freescale Semiconductor, Inc. and ON Semiconductor.

65. The use of the singular form of any word includes the plural, and the use of the plural form of any word includes the singular.

INSTRUCTIONS

The following instructions are applicable herein:

1. Produce all responsive documents and things in your possession, custody, or control.
2. Produce all documents and things requested in the same file or manner in which they are kept in the usual course of business.
3. Provide the following information for any responsive document or thing withheld from production on the grounds that it is protected from disclosure by the attorney-client privilege, the work product doctrine, or any other relevant privilege:
 - a. The author of the document;
 - b. The person(s) for whom the document was prepared, to whom it was sent, or who received copies;
 - c. The date of the document;
 - d. The subject matter of the document;
 - e. The type of document (e.g., letter, memorandum, note, report, etc.)
 - f. The number of pages and attachments; and
 - g. The nature and the basis for the claim of privilege.
4. This subpoena includes documents that exist in electronic form (including electronic mail, back-up tapes, magnetic tapes, and diskettes).
5. More than one paragraph of this request may ask for the same documents. The presence of such duplication is not to be interpreted to narrow or limit the normal interpretation placed upon each individual request. Where a writing is requested in more than one numbered paragraph, only one copy of it need be produced.

6. If you object to a request, or any part of a request, produce all documents to which your objection does not apply.

7. In the event that multiple copies of a document exist, produce every copy on which appear any notations or marking of any sort not appearing on any other copy.

8. If you are aware of a document or thing, or group of documents or things, that once existed but has been destroyed or discarded since May 1995, you are requested to state the type of document or thing or group of documents or things, the date it was created, the date it was destroyed or discarded, and the identity of the persons having knowledge of the contents of the document or thing, or group of documents and things.

9. A copy of the Protective Order entered in this case is attached.

DOCUMENT REQUESTS

Document Request No. 1

All agreements, including any exhibits and amendments thereto, in which Your Company licensed or proposed to license to Nokia or any other third party any IPR that Your Company believes or believed is or may be Essential to any Wireless Standard.

Document Request No. 2

All agreements, including any exhibits and amendments thereto, in which Nokia or any other third party licensed or proposed to license to Your Company any IPR that Nokia or the third party represents or represented to ETSI, 3GPP, IEEE, or to Your Company is or may be Essential to any Wireless Standard.

Document Request No. 3

All documents concerning any communication between Your Company and Nokia, Alcatel-Lucent, Motorola or Siemens (collectively, "the Licensing Parties") concerning the licensing of any IPR that Your Company believes is or may be Essential to any Wireless Standard, or that the Licensing Parties represented to ETSI, 3GPP, IEEE, or to Your Company is or may be Essential to any Wireless Standard. This includes, without limitation, any draft agreements exchanged between the companies, any communications with the Licensing Parties concerning the confidentiality of licensing terms, and any documents (including without limitation communications) exchanged between Your Company and the Licensing Parties during the period of negotiation of any consummated license agreements that relate to the licensing of any IPR.

Document Request No. 4

All documents prepared by Your Company concerning the value of the IPR that Nokia represented to Your Company or to ETSI, 3GPP, or IEEE is or may be Essential to any Wireless Standard.

Document Request No. 5

Documents sufficient to show Your accounting treatment for any license payments made to Nokia.

Document Request No. 6

All documents concerning or reflecting any statement by Nokia or Your Company concerning the meaning of the terms "RAND" or "FRAND" in the context of licensing IPR.

Document Request No. 7

Documents sufficient to describe the relative advantages and/or disadvantages of the following proposals considered by the European Conference of Postal and Telecommunications Administrations (also known as CEPT) in 1987 for the GSM standard, as described in the attached Exhibit A:

- a. the proposal for Frequency Division Multiple Access (FDMA);
- b. the proposal for Narrowband Time Division Multiple Access (TDMA), with or without frequency hopping; and
- c. the proposal for Wideband TDMA.

Document Request No. 8

Documents sufficient to describe the relative advantages and/or disadvantages of the following proposals made to ETSI in 1997 and 1998 for the UMTS standard, as described in the attached Exhibit B:

- a. the proposal for Wideband CDMA (Code Division Multiple Access), also known as the “Alpha” proposal;
- b. the proposal for OFDMA (Orthogonal Frequency Division Multiple Access), also known as the “Beta” proposal;
- c. the proposal for Wideband TDMA (Time Division Multiple Access), also known as the “Gamma” proposal;
- d. the proposal for Wideband TDMA/CDMA, also known as the “Delta” proposal; and
- e. the proposal for ODMA (Opportunity Driven Multiple Access), also known as the “Epsilon” proposal.

Document Request No. 9

Documents sufficient to describe disputes or disagreements between any ETSI member and ETSI about complying with, or the meaning of, ETSI’s IPR policy, including without limitation disputes by Your Company, Nokia, Motorola, and/or Qualcomm with ETSI about complying with, or the meaning of, ETSI’s IPR policy.

Document Request No. 10

All documents concerning communications between Your Company and Nokia concerning any proposal to ETSI, 3GPP, or IEEE to amend or enact policies concerning the licensing of IPR declared Essential to any Wireless Standard.

Document Request No. 11

All documents concerning communications between Your Company and Nokia concerning any vote on any submission or proposed submission to ETSI, 3GPP, or IEEE for technology to be incorporated in the Wireless Standards.

Document Request No. 12

All documents concerning any actual or potential agreements between or among any ETSI members, including without limitation Your Company, Motorola, Nokia, Samsung, Alcatel-Lucent, and/or Siemens, to offer licenses to any patents Essential to any ETSI standards on specified terms and/or to promote a cap on royalties for patents Essential to one or more ETSI standards.

Document Request No. 13

All documents relating to any proposal, submission, or communication to, from, and/or with any SSO or SSO member that concerns sending packet data over a wireless network, including without limitation through fast-call establishment, GPRS reserved resources, and/or the GPRS attach function and Packet Data Protocol (“PDP”) context function ultimately standardized in 3GPP TS 23.060, 3GPP TS 43.064, or IEEE Std. 802.11-2007 § 5.

Document Request No. 14

All documents relating to the conception, creation, development, testing, analysis, implementation, negotiation, standardization, or selection of standards for sending packet data over a wireless network, including without limitation through fast-call establishment, GPRS reserved resources, and/or the GPRS attach function and PDP context function for any Wireless Standard, including, without limitation, all documents constituting or concerning:

- a. Your Company’s participation therein;
- b. Nokia’s participation therein;
- c. any draft or version of any specification ultimately standardized as 3GPP TS 23.060, and any follow-on draft or version of TS 23.060;

- d. any draft or version of any specification ultimately standardized as GSM 03.60, 3GPP TS 43.064, and/or IEEE Std. 802.11-2007 § 5, and/or any follow-on draft or version of these specifications;
- e. proposals and submissions from any party to any SSO or SSO member regarding sending packet data over a wireless network, including without limitation through fast-call establishment, GPRS reserved resources, and/or the GPRS attach function and PDP context functions;
- f. selection of features and technologies for sending packet data over a wireless network, including without limitation through fast-call establishment, GPRS reserved resources, and/or the GPRS attach function and PDP context functions;
- g. any feature or technology considered, proposed, analyzed, or tested for inclusion in the sending packet data over a wireless network standard, including without limitation the features or technologies ultimately standardized in 3GPP TS 23.060 §§ 14, 6.5, 9.2; 3GPP TS 43.064 § 6.6.4.7; or IEEE Std. 802.11-2007 § 5;
- h. all of Your Company's internal documentation, work, research, analysis, and testing concerning sending packet data over a wireless network, including without limitation through fast-call establishment, GPRS reserved resources, and/or the GPRS attach function and PDP context functions; and
- i. communications or submissions to, from, and/or within any SSO concerning sending packet data over a wireless network, including without

limitation through fast-call establishment, GPRS reserved resources, and/or the GPRS attach function and PDP context functions.

Document Request No. 15

All documents concerning the proposal for reorganization of GSM 03.60 (Stage 2) by DeTeMobil for the GSM standard, as described in Exhibits C and/or D.

Document Request No. 16

All documents, written or published prior to September 6, 1993, concerning sending packet data over a wireless network, including without limitation through fast-call establishment, GPRS reserved resources, and/or the GPRS attach function and PDP context function.

Document Request No. 17

All documents concerning any proposal, submission, or communication to, from, and/or with any SSO or SSO member that relates to the structure for radio blocks transmitted over a wireless network, including without limitation the RLC/MAC Block structure ultimately standardized in 3GPP TS 45.001, 3GPP TS 44.060, 3GPP TS 43.060, or IEEE Std. 802.11a-1999 § 17.

Document Request No. 18

All documents concerning the conception, creation, development, testing, analysis, implementation, negotiation, standardization, or selection of standards concerning the structure for radio blocks transmitted over a wireless network, including without limitation the RLC/MAC Block structure for any Wireless Standard, including, without limitation, all documents constituting or concerning:

- a. Your Company's participation therein;
- b. Nokia's participation therein;

- c. any draft or version of any specification ultimately standardized as 3GPP TS 44.060, and any follow-on draft or version of TS 44.060;
- d. any draft or version of any specification ultimately standardized as GSM 04.60, 3GPP TS 45.001, 3GPP TS 43.060, and/or IEEE Std. 802.11a-1999 § 17, and/or any follow-on draft or version of these specifications;
- e. proposals and submissions from any party to any SSO or SSO member regarding the structure for radio blocks transmitted over a wireless network, including without limitation the RLC/MAC Block structure;
- f. selection of features and technologies for the structure for radio blocks transmitted over a wireless network, including without limitation the RLC/MAC Block structure;
- g. any feature or technology considered, proposed, analyzed, or tested for inclusion in the structure for radio blocks transmitted over a wireless network, including without limitation the RLC/MAC Block structure standard, including without limitation the features or technologies ultimately standardized in 3GPP TS 44.060 §§ 3.1, 4, 10; 3GPP TS 43.064 § 6.5; or IEEE Std. 802.11a-1999 § 17;
- h. all of Your Company's internal documentation, work, research, analysis, and testing concerning the structure for radio blocks transmitted over a wireless network, including without limitation the RLC/MAC Block structure; and
- i. communications or submissions to, from, and/or within any SSO concerning the structure for radio blocks transmitted over a wireless network, including without limitation the RLC/MAC Block structure.

Document Request No. 19

All documents, written or published prior to August 18, 1997, concerning the structure for radio blocks transmitted over a wireless network, including without limitation the RLC/MAC Block structure.

Document Request No. 20

All documents concerning the following ETSI Documents:

- a. SMG2 GPRS 143/96 (December 1996), titled "GPRD RLC/MAC - Block Formats";
- b. SMG2 GPRS 112/96 (October 1996), titled "Channel Coding Schemes for GPRS";
- c. SMG2 GPRS 161/96 (December 5, 1996), with the subject "Updating channel coding according to decision in SMG2 GPRS"; and
- d. SMG2 GPRS 139/96 (December 2, 1996), with the subject "Updating channel coding according to decision in SMG2 GPRS."

Document Request No. 21

All documents constituting or concerning any communication to, from, or within any SSO or any SSO member that concerns speech coding/decoding or channel coding/decoding technologies for the Enhanced Full Rate ("EFR"), Adaptive Multi-Rate ("AMR"), Full Rate ("FR"), Half Rate ("HR"), or PCS 1900 standards. This includes without limitation any proposal or submission to any SSO that concerns speech coding/decoding or channel coding/decoding.

Document Request No. 22

All documents concerning the conception, creation, development, testing, analysis, implementation, negotiation, standardization, or selection of EFR speech coding/decoding

standards or EFR channel coding/decoding standards for GSM, ETSI, 3GPP, or PCS 1900 including, without limitation, all documents constituting or concerning (as used below, "EFR" refers to both EFR speech coding/decoding and EFR channel coding/decoding functions):

- a. Your Company's participation therein;
- b. Nokia's participation therein;
- c. an EFR codec;
- d. the so-called "US-1" codec;
- e. the so-called "NPAG" codec;
- f. the use of pitch gain, pitch lag, codebook index, or codebook gain parameters for EFR;
- g. any features to enhance the pitch in the encoder or decoder;
- h. any draft or version of any specification ultimately standardized as TS 05.03, and any follow-on draft or version of TS 05.03;
- i. any draft or version of any specification ultimately standardized as TS 06.60, and any follow-on draft or version of TS 06.60;
- j. any draft or version of any specification ultimately standardized as TS 06.90, and any follow-on draft or version of TS 06.90 including, without limitation, 26.090;
- k. any draft or version of any specification ultimately standardized as part of PCS 1900 and any follow-on draft or version including, without limitation, any draft or version of ANSI J-STD-007;
- l. proposals and submissions from any party to GSM, ETSI, 3GPP, and/or any PCS SSO regarding EFR;

- m. selection of features and technologies for EFR;
- n. any feature or technology considered, proposed, analyzed, or tested for inclusion in the EFR standard;
- o. proposed or candidate EFR codecs, including any testing or analysis thereof;
- p. proposed or candidate EFR codecs submitted by Your Company, Nokia, Nortel, Mercury, Motorola, AT&T, France Telecom, British Telecom, TeleDenmark, Texas Instruments, Bellcore, Hughes, Omnipoint, OKI, Qualcomm, Alcatel-Lucent, or NEC;
- q. all of Your Company's internal documentation, work, research, analysis, and testing concerning EFR; and
- r. communications or submissions to, from, and/or within GSM, ETSI, 3GPP, and/or any PCS SSO concerning EFR.

Document Request No. 23

All documents created on or before December 21, 2001 concerning cell measurement reporting, acknowledgments, and/or polling codes, in a cellular network.

Document Request No. 24

All documents created on or before December 21, 2001 that relate to a request by a cellular network for a mobile station (including, for example, a cell phone) to take measurements of surrounding cell conditions (including, for example, signal levels (power) between the receiving and transmitting stations, quality of the signal, distance between the stations, amount of transmitted data, etc.).

Document Request No. 25

All documents created on or before December 21, 2001 that relate to a mobile station that takes measurements of surrounding cell conditions in a cellular network.

Document Request No. 26

All documents created on or before December 21, 2001 that relate to the preparation of a report or other results of surrounding cell conditions measured by a mobile station in a cellular network.

Document Request No. 27

All documents concerning the extended measurement report feature defined by at least section 8.4.6 of 3GPP TS 05.08 standard and at least sections 3.4.1.3, 9.1.51, and 10.5.2.46 of 3GPP TS 4.18.

Document Request No. 28

All documents concerning the enhanced measurement report feature defined by at least section 8.4.8 of 3GPP TS 45.008.

Document Request No. 29

All documents concerning the pilot measurements feature of IS-95A, as defined by at least sections 7.6.6.2.2.4, 7.7.3.3.2.5, and 6.7.2.3.2.6.

Document Request No. 30

All documents concerning the channel quality measurements and reporting feature of IS-54, as defined by at least sections 2.4.5.2.1, 2.4.5.2.3, 2.5.4.2.1, 2.7.3.1.3.2.3-4, and 3.7.3.1.3.2.2.

Document Request No. 31

All documents created on or before December 21, 2001 that relate to a request by a cellular network for a mobile station (including, for example, a cell phone) to respond with an

acknowledgment, non-acknowledgment, and/or measurement report, including, without limitation, requests contained in the header of a network message.

Document Request No. 32

All documents created on or before December 21, 2001 that relate to a mobile station that responds to a cellular network request for the mobile station to send an acknowledgment, non-acknowledgment, and/or measurement report to the cellular network.

Document Request No. 33

All documents concerning the polling for packet downlink Ack/Nack and network change order procedure features of sections 8.1.2.2 and 8.3 of 3GPP TS 04.60.

Document Request No. 34

All documents concerning the ES/P polling feature of sections 9.1.8.2.1.1 and 10.4.4 of 3GPP TS 44.060.

Document Request No. 35

All documents concerning sections 2.4.5.1, 2.4.5.2.1 and 2.7.3.1.3.2.3 of IS-54.

Document Request No. 36

All documents concerning sections 6.4.1, 6.6.6.2.2, 7.6.6.2.2.4, 6.7.1.3.2.2, and Table 7.7.4-1 of IS-95A.

Document Request No. 37

All documents dated before December 21, 2001 concerning the conception, creation, development, testing, analysis, implementation, negotiation, standardization, or selection of standards, including without limitation GSM, GPRS, and/or EDGE, within any SSO concerning measurement reporting and/or polling activity including, without limitation, all documents constituting or concerning:

- a. Your Company's participation therein;
- b. Nokia's participation therein;
- c. extended measurement reporting;
- d. enhanced measurement reporting;
- e. supplementary/polling (S/P) bits;
- f. extended supplementary (ES/P) bits;
- g. any features that allow a mobile station (including, for example, a cell phone) to prepare a measurement report without including identification parameters of the cells;
- h. any features that allow a cellular network to request a mobile station (including, for example, a cell phone) to transmit a previously-prepared measurement report;
- i. any draft or version of any specification ultimately standardized as TS 04.08, and any follow-on draft or version of TS 04.08, including without limitation, 24.008;
- j. any draft or version of any specification ultimately standardized as TS 04.18, and any follow-on draft or version of TS 04.18, including without limitation, 44.018;
- k. any draft or version of any specification ultimately standardized as TS 04.60, and any follow-on draft or version of TS 04.60, including without limitation, 44.060;

- l. any draft or version of any specification ultimately standardized as TS 05.08, and any follow-on draft or version of TS 05.08, including without limitation, 45.008;
- m. proposals and submissions from any party to any SSO or SSO member regarding measurement reporting and/or polling activity;
- n. proposed or candidate specifications or standards regarding measurement reporting and/or polling activity submitted by any third party, including without limitation Motorola, Nortel, Alcatel-Lucent, Vodafone, Qualcomm, Mitsubishi, France Telecom, or Siemens;
- o. all of Your internal documentation, work, research, analysis, and testing concerning measurement reporting and/or polling activity; and
- p. all of Your Company's IPR declarations concerning measurement reporting and/or polling activity, including for example, documents concerning what patents to declare Essential (or not declare Essential).

Document Request No. 38

To the extent not duplicative of other requests, all documents concerning Your Company's participation in ETSI meetings relating to measurement reporting, acknowledgments, and polling codes, including without limitation the below-listed meetings:

- a. SMG2 WPB Meeting No. 1 (September 22-26, 1997, Edinburgh, United Kingdom);
- b. SMG2 WPB Meeting No. 2 (November 3-6, 1997, Bonn, Germany);
- c. ETSI/STC SMG2/3 WPA Meeting (November 10-14, 1997, Sophia Antipolis, France);

- d. ETSI SMG2 Meeting No. 24 (December 1-5, 1997, Cork, Ireland);
- e. ETSI TC SMG Meeting No. 24 (December 15-19, 1997, Madrid, Spain);
- f. ETSI Joint SMG 1, 2, 3 and 4 EDGE Workshop No. 1 (February 16-17, 1998, Helsinki, Finland);
- g. ETSI SMG2 Meeting No. 25 (February 23-27, 1998, Geneva, Switzerland);
- h. ETSI TC SMG Meeting No. 25 (March 16-20, 1998, Sophia Antipolis, France);
- i. ETSI SMG2 Working Session on EDGE (March 2-4, 1999, Toulouse, France);
- j. ETSI SMG2 Working Session on EDGE (May 17-19, 1999, D'Arcy, France);
- k. ETSI STC SMG2 WPA Meeting (June 1-3, 1999, Tucson, Arizona);
- l. SMG2 Plenary Meeting No. 31 (May 31-Jun. 4, 1999, Tucson, Arizona);
- m. ETSI SMG Plenary Meeting No. 29 (June 23-25, 1999, Miami, Florida);
- n. SMG2 WPB Meeting No. 10 (September 21-23, 1999, Bordeaux, France);
- o. ETSI STC SMG2 Meeting No. 32 (September 20-24, 1999, Bordeaux, France);
- p. SMG2 WPB Meeting No. 11 (November 23-25, 1999, Sophia Antipolis, France);
- q. SMG2 Plenary Meeting #33 (November 22-26, 1999, Sophia Antipolis, France);

- r. ETSI SMG2 Working Session on EDGE No. 12 (December 13-16, 1999, Amsterdam, The Netherlands);
- s. SMG2 WPA Meeting (January 11, 2000, Aalborg, Denmark);
- t. SMG2 WPB Meeting No. 12 (January 11-13, 2000, Aalborg, Denmark);
- u. SMG2 Plenary Meeting No. 34 (January 10-14, 2000, Aalborg, Denmark);
- v. SMG Plenary Meeting No. 31 (February 14-16, 2000, Brussels, Belgium);
- w. SMG2 WPA at SMG2 No. 35 (April 4-6, 2000, Schaumburg, Illinois);
- x. SMG2 WPB No. 35 at SMG2 No. 35 (April 4-6, 2000, Schaumburg, Illinois);
- y. SMG2 Meeting No. 35 (April 3-7, 2000, Schaumburg, Illinois); and
- z. ETSI SMG Meeting No. 31b (April 17, 2000, Frankfurt, Germany).

Document Request No. 39

All documents concerning Your Company's knowledge of Nokia's contributions or activities in 3GPP Technical Specification Groups ("TSG") or working groups relating to Architecture (SA 2G2), Security (SA WG3), or Radio Aspect Network working groups RAN WG 1, RAN WG 2, RAN WG 3, and RAN WG 4, during the period 1999-2001.

Document Request No. 40

All documents concerning alternative proposals presented by Your Company that were not adopted by 3GPP for versions of the following specifications, during the period 1999-2001: 24.008; 25.301; 25.321; 25.322; 25.331; 25.413; 33.102; 33.105; 33.401; and 25.201.

Document Request No. 41

All documents concerning Your Company's participation in the following meetings:

- a. ETSI SMG-Security Group Meeting No. 1/96 (January 8-10, 1996, Leidschendam, The Netherlands);
- b. ETSI SMG2 Speech Experts Group Meeting number 7 (June 19-21, 1996, Nuremberg, Germany);
- c. 3GPP TSG-RAN WG2 (Radio layer 2 and Radio layer 3) Meeting (March 8-11, 1999, Stockholm, Sweden);
- d. 3GPP TSG SA WG3 Meeting (March 23-26, 1999, Stockholm, Sweden);
- e. ETSI SMG2 WPB Meeting number 12 (January 11-13, 2000, Aalborg, Denmark);
- f. 3GPP TSG-SA WG3 Meeting No. 12 (April 11-14, 2000, Stockholm, Sweden);
- g. 3GPP TSG-SA Meeting No. 8 (June 26-28, 2000, Dusseldorf, Germany);
- h. 3GPP TSG-RAN WG2 Meeting No. 19 (February 19-23, 2001, Sophia Antipolis, France);
- i. 3GPP TSG SA WG3 Meeting (February 27-March 2, 2001, Goteborg, Sweden).
- j. 3GPP TSG-RAN Meeting No. 11 (March 13-16, 2001, Palm Springs, California); and
- k. 3GPP TSG-RAN WG2 Meeting No. 20 (April 9-13, 2001, Hayama, Japan).

Document Request No. 42

All documents concerning Your Company's contributions or proposals to 3GPP regarding Cipherng Models, including but not limited to any proposed MAC + RLC solution.

Document Request No. 43

All documents concerning work performed by Ainkaran Krishnarajah of Your Company for 3GPP TSG or working group meetings during the period 2000-2001.

Document Request No. 44

All documents dated before June 14, 2002 relating to technology for storing a network address, including but not limited to a Bluetooth Device Address, in a Database for later use.

Document Request No. 45

All documents dated before June 14, 2002 relating to technology for presenting a network address, including but not limited to a Bluetooth Device Address, in a list for a user to select.

Document Request No. 46

All documents relating to publications, abstracts, papers, presentations, or speeches authored or given, in whole or in part, by Motorola relating to, in whole or in part, a method or apparatus to store a network address in a Database for later use.

Document Request No. 47

Any documents concerning the Litigation, the Patents, or Related Patents. This includes without limitation any documents constituting or concerning communications between You and Alston & Bird LLP; Morris, Nichols, Arsht & Tunnell LLP; or any other counsel for Nokia relating to the Litigation or relating to the Patents.

MATTERS REGARDING WHICH EXAMINATION IS REQUESTED

Topic No 1

Examination is requested concerning the topics described above in Document Requests Numbers 1-5 and 8-11.

Topic No 2

All agreements, including any exhibits and amendments thereto, in which Your Company licensed or proposed to license to Nokia or any other third party any IPR that Your Company believes or believed is or may be Essential to any Wireless Standard.

Topic No 3

All agreements, including any exhibits and amendments thereto, in which Nokia or any other third party licensed or proposed to license to Your Company any IPR that Nokia or the third party represents or represented to ETSI, 3GPP, IEEE, or to Your Company is or may be Essential to any Wireless Standard.

Topic No 4

All communication between Your Company and Nokia, Alcatel-Lucent, Motorola or Siemens (collectively, "the Licensing Parties") concerning the licensing of any IPR that Your Company believes is or may be Essential to any Wireless Standard, or that the Licensing Parties represented to ETSI, 3GPP, IEEE, or to Your Company is or may be Essential to any Wireless Standard. This includes, without limitation, any draft agreements exchanged between the companies, any communications with the Licensing Parties concerning the confidentiality of licensing terms, and any documents (including without limitation communications) exchanged between Your Company and the Licensing Parties during the period of negotiation of any consummated license agreements that relate to the licensing of any IPR.

Topic No 5

The value of the IPR that Nokia represented to Your Company or to ETSI, 3GPP, or IEEE is or may be Essential to any Wireless Standard.

Topic No 6

Your accounting treatment for any license payments made to Nokia.

Topic No 7

Any statement by Nokia or Your Company concerning the meaning of the terms “RAND” or “FRAND” in the context of licensing IPR.

Topic No 8

Disputes or disagreements between any ETSI member and ETSI about complying with, or the meaning of, ETSI’s IPR policy, including without limitation disputes by Your Company, Nokia, Motorola, and/or Qualcomm with ETSI about complying with, or the meaning of, ETSI’s IPR policy.

Topic No 9

Communications between Your Company and Nokia concerning any proposal to ETSI, 3GPP, or IEEE to amend or enact policies concerning the licensing of IPR declared Essential to any Wireless Standard.

Topic No 10

Communications between Your Company and Nokia concerning any vote on any submission or proposed submission to ETSI, 3GPP, or IEEE for technology to be incorporated in the Wireless Standards.

Topic No 11

Any actual or potential agreements between or among any ETSI members, including without limitation Your Company, Motorola, Nokia, Samsung, Alcatel-Lucent, and/or Siemens, to offer licenses to any patents Essential to any ETSI standards on specified terms and/or to promote a cap on royalties for patents Essential to one or more ETSI standards.

Topic No 12

The conception, creation, development, testing, analysis, implementation, negotiation, standardization, or selection of EFR speech coding/decoding standards or EFR channel coding/decoding standards for PCS 1900, GSM, ETSI, and/or 3GPP. This includes, without

limitation, technologies considered for the standard but not adopted, and any alternative technologies known to You.

Topic No 13

Facts and circumstances concerning Your Company's conception, creation, development, testing, analysis, implementation, design, and understanding of technology related to measurement reporting, acknowledgments, and polling codes. This includes without limitation extended measurement reporting, enhanced measurement reporting, supplementary/polling (S/P) bits, and extended supplementary/polling (ES/P).

Topic No 14

Facts and circumstances concerning the adoption of any standard or technical specification related to measurement reporting, acknowledgments and polling codes, including without limitation GSM and 3GPP TSs 04.08 and 24.008; 04.18 and 44.018; 04.60 and 44.060; and 05.08 and 45.008; as well as any standard or technical specification that is a predecessor or successor. This also includes without limitation submissions to, proposals to, communications with, presentations to, or participation in any SSO or meeting by any Person, including without limitation by You. This also includes without limitation any proposed or candidate technologies that were proposed but not adopted.

Topic No 15

Knowledge of Nokia's contributions or activities in 3GPP Technical Specification Groups ("TSG") or working groups relating to Architecture (SA 2G2), Security (SA WG3), or Radio Aspect Network working groups RAN WG 1, RAN WG 2, RAN WG 3, and RAN WG 4, during the period 1999-2001.

Topic No 16

Knowledge of alternative proposals presented by Your Company that were not adopted for versions of the following specifications, during the period 1999-2001: 24.008; 25.301; 25.321; 25.322; 25.331; 25.413; 33.102; 33.105; 33.401; and 25.201, including, but not limited to, alternative proposals regarding (1) adding information relating to channel identity to an

integrity or encryption algorithm; (2) checking the integrity of information about encryption algorithms used by other networks in messages; (3) using a logical or transport channel specific parameter as an input to the ciphering algorithm; or (4) ciphering models, including but not limited to any proposed MAC + RLC solutions.

Topic No 17

Knowledge regarding participants, activities and events during the following meetings:

- a. ETSI SMG-Security Group Meeting No. 1/96 (January 8-10, 1996, Leidschendam, The Netherlands);
- b. ETSI SMG2 Speech Experts Group Meeting number 7 (June 19-21, 1996, Nuremberg, Germany);
- c. 3GPP TSG-RAN WG2 (Radio layer 2 and Radio layer 3) Meeting (March 8-11, 1999, Stockholm, Sweden);
- d. 3GPP TSG SA WG3 Meeting (March 23-26, 1999, Stockholm, Sweden);
- e. ETSI SMG2 WPB Meeting number 12 (January 11-13, 2000, Aalborg, Denmark);
- f. 3GPP TSG-SA WG3 Meeting No. 12 (April 11-14, 2000, Stockholm, Sweden);
- g. 3GPP TSG-SA Meeting No. 8 (June 26-28, 2000, Dusseldorf, Germany);
- h. 3GPP TSG-RAN WG2 Meeting No. 19 (February 19-23, 2001, Sophia Antipolis, France);
- i. 3GPP TSG SA WG3 Meeting (February 27-March 2, 2001, Goteborg, Sweden).

- j. 3GPP TSG-RAN Meeting No. 11 (March 13-16, 2001, Palm Springs, California); and
- k. 3GPP TSG-RAN WG2 Meeting No. 20 (April 9-13, 2001, Hayama, Japan).

Topic No 18

Knowledge of, design, development, operation, implementation, testing or certification of power-saving features or functions of technology to store a network address, including but not limited to a Bluetooth Device Address, in a Database for later use.

Topic No 19

To the extent not duplicative of Topic No. 22, knowledge of, design, development, operation, implementation, testing or certification of technology to present a network address, including but not limited to a Bluetooth Device Address, in a list for a user to select.

Topic No 20

Knowledge and communications concerning the Litigation, the Patents, or Related Patents. This includes without limitation any communications between You and Alston & Bird LLP, Morris, Nichols, Arsht & Tunnell LLP, or any other counsel for Nokia relating to the Litigation, the Patents, or Related Patents.

Topic No 21

The search for, collection of, and production of documents responsive to the subpoena.

Topic No 22

The authenticity of the documents produced in response to the subpoena.

Exhibit A

To: CEPT-CCH-GSM
Madeira, 16-20 February 1987

GSM Doc 22/87

From: WP2

REPORT OF WP2, THE HAGUE, 22-30 JANUARY 1987

Report 05/07.

CONTENTS

1. SUMMARY
2. INTRODUCTION
3. COMPARISON
 - 3.1 MINIMUM REQUIREMENTS
 - 3.2 COMPARISON OF SYSTEMS
 - 3.3 POSSIBLE SOLUTIONS

1. SUMMARY

This Report presents the conclusion that WP2 has reached regarding the recommendation of a Radio Sub-System for the GSM system.

Three choices have to be made, firstly whether a digital system can meet the minimum requirements dictated by current analogue systems, secondly, whether to use FDMA or TDMA, and thirdly, if TDMA is used, whether to use Narrowband (NB) or Wideband (WB) TDMA.

A summary of the major factors against the GSM criteria for each of these three choices is given in the Table below.

| | (a) | (b) | (c) |
|------------------------------|------------------|------------|------------|
| | Analogue/Digital | FDMA/TDMA | NB/WB TDMA |
| Speech Quality | Comparable | Comparable | Comparable |
| Spectrum Efficiency | Comparable | Comparable | NB |
| Infrastructure & Mobile Cost | Digital | TDMA | NB |
| HP Viability | Digital | TDMA | NB |
| Flexibility for New Services | Digital | TDMA | Comparable |
| Risk | Analogue | FDMA | NB |
| Spectrum Management | Comparable | FDMA | NB |

The broad conclusions are

- (a) A digital system can exceed the minimum requirements compared with analogue.
- (b) TDMA has advantages over FDMA
- (c) Narrowband TDMA is preferred to WBTDMA although both can meet the minimum requirements.

Two broad solutions are therefore possible, NBTDMA and WBTDMA (with modifications).

All the delegations agreed on the NBTDMA concept, whereas only two delegations agreed that the WBTDMA concept would satisfy their requirements.

2. INTRODUCTION

CEPT/GSM decided in Madrid that it must take a major decision at its February meeting in Portugal on which broad avenue of radio access method it should select. The choice is to be made from one of the following broad avenues:

- FDMA
- Narrowband TDMA with or without frequency hopping
- Wideband TDMA with or without CDMA

In order to enable GSM at its next meeting to take this decision WP2 held a meeting from 22-30 January 1987 to compare different experimental systems, the meeting agreed to follow the procedure outlined in the GSM approved report WP2/1 rev.5 (10/86); the three steps are:

- (i) To check whether the minimum requirements that have been set by GSM for the "broad avenue" are met.
- (ii) To compare the remaining avenues with the well known 6 criteria adopted by GSM at its Berlin meeting, assessing the risks as agreed in Madrid and finally analysis of the spectrum management issues for each of the systems.
- (iii) To specify some of the basic parameters for the GSM system.

3. COMPARISON OF BROAD AVENUES

3.1 MINIMUM REQUIREMENTS

Quality

| |
|---|
| The average speech quality must be equal to that of existing companded FM analogue systems. |
|---|

The tests on the speech coders show that this can be achieved with net bit rates of about 14 to 16 kbit/s. However this is subject to the radio subsystem providing sufficient quality, that is a BER less than 10^{-2} .

It is therefore necessary to determine whether or not each of the "broad avenues" can provide such a quality, not only in the typical urban propagation condition but also in the other propagation conditions likely to be encountered. The laboratory test results show that this can be met provided that certain measures are applied.

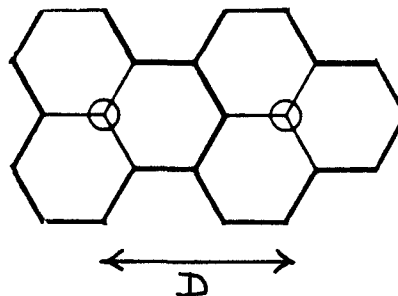
- * for the FDMA scenario almost perfect diversity is needed at the receiver (e.g. antenna diversity with dual receiver), together with adequate error protection;
- * regarding the narrowband TDMA experimental systems, the tests performed in difficult channel conditions revealed that the best equalizer cannot equalize everything, and that channel coding is necessary and should be included in the optimisation plan to ensure that service requirements (delay, BER) are met. The tests have also shown that in this case slow frequency hopping allows the error correction to perform in the same way at all speeds; furthermore an effective way of dealing with multipath (e.g. equalization) is necessary. (In this respect the tests have shown a better performance for maximum likelihood demodulation (e.g. Viterbi algorithm) than for decision-feedback equalization).
- * for wideband TDMA the speech quality requirement is met provided CDMA is not applied in the carrier and the system is provided with adequate error protection.

All three "broad avenues" therefore satisfy this requirement, with the conditions listed above.

Peak Traffic Density

It is required that the systems can accommodate a uniform traffic density of 25 Erl/km², with a base station (BS) separation equal to or greater than 3.5 km.

This figure has been obtained with reference to existing analogue systems using six or three sectored cells and directional antennas, with hexagonal cells and a BS site installed at a corner of the hexagon, each site illuminating three cells.



In this case, if D is the BS site separation, the area A of one cell is given by the formula;

$$A = \sqrt{3} D^2 / 6.$$

For this coverage it should be noted that the model relating the C/I and the cluster size derived in WP2 for spectrum efficiency calculations using omni-directional antennas does not apply to sectored antennas. Instead the graphs of J-E Stjernvall (*) can be used.

(*) J-E Stjernvall; Calculation of capacity and co-channel interference in a cellular system, Nordic Seminar on Digital Land Mobile Radiocommunication, Espoo, Finland 5-7 Feb 1985.

The set of published curves relating cluster size to the C/I achieved is reported in WP2 Doc 31/87. If the C/I value obtained in 90% of cases is C_i and the cluster size is C_s , then from the graphs the following is found:-

| C_s | C_i |
|-------|---------|
| 3 | 5 dB |
| 9 | 13 dB |
| 12 | 15 dB |
| 21 | 18.5 dB |
| 27 | 20.5 dB |

The following formula can be used to interpolate the cluster size:

$$C_s = 10^{((C_i + 2.75)/16.24)}$$

this gives the following cluster sizes for the C_i listed in the table above: respectively 3, 9, 3, 12.4, 20.4 and is close to the true results when $C_i < 15$ dB.

Some examples of systems that lie in this range have been taken to check that they satisfy this requirement.

(The C/I values and number of channels are taken from WP2 Doc 112/86 Annex 6 rev.1 the TR reference interface, case A.)

| | C_i | C_s | TCH/cell in the 24 MHz band | A_{max} (km ²) | D_{max} (km) BS separation |
|------------------|-------|-------------|-----------------------------------|------------------------------|------------------------------------|
| Mats-D/N | 12.9 | 9.2 | 129.2 | 5.17 | 4.2 |
| ADPM without FEC | 11.4 | 7.4 | 126.5 | 5.00 | 4.18 |
| ADPM with FEC | 7.5 | 4.3 | 125.7 | 5.02 | 4.17 |
| SFH 900 | 10.1 | 6.2 | 106.9 | 4.28 | 3.8 |
| DMS 90 | 13.1 | 9.4 | 90.33 | 3.61 | 3.54 |
| Max II | 19 | 21.8 | 95.8 | 3.83 | 3.64 |
| CD900 | 3.7 | <3 (2.5) | >88.5 | >3.55 | >3.5 |
| CD900 reduced | 4.2 | <3 | >100.67 | >4.03 | >3.7 |

This shows that the three "broad avenues" can meet the minimum requirement of $25E/km^2$ with a BS separation of not less than 3.5 km provided that sectorised antennas are used. The above results include an allowance for guard bands at the band edges (WP2 Doc 41/87) and a corrected channel spacing figure estimated by WP2 (WP2 Doc 36/87).

Hand-Held Stations

The system shall be able to accommodate hand-held stations.

The objective of this analysis is to determine which candidate systems will meet the WP2 criteria for operational duration of hand-portables (HPs) within the dimensional and weight constraints of typical HPs currently available for analogue cellular systems. X

The criteria for hand-portables are given in GSM Draft Rec 02.06 as follows:

Standby duration > 10 hours

Transmit duration > 1 hour

Maximum weight < 0.8 kg

Maximum volume < 0.9 l

The duration is obviously highly dependent on two primary factors:

- (i) battery capacity
- (ii) transmitter power

As a starting point the battery capacity has been assumed to be 500mAh, this being a typical figure for the capacity of battery for HPs used on current analogue systems, and hence of similar size and weight.

Since the transmitter power affects only the operational duration figures, calculations of duration have been made for two values of transmitter power viz:

- (i) 1/10th of that claimed necessary for a mobile unit transmitter as in the Plessey Top Down study
- (ii) 1.6 Watt ERP based on the outcome of the analysis in WP2 Doc 28/87.

Estimates of the power consumption for the component parts of the HP, both in the standby and operational modes have been taken from Tables 4.10, 4.11 and 4.12 of the Plessey Top Down study which appears to be the best source of information currently available. It should be noted that the figures used assume a switching duty cycle appropriate to the system in order to take reasonable advantage of the TDMA structure.

The results of calculations of the standby and transmit duration are summarised below.

| | TACS | TDMA TRIAL SYSTEMS |
|-------------------------------------|-------|--------------------|
| Standby Duration (hours) | 9.61 | 8.2 - 10.4 (18*) |
| Transmit Duration (hours) | 1.7 | 1.6 - 4.4 |
| Operation Duration (1.6W ERP hours) | 0.825 | Approx 0.8 |

* S900D

Within the accuracy of the estimates of the power consumption for the components required for the various systems, the battery duration is marginal for the standby condition and exceeds the requirement for the transmit duration if it is assumed that the HP will have a transmitter output power 1/10th that of a mobile station recommended for the candidate systems.

A more reasonable assessment of 1.6W ERP for the HP, allowing a 16km range capability in rural areas, reduces the operational duration to around 0.8h.

The results are to a degree dependent on the battery capacity chosen for the calculations and on the line voltage chosen.

The results shown in the table indicate that a considerable reduction in power consumption is required to show a significant advantage over current analogue HPs, and further work is therefore necessary.

Based on the E_b/N_0 figures obtained for the system tested, WP2 considered that hand portables for all the broad avenues would require a mean transmitter power of 3dB less than that required for analogue systems for the same range in non-urban environments (WP2 Doc 43/87).

This dictates a mean transmitter power in the region of 250 to 300 mW ERP; furthermore the peak power required would be the product of the mean power and the number of channels per carrier.

For reasons of power efficiency and peak current limitations of an HP, WP2 considered that 5 Watts peak power was a practical limit. This implies an upper bound on the number of channels per carrier of $5/0.25 = 20$ channels. Furthermore WP2 identified the need for study of the biological implication of the RF field from HPs (limits of $1\text{mW}/\text{cm}^2$ were quoted), since in the interest of subscriber safety there may be another restriction to the mean and/or peak power realisable.

WP2 concluded that the three broad avenues were capable of meeting the minimum requirement for HPs with further optimisation, provided full coverage of rural areas was not required.

Maximum Bandwidth

The maximum contiguous bandwidth occupied by one implementable part of the GSM system shall be less than or equal to 5 MHz.

WP2 identified that the FDMA and NBTDMA systems will meet the above requirement.

The WBTDMA system (CD900) would only meet the above requirement with some modification because of the need to limit the radiated power in the adjacent channels (outside 5 MHz) to -60dB relative to the transmitter power. With this constraint guard bands are necessary (WP2 Doc 41/87) and the wide band system tested would have to be modified to 40 channels or less.

Wide band systems may therefore require some modification to meet the above criterion and would therefore need some further study.

Cost

The cost of the system, when established, shall not be greater than that of any well established public analogue system.

Mobile System Cost:- Studies have indicated that the (mature) cost of TDMA mobile stations can be lower than that of current analogue systems, this has been supported by information presented by industry.

Infrastructure Cost: - Estimates of the cost of base station hardware (WP2 Doc 26/87 Appendix 2) indicate that for both NBTDMA and WBTDMA at 10, 20 and 60 channels per site the cost is lower than for analogue. For FDMA systems however the cost is similar to analogue.

Estimates of the total infrastructure cost (WP2 Doc 44/87) also indicate that both NBTDMA and WBTDMA systems can be significantly lower in cost than analogue systems, when the same site can be used.

As FDMA systems require ^{FDMA} complete space diversity (with two receivers and demodulators) no pure TDMA system was proposed by WP2. WP2 believes that an FDMA system would not be able to fulfil the cost requirement.

The minimum requirement for cost is met only by NBTDMA and WBTDMA systems.

Conclusion

The trials during the last few months have demonstrated the potential viability of digital cellular radio - coping with the interference and multipath problems produced by the environment. Of the broad approaches both narrowband and broadband TDMA systems have been shown to be capable of meeting the GSM criteria for the second generation system provided the conditions outlined in the above paragraphs are met.

The analysis shows however, that considerable advantage can be obtained by further optimisation.

3.2 COMPARISON OF SYSTEMS

GSM requires that the results of the tests on the candidate systems be compared against the six GSM criteria. It is required that performance in respect of the relevant criteria be at least equal to that of analogue systems and significantly better in at least one.

The six criteria are:

1. Speech quality
2. Spectrum efficiency
3. Infrastructure Cost
4. Subscriber equipment cost
5. Hand portable viability
6. Flexibility to support new services

In addition the proposed systems should be analysed with respect to:

7. Spectrum management and co-existence
8. The risks associated with their timely implementation

3.2.1 Speech Quality

In comparing spectrum efficiency the speech quality has been normalised. Further, a common codec algorithm will be used irrespective of the choice of multiple access methods. Analysis by the Speech Coding Joint Experts Group has shown that a number of the 16 kbit/s algorithms under consideration can match the performance of the analogue reference in listening tests.

WP2 is confident that further optimisation of those codecs which show the best promise of overall quality will enable the system to achieve a performance at least equivalent to the reference under operational conditions.

The systems are compared with common minimum speech quality. The digital systems, including error protection, have a strong threshold effect that yields a quality which is constant over a wide range of carrier levels.

3.2.2 Spectrum Efficiency

The method of comparing the spectrum efficiency has been specified in WP2 Doc 15/87. This document defines how the subscriber capacity of the candidate systems can be calculated as a function of traffic distribution, cluster size and number of available channels, for both a uniform traffic model and a bell shaped traffic model, using omnidirectional antennas.

Using the method specified, the results of C/I, obtained from the Paris tests, for a 1% BER in typical urban propagation conditions have been used to calculate the cluster size. Then taking into account the guard bands required to protect adjacent services (WP2 Doc 41/87), and the channel spacing (WP2 Doc 36/87), the number of traffic channels per cell per MHz has been calculated.

This has been done for the uniform and bell shaped traffic models for 24 MHz and 9 MHz of available spectrum and 2 and 4 km base station separation. The results are given in tables 3 and 4 and are summarised below for the uniform traffic model for 24 and 9 MHz of available spectrum.

In the case of the uniform traffic model, the spectrum efficiency calculations have been performed by a unanimously agreed method, and with comparable adjacent channel protection for every system.

In the case of the bell shaped traffic model calculations, some reservations were made on the calculation method because the adjacent channel interference has not been taken into account. X

TRAFFIC CHANNEL/CELL/MHz WITH 2km BS-BS SEPARATION

| SYSTEM | 24 MHz | | 9 MHz | |
|----------|---------------|-------------------|---------------|-------------------|
| | Uniform Model | Bell Shaped Model | Uniform Model | Bell Shaped Model |
| MOBIRA | 1.37 | 2.48 | 1.35 | 2.44 |
| MATS-D/N | *5.33 | 7.54 | 5.32 | 7.53 |
| MATS-D/W | 3.39 | 4.69 | 3.05 | 4.22 |
| SFH 900 | 3.22 | 4.22 | 3.18 | 4.17 |
| CD900 | 3.26 | 3.96 | 2.55 | 3.10 |
| S900D | 2.75 | 4.4 | 2.73 | 4.36 |
| MAX II | 3.37 | 5.96 | 3.37 | 6.95 |
| DMS90 | 3.04 | 4.25 | 2.93 | 4.2 |
| ADPM | 4.64 | 6.46 | 4.5 | 6.18 |
| ANALOGUE | 3.77 | 6.5 | 3.76 | 6.5 |

The results shown above for the uniform case are considered to be the most critical since a uniform model is more representative of a mature urban environment where maximum spectrum efficiency is most required.

With reference to the results shown the following conclusions can be drawn: MATS-D/N is an FDMA system and does not meet the minimum requirements (see section 3.1).

The C/I measurements for systems using space diversity have been made in a very optimistic way using two uncorrelated channel simulators. The improvement due to the uncorrelation is several dB in the case of FDMA

- Diversity gives optimistic results.
- The first attempt at prototyping digital systems has yielded figures of spectrum efficiency close to those obtained from an optimised analogue system (and exceeded it in the case of NBTDMA system.)
- The figures for a digital system can further be improved by optimisation of the equaliser and channel coding, and by realising the benefits of dynamic channel allocation, fast handover and frequency hopping brought about by greater signalling capacity and control possibilities.

Further, the results show that due to the need for guard bands the spectrum efficiency of the WBTDMA systems can suffer more from the effects of reduction of available spectrum from 24 MHz to 9 MHz than the NBTDMA system.

In conclusion, it can be seen that a NBTDMA system can provide at least the same spectrum efficiency as analogue systems, and with further optimisation this could be matched by some of the other systems.

The spectrum efficiency of the analogue systems is also shown to be equalled by WBTDMA in the "minimum requirements" section 3.1 of this report.

TDMA systems can therefore meet the GSM criterion for Spectrum Efficiency.

3.2.3 Cost Comparison

Evaluation procedure.

The problem of the cost (as distinct from the price) has been addressed by GSM as one of major interest.

The procedure of cost comparison in Report WP2/1 "Comparison of mobile radio sub-systems" Annex C.

The issue has been tackled by means of a comparison of any proposed scenario with the well known SCPC (Single Channel Per Carrier) scenario.

The cost of a mobile system has been considered as composed of two parts: the mobile terminal and the infrastructure.

Mobile Terminal

As far as the mobile part is concerned, it is necessary to consider that, in many countries, the GSM system will be put into operation in an environment dominated by the previous analogue systems.

In many countries, analogue and digital systems will operate simultaneously. Then the cost of the mobile terminal in the GSM system (when established) must have an upper limit set by the cost of the already existing mobile analogue terminal.

Infrastructure

As far as the infrastructure is concerned, the stages of investment over time make it necessary to consider the problem from the medium and long term financial points of view.

The various scenarios have been represented in terms of number of channels per carrier and with a suitable Bs distribution according to the three "broad avenue" such as SCPC, NBDMA and WBDMA.

The procedure developed establishes the maximum cost of the radio transceiver in any scenario in order to be competitive with the SCPC case. The result is expressed in terms of transceiver cost ratio of any scenario with respect to the SCPC scenario.

Infrastructure Input Data

Many Administrations and operators represented in GSM supplied data for the application of the procedure developed. The combination of the data is a model of the global traffic distribution that is considered to be representative of Europe as a whole.

The procedure was run on the following input data:

TABLE 1

| SCENARIO | Channels | Cluster Size | Channels/Carrier | BSs |
|----------|----------|--------------|------------------|------|
| SCPC | 1920 | 21 | 1 | 4996 |
| NBDMA | 960 | 12 | 5 | 4359 |
| WBDMA | 300 | 3 | 40 | 5472 |

Comparison of Infrastructure Cost

The results, as transceiver maximum cost limit (cost ratio) in order to be competitive to the SCPC scenario, are:

TABLE 2

| SCENARIO | COST RATIO | | | COST (%)* |
|----------------------|------------|------------|---------|------------|
| Channels/ Carrier | IRR = Cost | NPV = Cost | Average | Difference |
| 1 SCPC | 1 | 1 | 1 | 0 |
| 5) | 3.7 | 4.7 | 4.2 | -52 |
|) NBTDMA | | | | |
| 15) | 4.6 | 10.3 | 7.45 | -70 |
| 40) | 2.9 | 11.3 | 7.1 | -56 |
|) WBTDMA | | | | |
| 60) | 2.9 | 11.4 | 7.15 | -58 |

* Using the hypothesis of a double cost in the NB and triple cost in the WB-TDMA with respect of the SCPC transceiver cost.

Conclusion

According to the absolute cost forecast it can be concluded that both NB and WB are very competitive to the SCPC scenario in terms of subscriber connection cost.

From the input data received, it seems that the Narrow Band approach shows a greater cost margin.

3.2.4 Handportable Viability

According to information received from manufacturers, no significant differences for optimised systems in cost and active mode power consumption can be identified (WP2 Doc 31/87).

In standby mode (listening) some manufacturers have proposed a low duty cycle in order to save battery life. This will allow for a battery life of several days (ref: company presentations 23 January in WP2).

For the same range the required peak-power is proportional to the number of channels (WP2 Doc 43/87). From a technological point of view it was agreed that the peak power limit is about 5 Watts. This value might however have to be reduced due to the risk of biological effects.

In order to keep power consumption as low as possible, a non-linear amplifier must be used. The efficiency of the class-C amplifier should be as high as possible (WP2 Doc 27/87).

Very sharp cutoff RF filters will add extra cost and size to a hand portable station.

A rough calculation indicates that the maximum number of channels must be lower than 20 in order to have a better rural coverage than with a TACS hand portable (WP2 Doc 43/87).

The weight and size requirements for a GSM hand portable are largely determined by the battery. It has been determined, (WP2 Doc 43/87) that the same mean power is required for a given range independent of system, therefore the same battery can be used.

It is concluded therefore that a GSM hand portable can be within the WP1 size, weight and battery duration specifications (GSM Draft Rec. 02.06).

3.2.5 Flexibility

Comparison criteria for GSM candidate systems include flexibility in planning related to frequency coordination, in system engineering, and in capability of exploiting technological evolution.

Some comparison elements from contributions to WP2 on this topic (WP2 Docs 22 and 39/87), together with the outcome of discussion in plenary session are presented below.

Matters Related to Frequency Planning

(i) Static capacity allocation.

The ability to provide capacity corresponding to traffic density distribution.

Because of the relatively large number of channels, large cluster size NBTDMA systems provide the possibility of concentrating channels in specified areas within a cluster by means of sectorisation and moving carriers from one part of the cluster, known to require only small capacity, to another. However the problems of adjacent channel interference need to be examined.

WBTDMA systems using 3 sectors/site (a cluster) in high density areas cannot allocate timeslots used in one sector to another without taking that timeslot out of operation at some of the surrounding base stations.

(ii) Adaptive capacity allocation.

Temporary allocation of extra capacity to a restricted area, e.g. at peak traffic hours.

This can be made in a more efficient way for NBTDMA than for WBTDMA.

(iii) Cell splitting.

Two ways of cell splitting can be considered

(a) Sectorised antennas

WBTDMA systems have not yet shown the possibility of having more than 3 sectors per BS, whereas NBTDMA systems can take greater advantage of this technique.

(b) New site creation

This kind of cell splitting is simpler for WB than NB TDMA. A site cluster of one can be reached in this case.

(iv) Frequency assignment.

The problem of frequency assignment is greatly simplified in the CD900 concept in high density areas by using all the frequencies on every site.

(v) Minimum bandwidth required for complete cluster expansion.

The choice of the NB or WB TDMA avenue implies an increase in the full cluster expansion bandwidth (cluster size x minimum bandwidth) of the order of 5-20 relative to analogue systems. Comparison of the NB and WB TDMA avenues shows no clear advantage. However, using a system needing a small quantum of bandwidth would ease the transition from an existing analogue system to the digital one.

(vi) Required accuracy in site location.

Due to a relatively large cluster size (with correspondingly large re-use distance) the sensitivity of a NBTDMA system to non-optimum site location is small. WBTDMA has a small re-use distance and is more sensitive, resulting in loss of capacity and increased interference in adjacent sector cells.

System Engineering

(i) Range

PN design. 21 km range. variable.

Since the WB TDMA system may have a smaller range than existing analogue systems, it may be difficult to provide continuous coverage in some areas. This will apply particularly to rural areas. The need to establish new sites may prolong the implementation of the system.

(ii) Synchronisation

It is evident that some form of synchronisation is needed in a WB TDMA system, thus loss of synchronisation would have severe consequences.

Following technological evolution

Both avenues have the capability to evolve, allowing the introduction of facilities such as sub-rate channels etc.

3.2.6 Spectrum Management and Co-existence

The problems of frequency management which will arise during the initial deployment and growth of a GSM system were discussed in WP2 Docs 29/87 and 39/87. The major points requiring consideration were identified as follows:

1. The full GSM band will not be available when the GSM system is first brought into operation.
2. It is likely that sub-division of the available band between competing operators will be required in some countries.

3. In considering export potential, operation in similar sub-bands may be required.
4. Gradual replacement of existing cellular systems is likely to allow the re-allocation of spectrum only in a piecemeal fashion.
5. The system must be able to co-exist with service in adjacent frequency bands, neither generating nor suffering from harmful interference.
6. It is likely that sharing of base station sites with existing systems will be required.
7. Problems with localised interference and propagation effects may require tailoring of frequency plans.
8. Frequency coordination may be necessary with both GSM and non GSM services operated by neighbouring administrations.

The need to provide adequate frequency guardbands to allow coexistence with services in adjacent bands was recognised, together with the accompanying cost of spectrum efficiency.

The ease of managing a system has been widely acknowledged to increase as the necessary bandwidth decreases. It was generally agreed at the meeting that the remaining wideband system would be very difficult to implement in the form proposed.

When the need for guardbands was taken into account it was found that the wideband system would have to be scaled down to a 40 channel system to fit into a single 5 MHz band to allow for a minimum implementation.

Although one administration foresaw no problems in implementing a wideband system, and another was prepared to manage a system with a bandwidth of 1.5 to 2 MHz, the majority were in favour of adopting narrowband systems with channel spacing of about 300 kHz. It was seen that the latter would allow adequate flexibility in planning the initial system and also allow spectrum released from redundant systems to be more easily reallocated.

3.2.7 Risk Factors

The risk factors have been separated into three areas:

- (i) Development
- (ii) Implementation
- (iii) Operational

GSM should assume that WP2 will meet the timescale on the system specification. The risk factors then include the timescale for the development and implementation together with the operational susceptibility to a failure. WP2 Doc 26/87 refers to these risk factors as presented in the Plessey Top Down study. It was difficult to quantify the impact of the development and implementation on the timescale, but the majority of delegations accept that the wideband TDMA systems present a high relative risk when compared to the narrowband TDMA systems. The lowest risk was associated with the single-channel-per-carrier systems.

The technological development for wideband TDMA systems represents a significant risk in terms of the custom VLSI. More data has been collected by the PN on the risk of VLSI. For TDMA systems it is largely linked with the possibility of an available VLSI design ready ahead of the manufacturing phase and early enough to facilitate an introduction of the system in 1991. The conclusion of WP2 Doc 26/87 is that this risk is lower for lower bit rates. The development risk factor will increase significantly for a modified WBTDMA system. The risk for the wideband TDMA, even allowing for the exclusion of CDMA may be further increased by the complexity in the implementation e.g., the system requires an RF antenna switch/combiner synchronised to the TDMA bursts. The less constrained implementations of the narrowband TDMA systems place no requirement on the inter base-station synchronisation.

The conclusion of WP2 Doc 26/87 is that the development and implementation risk factor count for wideband TDMA is approximately twice that of the narrowband TDMA systems. This count allows an equal weighting even in the critical areas of VLSI where wideband TDMA systems should be attributed a higher risk.

Some delegations disagree with this conclusion. Since specifications from the proposed WBTDMA system are more advanced than those for the proposed NBTDMA systems, some delegations consider that the development time for validation tests may be less for the WBTDMA than for the NBTDMA proposal.

Two aspects of the operational risk need attention:

- (i) service outage due to system susceptibility to interference
- (ii) performance shortfall owing to system inflexibility

All the systems have some risk in a shortfall of performance.

Service outage caused by the loss of a complete carrier at the edge of the band due to adjacent band services is a serious risk in TDMA systems. The effect of this is more serious for a WB than for a NBTDMA system.

Overall, the risk factors weigh against the wideband TDMA on a relative scale.

3.3 POSSIBLE SOLUTIONS

As requested by GSM, WP2 did not try to make a choice from the experimental concepts proposed and tested, but tried to choose one of the "Broad Avenues". Because of the high cost and lack of flexibility to accommodate new services, WP2 recommends GSM not to follow the FDMA avenue.

Two Broad Avenues remain, NBTDMA and WBTDMA, both of which satisfy the GSM criteria to a greater or lesser extent. All the delegations agreed upon the adequacy of the NBTDMA concept, only two delegations agreed that the WBTDMA concept would satisfy their requirements.

Some of the characteristics of the two Broad Avenues are described below. Agreement has been reached in WP2 on some of the system characteristics and in addition some design objectives have been set. It is recommended that these characteristics and objectives be refined during the optimisation phase defined in the WP2 action plan.

3.3.1 Characteristics of the NBDMA Concept

There was unanimous agreement that this concept would satisfy the requirements of all administrations. Accordingly, the following characteristics and objectives have been determined for the NBDMA approach.

Equaliser

- (a) This should be designed to equalise delayed echoes at least up to 7 us. The equaliser to be considered during the optimisation phase will consist of maximum likelihood demodulation.
- (b) Echoes in excess of 7 us, not dealt with by the equaliser, can be considered as interferers and require error correction.

C/I Protection and Cluster Size

The system should yield the minimum required voice quality with a C/I of less than 10 to 12 dB. The need for this requirement is to ensure a robust system and specifically to deal with b) above.

This corresponds to a cluster size of 9 to 12 cells (in the case of uniform traffic distribution) and a code rate around 2/3.

Spectrum Utilisation

A carrier spacing of approximately 300 kHz has been agreed in WP2, and a design goal of 25 kHz per traffic channel has been set.

TDMA Factor

The number of traffic channels per carrier has been specified as 8 to 12.

Modulation

The meeting agreed to Constant Envelope modulation. The choice being limited to GMSK, DPM and 8-PSK.

Frequency Hopping

It was agreed that frequency hopping should be included as a network option. All mobiles (should) be able to utilise hopping if commanded. This was felt to have no significant impact on the cost of the mobile station. All the requirements will have to be met without the use of this option.

Interleaving

It was agreed that interleaving was considered desirable within the constraint of allowable time delay.

Adaptive Power Control

Power Control was considered desirable in particular in the MS to BS direction. The possibility of use in both directions will be studied.

Burst Duration

No precise figure was agreed. A value of around 500 us was suggested as a starting point for further optimisation.

Peak Power

A maximum peak power of 5 Watts was provisionally agreed for Hand Portables. This would allow coverage comparable to that obtainable with HPs in current analogue systems.

Technology

It is a design goal for the demodulator to be able to demodulate at least an additional time slot between two successive time slots of the same traffic channel. This implies a demodulator VLSI duty cycle of less than 50%. It is required also that the synthesizer should be able to change its frequency quickly enough to listen to another frequency during one time slot situated between two successive time slots of the traffic channel.

Speech Activity Detection

It is a requirement for the radio sub-system to be able to exploit speech activity detection if implemented in the speech coder.

3.3.2 Characteristics of the WTDMA Concept

Only two delegations agreed that his concept would satisfy their requirements.

The wideband scenario proposed to GSM is a version of CD900 revised to provide a lower number of channels and a lower bandwidth.

The multiple access scheme (TDMA) and the modulation (QPSK) remain unchanged.

The proposed new parameters are:

- (i) 24 channels per carrier;
- (ii) 1.45 Mchip/s as modulation rate;
- (iii) a channel spacing, calculated by WP2 to fit the 20 dB adjacent channel protection, of 2 MHz;
- (iv) guard bands at each end of the 24 MHz bandwidth of 500 kHz.

END

Exhibit B

(Part A)

Executive Summary SMG #24

The SMG #24 Plenary Meeting was held in Madrid, Spain. It was hosted by Telefónica. SMG # 24 was attended by 270 delegates, including delegations from ANSI T1P1, RITT (China), ARIB (Japan), chairs of GSM MoU and UMTS Forum as well as 5 ETSI Board members.

1 UMTS AND IMT 2000 MATTERS

SMG2 presented their findings regarding four UTRA (UMTS terrestrial radio access) concepts. SMG 2 reported that the essential requirements had been fulfilled by all concepts. SMG 2 was not able to reach a consensus and asked SMG to take a decision on one concept that should be used by SMG 2 for the refinement phase until mid 1998.

Regarding IPR the SMG Chairman reminded the ETSI members to fulfil their membership duties. ETSI's legal adviser reported that she had received some IPR statements, but no information about essential IPR.

After an intensive and comprehensive discussion a vote for indication of intend was held. This resulted in 58.45 % of the weighted votes for W-CDMA and 41.55 % for TD-CDMA and no votes for the two other concepts. A decision requires 71 %. A vote will be held in SMG#24bis (28-29 January 1998).

Regarding **UMTS services** the standard on services principles was approved.

Regarding **UMTS network aspects** the definition of the GSM-UMTS core network pivoting GSM core network evolution was agreed.

Several **ITU contributions** to TG8/1 and SG11 were approved and the ITU work program was updated.

2 GSM MATTERS

Several specifications of **Release '97** were approved, e.g.

- Support of mobile number portability (stage 1)
- Support of private numbering plan (stage 1)
- GPRS: all radio related specifications and some network related specifications

The rest of Release '97 is planned for approval in SMG # 25.

287 Change Requests were approved. The work plan for harmonisation between T1P1's GSM specifications were approved. The AMR performance requirements were agreed in principle.

3 SMG MATTERS

SMG agreed in principle that a more efficient global co-operation is needed for future GSM and UMTS standardisation. It was felt necessary to enable the full participation of relevant parties outside ETSI and to avoid complex co-operation structures between different standardisation bodies. The SMG Chairman was charged to explore with all relevant parties, whether one joint working structure avoiding parallel work and overhead co-ordination could be implemented within the framework of an ETSI Partnership Project.

Status: Approved

(Part B)

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Fred Hillebrand, Chairman of SMG, opened the meeting and thanked Telefónica for hosting the meeting.

Francisco Ruiz-Vinuesa, Network General Director of Telefónica Móviles, addressed the meeting and welcomed the delegates on behalf of the hosts.

Fred Hillebrand welcomed the delegation from ARIB (the Japanese Standards organisation responsible for the IMT-2000 radio access), participating for the first time at an SMG plenary, and its Head of delegation Akio Sasaki. He also welcomed Mel Woinsky, T1P1 Chairman; Thomas Beijer, UMTS Forum Chairman; Dr. Adriana Nugter, GSM-MoU Chair; members of the ETSI Board: Peter Koch, Kiritkumar Lathia, Pierre Perrichon, Peter Bumann, Gerry Lawrence; the delegations from North America, China, Hong Kong, Israel and Australia; the large number of delegates participating for the first time in an SMG meeting, and - last but not least - the “semi-permanent” SMG delegates.

0 MEETING REPORT OF SMG#23

The SMG#23 report had been approved by correspondence. SMG#24 plenary noted that approval.

1 TARGETS OF SMG #24, SHORT CHAIRMAN’S REPORT

Fred Hillebrand gave a short Chairman’s report ([Tdoc SMG 1021/97](#)).

Main activities:

- Co-ordination of UMTS and IMT-2000 matters
- Presentations to ETSI GA, UMTS Forum GA and some major conferences
- Negotiations with ETSI management on decisions relevant for SMG

Other points:

- The obligations of ETSI members concerning IPR declarations were not fulfilled sufficiently by all members.

The **following targets** for SMG#24 were proposed and approved by SMG#24:

- Approval and review of GSM release ‘97
- UTRA milestone M2: selection of one concept
 - * consensus process in SMG#24
 - * voting if needed in SMG#24bis
- UMTS services: Agreement on the concept
- UMTS network aspects: the way forward
- Clarification of the IMT-2000 family concept by review and approval of the ITU contributions for the January/February ’98 TG8/1 and SG11 meetings.

2 ADOPTION OF AGENDA

The agenda in [Tdoc SMG 1020/97](#) was approved with the addition of Agenda Item [5.7: T1P1 work items](#) and a clarification that the decision on an SMG#24bis meeting would be made before Friday, 19th December, lunch. The agenda of side events in [Tdoc SMG 1046/97](#) was also approved.

3 SMG MATTERS

3.1 ELECTION OF SMG OFFICIALS

For the election of the SMG Chair, Fred Hillebrand passed the chair to the SMG Vice Chairman Alan Cox. For the position of SMG chair, the only candidate was Fred Hillebrand. SMG#24 approved unanimously to propose to the General Assembly a nomination of Fred Hillebrand as SMG Chairman for a further period.

For the position of SMG3 chair, the only candidate was Michel Mouly. He was elected by SMG#24 for a further period.

For the position of SMG7 chair, the only candidate was Rémi Thomas. He was elected by SMG#24 for a further period.

For the position of SMG vice chair, the only candidate was Gunnar Sandegren. He was elected by SMG#24 for a further period.

3.2 PT SMG

Ansgar Bergmann presented [Tdoc SMG 1038/97](#), *PT SMG status report to SMG#24*, source PT SMG. It was approved.

New problems within ETSI have been arising every 1-2 months, the latest ones: New travel rules August 97, Proposal to reduce the payment for STF contracts, Board decision to limit experts' contracts to 18 months.

Pierre Perrichon commented that the PT SMG status report should in future be delivered in the form as used before SMG#22, that is as a Word document including all necessary information as annexes rather than referring to other temporary documents. This was agreed.

Liaison activities of PT SMG with T1P1: it was clarified that liaison on administrative matters is meant.

AP Antun Samukic To provide a Tdoc about the information exchange between Korean TTA and ETSI/PT SMG (to become [Tdoc SMG 1164/97](#)).

For the question of in-time delivery of new versions of specifications by PT SMG, raised in a letter from SMG2 to the PT SMG leader in Annex I of [Tdoc SMG 1017/97](#), SMG#24 noted the SMG2 priority of in-time delivery of new versions of specifications

by PT SMG against support of SMG2 (subgroup) meetings and agreed that this is mainly a decision of each STC.

CD-ROMs: PT SMG and ETSI secretariat produce after each SMG plenary a CD-ROM with the plenary documentation. A majority of delegates asked for a CD-ROM #24 without waiting for the material of SMG#24bis. On the general question of trade-off between timely delivery of the CD-ROM and amount of newest specifications etc., SMG#24 didn't make any further conclusions.

Around 30 delegates announced their interest in obtaining the earlier SMG plenaries documents in electronic form.

SMG#24 discussed shortly whether to change the name "PT SMG". It was clarified that the new names STF12, STF83 etc. decided by ETSI affect the budgetary units of STFs belonging to PT SMG.

AP Ansgar Bergmann: To make a proposal whether to change the name PT SMG and if yes, to propose a new name for PT SMG.

Voluntary Scheme for PT SMG funding: Per Björndahl presented [Tdoc SMG 1092/97](#), *Report to SMG#24 from STF SMG Funding Task Force meeting #1*. The group

- reviewed the PT SMG activities,
- discussed means of raising funds evaluated the business plan for resources 1999-2000 and issues of a legal entity
- and established an action plan until SMG#26.

Dissemination of information as a task for PT SMG: It was the common view that when resources of PT SMG are restricted, this task should have a lower priority. It was pointed out that this approach had already been used hitherto.

3.3 ORGANISATION OF GSM AND UMTS STANDARDISATION

Hans Hauser presented [Tdoc SMG 1062/97](#), *Future Organisation for GSM and UMTS Standardisation*, source T-Mobil, Mannesmann Mobilfunk, E-Plus Mobilfunk, aiming at a smooth and efficient standardisation process for the evolution of GSM and towards UMTS. The GSM community is now a global community of operators and manufacturers but has experienced difficulties to open up for a wider participation in ETSI/SMG. Organisations from outside Europe still cannot become full ETSI members. Even voting rights for associate members in Technical Bodies were not endorsed by ETSI's General Assembly in November 97. Present working methods with ANSI T1P1 on common GSM specifications are proven as best possible solution for co-operation with other standard bodies, but they are very complex. This situation calls for a closer and more efficient overall co-operation. The GSM MoU Association and especially the APIG (Asian Pacific Interest Group) of GSM MoU have expressed their desire to participate fully in GSM work and in Third Generation standardisation and to ensure roaming with Japan.

For these reasons, these three companies proposed the establishment of SMG as the joint working structure among the interested bodies to produce GSM and UMTS

standards for ETSI (as an ETSI partnership project) and for the other interested bodies, avoiding parallel work and overhead co-ordination; current budget allocations for ETSI/SMG to be considered as an asset for this possible joint working structure; the SMG Chairman to carry out an exploratory mission in this sense.

Comments in the discussion:

- Pietro Porzio-Giusto indicated support of the paper and asked for some results before a possible SMG#24bis.
- Neil Lilly indicated full support of the effort from GSM MoU.
- Gary Jones indicated support of the proposal from the American GSM community and their readiness for participating in the efforts.
- Peter Bumann (member of the ETSI Board) stated that the EPP concept was invented with SMG in mind.
- Tony Wiener indicated support for the proposal, but questioned possible additional costs. Armin Toepfer responded that as the number of committees would be reduced, hence costs would go down.
- Per Björndahl commented the review task force (see section 3.2) having had this idea in mind as a way forward.
- Patrick Blanc questioned the role of such an organisation as compared to ITU. Armin Toepfer explained that the work would be complementary, ITU defining the framework, a group like SMG doing the detailed technical development, evolution and maintenance of competitive standards.
- Albert Dorgelo asked to add TIA to the contacts mentioned in section 3.
- Neil Lilly commented that the scheme would allow improved ways to contribute to ITU if prepared in SMG with such a new basis.
- Neil Lilly commented that voting/balloting rights of Standards Organisations using the SMG specifications should not to be impacted.
- Paola Tonelli proposed to put the emphasis on UMTS. Gary Jones confirmed that the American community has in the first line GSM in mind. He expressed the support of GSM NA of the fact that the proposal not only includes UMTS but also GSM.
- Alistair Urie explained that similar rules as the ETSI Partnership Project rules would probably be applicable for other interested standards organisations.
- Heikki Ahava indicated work in the US very often being done in Fora outside the standardisation groups and brought to the standardisation groups in a rather mature state, so to include such fora in the preparation.
- Rémi Thomas commented that practical steps, how to approve CRs etc, require experience and time, and expressed the expectation that the scheme would not yet be working within three months.
- Gunnar Sandegren explained that the idea would be one body leading the specification activities on GSM and UMTS; preparation of specifications should be done so that the adopting in the regional standards organisations would be a formality. He saw the proposal as a necessary corrective factor for the mismatch between spreading of the GSM standard and influence on its development.

- Alan Cox: For information: There wasn't a majority against extending technical voting to associate members. The non-decision of GA should not be seen as the major objective or reason for the proposal.
- Gerry Lawrence and Pierre Perrichon, presenting a view from the ETSI Board: Proposal fits well to the EPP concept. Pierre Perrichon remembered that there is also the ISDN evolution UMTS Core Network as an ETSI project outside of SMG.
- Gunnar Sandegren: The project should take care for recognising convergence parts, but should not be responsible itself for that convergence.

Decisions on the matter:

- It was agreed by SMG#24 as important that both GSM and UMTS are included in the proposal.
- Time plan: It was agreed Fred Hillebrand to give a status report into SMG#24bis (if held), and to propose a concept for SMG#25.
- SMG#24 endorsed the paper in principle.

Neil Lilly commented that the time plan would fit well for reporting to the next GSM MoU.

Later in the meeting, Hans Hauser presented a revision of [Tdoc SMG 1062/97](#) in [Tdoc SMG 1142/97](#).

Rémi Thomas and Didier Chauveau argued against stating in section 1 of [Tdoc SMG 1142/97](#) the general rule of equal rights for all participants, this being a decision still to be made.

Peter Bumann and Peter Adams asked to inform all relevant ETSI groupings like ETSAG, Board, GA, the ad hoc group on fixed/mobile convergence and others in order to have a good acceptance for the way ahead.

It was clarified that Albert Dorgelo's request to add TIA was not followed because TIA has no activities in GSM or UMTS. As a consequence, Albert Dorgelo requested the modification (6) below which was accepted by SMG#24.

It was clarified that for the MPTs to be contacted, first priority shall be the Chinese MPT, second priority the Japanese MPT.

Modifications of [Tdoc SMG 1142/97](#):

- (1) "The SMG Chairmanshould report to SMG#25 and propose a way forward."
- (2) "It is expected that the SMG Chairman will contact"
- (3) Heading of section 1 to become "Guidance for exploratory mission".
- (4) Section 1: Replace "have to be provided" by "is to be considered".
- (5) Insert: "The SMG Chairman will seek support for this mission by the two SMG Vice Chairmen. This team will be supported by the PT SMG leader."
- (6) replace "considering 3rd generation work issues" by "UMTS work issues".

With these modifications, [Tdoc SMG 1142/97](#) was approved. The approved version is [Tdoc SMG 1154/97](#) replacing [Tdoc SMG 1062/97](#) and [Tdoc SMG 1142/97](#).

4 UMTS MATTERS

4.1 UTRA

4.1.1 SMG2 status report

Niels Peter Skov Andersen presented the SMG2 status report on the UMTS Terrestrial Radio Access (UTRA) definition process (see [Tdoc SMG 1017/97](#) and [Tdoc SMG 893/97](#)). SMG2's detailed work towards that definition was initiated by a workshop on radio access technologies held December 1996. Since then SMG2 have dealt with UMTS Terrestrial Radio Access at several meetings amongst these four SMG2 plenaries, four ad-hoc meetings dedicated to UMTS, a joint SMG2-ARIB workshop, a question and answer session and numerous concept group meetings.

In the first step of the process the procedure and time schedule for the UTRA definition was elaborated by SMG2 and agreed by SMG at SMG#21. Hereafter, the requirements impacting the UMTS Terrestrial Radio Access was collected and the high level requirements for the UMTS Terrestrial Radio Access documented and approved by SMG#22. The high level requirements were further detailed in UMTS 21.01. At the same time UMTS 30.03 describing evaluation criteria for the UTRA definition procedure was elaborated. UMTS 21.01 and UMTS 30.03 were approved by SMG#22. In parallel with the work on these reference documents, SMG2 were collecting technical proposals for radio access technologies for the UMTS Terrestrial Radio Access. These proposals grouped into the following five concepts:

- α -concept based on wideband CDMA (WCDMA)
- β -concept based on OFDMA
- γ -concept based on wideband TDMA (WB-TDMA)
- δ -concept based on TDMA with spreading (WB TDMA/CDMA)
- ϵ -concept based on ODMA (Opportunity Driven Multiple Access)

This grouping was presented to SMG#22 for approval. Hereafter, SMG2 formed five concept groups to assist in evaluation of the different building blocks suggested. Through the period since SMG#22 detailed evaluation of the proposals have been performed and the different original proposals combined into one single proposal for UMTS Terrestrial Radio Access per concept group. Originally the intention was then to merge the concepts into one single concept for the UMTS Terrestrial Radio Access. Unfortunately, SMG2 have failed to do so.

The concepts have been refined and their performance been evaluated in detail. Link level results and system level results have been discussed within SMG2. Further, SMG2 have checked the different concepts against the high level requirements. In general the concepts can be claimed to fulfil the high level requirements. However, SMG2 remarked

- that the area of private and residential operation and the use of unpaired spectrum are not areas on which the concept groups have placed the highest attention;

- that therefore the issue of UMTS deployment of private and residential operation would require further studies in SMG2 to ensure that the requirements in this area are properly met;
- that the issue of how UMTS can be implemented to enable an operator to make the most effective use of the unpaired spectrum, has not been fully addressed and will require further studies in SMG2;
- *that, in particular it may be necessary to consider modification of any adopted UMTS Terrestrial Radio Access concept to improve these aspects of performance.*

Regarding the results of the evaluation and refinement work performed, SMG2 informed SMG about the following findings and conclusions regarding the epsilon concept (ODMA - Opportunity Driven Multiple Access):

- Investigation of relay systems has been carried out within SMG2 considering the technology called Opportunity Driven Multiple Access – ODMA. The protocols used in ODMA are very similar to those of a packet radio system currently being trialed. System level simulations were carried out in accordance with UMTS 30.03 which showed that wide area high data rate coverage was possible in all environments using a subscriber relay system and that there was potential for increased capacity when used in a cellular hybrid.
- Feasibility studies were conducted to determine the practicality of supporting relaying using the basic WCDMA and WB TDMA/CDMA designs. The conclusion was that both the WCDMA and the WB TDMA/CDMA designs were sufficiently flexible to support relaying with negligible increase to the mobile station complexity or cost. These technologies can therefore offer the flexibility of simple relaying but also provide a suitable platform for advanced relay protocols such as ODMA.
- For the above reasons it was decided that relaying/ODMA should be presented as an enhancement to both WCDMA and WB TDMA/CDMA rather than as a standalone technology. As a result, documentation from the studies of epsilon concept is included as a part of the evaluation reports on the alpha and delta concepts.

Regarding the four other concepts (α , β , γ , δ), Niels Peter Skov Andersen reported further

- that SMG2 have not been able to obtain any further merging;
- moreover that, considering the uncertainty on simulations and the differences in the assumptions made in order to evaluate the performance of the concepts, SMG2 have not be able to conclude that any single one of these concept provides a better solution than the other concepts;
- that therefore, SMG2 request SMG to decide on the basis of which of the concepts α , β , γ , or δ , SMG2 shall continue the work on the UMTS Terrestrial Radio Access.

In order to assist SMG in making the decision SMG2 have prepared the following documentation for each of the concepts:

- A summary of system description for the concept
- A summary of the concept evaluation for the concept

- An evaluation report for the concept

SMG2 could not recommend SMG to make a direct comparison of the performance results for the concepts based directly on the values contained in the evaluation documentation. This was due to the different nature of the concepts, which has led to differences in the assumptions for the performance evaluation, which lead to differences in the results. Especially regarding guard bands SMG2 highlighted that it is difficult to perform a direct comparison of Minimum Coupling Loss (MCL) based guard band analysis, as, e.g., the likelihood for different scenarios might be different for the different concepts.

SMG2 have not been able to reach a consensus on how the results of the evaluation should be compared, and is therefore unlikely to be able to reach a consensus on the technology for UMTS Terrestrial Radio Access in the foreseeable future. SMG2 therefore recommended to SMG that the best way forward for the elaboration of the UMTS radio interface would be for SMG to make a decision on one concept that should be used by SMG2 in the refinement phase.

Niels Peter Skov Andersen expressed the understanding of SMG2 that by deciding to base the UMTS Terrestrial Radio Access on a given concept, SMG approves the summary of the system description for that concept; that this means that the further refinement of the selected concept is done with reference hereto; that changes in order to improve the concept shall be justified relative to the concept described in the summary system description.

For the detailed reports on the concept groups, see section 4.1.4.

Decisions of SMG#24:

- The epsilon concept, ODMA (Opportunity Driven Multiple Access) is not regarded as a candidate concept group; it is an advanced relay protocol applicable to all concept groups.
- Technical Report UMTS 30.06, *UMTS Terrestrial Radio Access Concept (UTRA) evaluation*, was approved.

For decisions of SMG#24 concerning the further treatment of the UTRA definition in SMG#24bis, see section 6.1.

4.1.2 Voting process in SMG#24

Hélène Lafferre, ETSI legal advisor, presented [Tdoc SMG 995/97](#), *Procedure of vote for indication of intent on UTRA in SMG#24*.

Comments of SMG#24:

Section 0: No comments.

Section 1: It was clarified that the voting at SMG#24 was not a vote for a decision on the matter but rather a vote for indication of members' opinions. Therefore, abstentions were also proposed to be counted.

Section 2: It was clarified that registration for voting at SMG#24 was also possible during the SMG#24 before the voting. The deadline in [Tdoc SMG 883/97](#) for sending the registration form was an administrative measure to have enough registrations processed before SMG#24 but could not restrict rights of members to participate at voting. Peter Donat explained that two members had misinterpreted [Tdoc SMG 883/97](#) as not allowing participation at the voting for members missing the deadline of 11th December, and that they therefore were not present at the meeting.

Heikki Ahava asked to document which delegates registered for voting for which companies. This was agreed by SMG#24, and later in the meeting Ian Doig presented [Tdoc SMG 1106/97](#) the requested information.

Section 3.3: Weighted voting was requested by Vodafone. Adriana Nugter pointed at the lack of symmetry of the ETSI rules where members do a secret vote and associate members have to declare their opinion openly; the SMG Chairman asked delegates from associate members wishing an anonymous declaration of associate members' opinion to contact him; however, no associate member expressed such a request during SMG#24.

[Tdoc SMG 995/97](#) was approved by SMG#24.

For decisions of SMG#24 concerning the further treatment of the UTRA definition in SMG#24bis, see section 6.1.

4.1.3 UTRA IPR

Hélène Lafferre presented [Tdoc SMG 1066/97](#)¹, *Report on Essential IPRs declared in relation to the work of SMG#24*.

Andy Bell, NEC Technologies (UK), stated that [Tdoc SMG 998/97](#) had, for technical reasons, not been available in time for inclusion in [Tdoc SMG 1066/97](#).

Fred Hillebrand read out section 4.1 of the ETSI IPR policy:

- “4.1 Each MEMBER shall use its reasonable endeavours to timely inform ETSI of ESSENTIAL IPRs it becomes aware of. In particular, a MEMBER submitting a technical proposal for a STANDARD shall, on a bona fide basis, draw the attention of ETSI to any of that MEMBER's IPR which might be ESSENTIAL if that proposal is adopted.
- 4.2 The obligations pursuant to Clause 4.1 above do however not imply any obligation on MEMBERS to conduct IPR searches.”

Clarifications:

- These declarations are to be made by companies without an explicit request of ETSI. They are not restricted to the company's IPRs but also include all IPRs of other companies the company is aware of. Hélène Lafferre explained that ETSI

¹ Collector's Note: [Tdoc SMG 1067/97](#), *TD-CDMA (delta), the best of both worlds*, was issued in some copies with the wrong number 1066/97.

secretariat considers the declaration of the owner as public, but considers the disclosure of IPRs of other companies as not sufficiently reliable for being published.

- Whereas the obligations for granting licences are valid also if a declaration has not been made, a declaration is still requested.

Hélène Lafferre has written a letter to ETSI members and also to non-members. A maximum period of three months for a response is foreseen:

“6.1 When an ESSENTIAL IPR relating to a particular STANDARD is brought to the attention of ETSI, the Director-General of ETSI shall immediately request the owner to give within three months an undertaking in writing that it is prepared to grant irrevocable licences on fair, reasonable and non-discriminatory terms and conditions under such IPR to at least the following extent:

- MANUFACTURE, including the right to make or have made customised components and sub-systems to the licensee's own design for use in MANUFACTURE;
- sell, lease, or otherwise dispose of EQUIPMENT so MANUFACTURED;
- repair, use, or operate EQUIPMENT; and
- use METHODS.

The above undertaking may be made subject to the condition that those who seek licences agree to reciprocate.”

Comments on IPR declarations received: Neil Lilly indicated that - according to his information - companies having contributed to more than one concept group only declared IPRs in the concept group supported by the company. Alistair Urie explained on behalf of Alcatel that their declaration also applies to IPRs relevant for other concept groups than the delta group.

Hamid Amir-Alikhani stated some IPR declarations in [Tdoc SMG 1066/97](#) not to be detailed enough.

Jean Pierre Charles, France Télécom, stated proponents of the beta and gamma group not to have declared IPRs.

Dirk Weiler stated that the final situation of IPRs is not available but an estimation of the situation can be done.

Rémi Thomas estimated that the list presented in [Tdoc SMG 1066/97](#) is far from being complete.

Patent searches: Patent searches on a regular basis could be conducted by ETSI on a request (and participation in the costs) of ETSI members or EC/EFTA, but are at present excluded in the ETSI rules of procedure.

Essential IPRs: Peter Bumann pointed out that there are different categories of IPRs, such as essential IPRs, commercial IPRs, technical IPRs. The definition of essential IPR is found in the annex of the IPR policy document:

“6 **"ESSENTIAL"** as applied to IPR means that it is not possible on technical (but not commercial) grounds, taking into account normal technical practice and the state of the art generally available at the time of standardisation, to make, sell, lease, otherwise dispose of, repair, use or operate EQUIPMENT or METHODS which comply with a STANDARD without infringing that IPR. For the avoidance of doubt in exceptional cases where a STANDARD can only be implemented by technical solutions, all of which are infringements of IPRs, all such IPRs shall be considered ESSENTIAL.”

List of companies approached without response: A list of companies possibly having UTRA relevant IPRs was given to ETSI secretariat on a confidential basis and can't be published.

Consequences of not declaring/granting IPRs: Hélène Lafferre explained that, if IPRs haven't been declared, the consequences are not clear, because a bona fide approach is applied. If an ETSI member or non-member refuses to grant licenses, corrective actions of ETSI (such as withdrawal of parts of a standard) are possible (8.1 and 8.2 of the ETSI IPR policy paper).

Dirk Weiler presented [Tdoc SMG 930/97](#), stating the following position:

- the more patents relevant for a standard, the more license fees to be expected
- the most difficult position to be that where companies mainly want to earn on their patents, rather than to participate in the manufacturing/application of the technology, and do not apply the ETSI IPR policy rules

He presented statistical results (contained in the same document) of a patent research concentrating on CDMA (on only WCDMA) and TD/CDMA (excluding the - in Siemens' opinion mostly GSM relevant - patents for TDMA).

Michael Färber stated DS CDMA relevant patents not to be relevant for TD/CDMA. He explained that this was confirmed by Siemens patent lawyers.

Different interpretations of these results (e.g., a correlation of IPRs and maturity of a proposal) and comments of the search methods were stated.

Handling of IPRs in Japan: Akio Sasaki presented information from [Tdoc SMG 906/97](#), *Current Situation and principle attitude of standardisation Activities on Radio Transmission Technology for IMT-2000 in ARIB*: Even if the number of WCDMA relevant patents were very high, the policy would be to grant licences at very low costs (for ARIB members). (The other issues of the document are discussed under section 4.1.5.7.)

Peter Adams asked for clarification on the following sentence in section 4 of [Tdoc SMG 906/97](#) on IPRs: “ARIB has not defined an IPR policy for the IMT-2000 specifications but rather the current IPR policy may be applied.”

Kiritkumar Lathia: The issue of access to a network depends on detailed technology and frequency band. Roaming is a network issue and not a radio access issue. The DoCoMo

position confronts SMG with an a priori decision. IPR statements of ARIB are problematic. For the GSM market, the evolution path to UMTS is a very essential issue.

Akio Sasaki also presented [Tdoc SMG 1116/97](#), IPR policy of ARIB. It clarifies the conditions and applicable scope and territory.

Akio Sasaki also explained corresponding to the raised question that ARIB is considering to decide the application of the current IPR policy of ARIB to IMT-2000 specifications around February 1998.

| |
|--|
| AP AB To forward Tdoc SMG 1116/97 to ETSI legal advisor. - Done. |
|--|

Leo Vercauteren pointed at the problems of a lot of small (research) companies having relevant IPRs, problems being different if operators hold patents.

Armin Toepfer presented [Tdoc SMG 1061/97](#), *UTRA Decision - IPR Statements*, source T-Mobil, E-Plus Mobilfunk, Mannesmann Mobilfunk. He presented the following position:

- The German GSM operators are seriously concerned that patent issues if at all are not resolved in a satisfactory manner.
- It is their expectation that licenses are granted under fair and reasonable conditions without any discrimination to all members of the industry for the production of UMTS/IMT-2000 products, whatever UTRA concept will be chosen.
- The encouragement of members of the industry to notify the respective ETSI body any difficulty experienced obtaining such licenses under fair and reasonable conditions, no matter whether IPRs belong to ETSI members or not.

It was recognised by SMG#24 that the requirements expressed in [Tdoc SMG 1061/97](#) cannot be reached by the ETSI rules. The Chairman remembered the meeting that an ice breaking activity on IPR matters for GSM had been conducted by GSM MoU in the late eighties.

4.1.4 SMG2 Presentation and discussion of UTRA concepts

Niels Peter Skov Andersen presented the UTRA concept groups (in random order):

- beta concept (OFDMA) in [Tdoc SMG 894/97](#), [Tdoc SMG 895/97](#) and [Tdoc SMG 896/97](#)
- delta concept (WB-TDMA/CDMA) in [Tdoc SMG 897/97](#), [Tdoc SMG 898/97](#) and [Tdoc SMG 899/97](#)
- gamma concept (WB-TDMA) in [Tdoc SMG 900/97](#), [Tdoc SMG 901/97](#) and [Tdoc SMG 902/97](#)
- alpha concept (WCDMA) in [Tdoc SMG 903/97](#), [Tdoc SMG 904/97](#) and [Tdoc SMG 905/97](#)

The full documentation is available as Technical Report UMTS 30.06, *UMTS Terrestrial Radio Access Concept (UTRA) evaluation*.

SMG#24 thanked SMG2 for the excellent work done.

Discussion of the SMG2 evaluation: For the limits of applying the results for a direct technical comparison, see section 4.1.

Further discussion of the UTRA definition: Among others, the following aspects were discussed:

- preferences of non-European operators
- relevance of multi-mode terminals for IMT-2000
- relevance of a single global radio interface for roaming
- importance of compatibility with GSM
- political nature of a decision on UTRA
- relations between radio access and mobility management
- missing GSM MoU requirements for 2nd generation inter-standard roaming
- missing spectrum harmonisation between North America and the other regions

Several members expressed the position of their company in favour of a concept group.

4.1.5 Contributions from other bodies on UTRA definition

4.1.5.1 UMTS Forum contributions

Thomas Beijer presented information in [Tdoc SMG 1049/97](#), *Operators' Requirements on UTRA (UMTS Terrestrial Radio Access)*, a liaison from the UMTS Forum to SMG and emphasized the requirement of selection of only one radio interface for UTRA.

4.1.5.2 MoU criteria for UTRA selection

Adriana Nugter presented requirements of GSM MoU for the UTRA selection:

- single global radio interface
- evolution from GSM platform
- global standardisation policy
- all GSM MoU members should be able to influence events
- no blocking IPRs
- fair and open access of IPRs for all technologies
- MoU endorsement depending on IPR position.

Adriana Nugter and Bengt Nordstrom (Smartone Mobile Communications) expressed their concerns on ETSI's decision not to give voting rights to associate members.

4.1.5.3 Statement of the European Commission

Bartolomé Arroyo Fernandez, European Commission, DGXIII, declared the following position:

“Although the process of defining the actual UMTS standard still lies ahead for which ETSI has established the rules applicable to the IPR aspects involved, the current choice of the concept including its basic parameters is a decisive one. The Commission is

encouraged by the recent move of the various actors to notify ETSI of know-how they may possess and which is related to the UMTS standard.

While recognising that patents may constitute a valuable asset for firms in the commercial and global context, it is of the utmost importance that full transparency is achieved as early as possible on the IPR situation with regard to UMTS.

Besides their technical merits, the concepts proposed for UMTS therefore in our view would gain credibility to the extent that already at this stage the conditions are known to which interested parties will be granted access to the know-how necessary to implement UMTS. Hence, it is important - at global level - to establish who owns IPRs related to UMTS and to what extent the IPR situation for the technical solutions proposed is mature.

We will carefully monitor the decisions related to UMTS which have a global impact, and call on all parties concerned to contribute in achieving transparency at this juncture. We would consider necessary action in case IPR questions would threaten to affect the further development of UMTS in Europe and at global level.”

4.1.5.4 DECT Forum

Ruud van Bokhorst presented [Tdoc SMG 1121/97](#), *Requirements for UMTS/UTRA as expressed by the DECT community*, informing about the DECT Forum and its relation to ETSI and indicating the expectations on UMTS/UTRA:

- Inclusion of at least those services and facilities offered today by DECT and GSM, i.e., fixed and mobile, private and public
- Allocation of sufficient spectrum to use these services adequately in the private and public domains
- UMTS should provide the same flexibility and efficiency as DECT's TDD (Time Division Duplex) and DCS (Dynamic Channel Selection) provide, i.e:
 - * to cater for high traffic conditions in unpredictable indoor and outdoor radio environments;
 - * to cater for unbalanced and variable uplink and downlink data throughput needs;
 - * to allow for shared spectrum usage in the same geographical area.

In the discussion, it was clarified that DECT doesn't use UMTS frequency.

4.1.5.5 T1P1 position on UTRA definition

Mel Woinsky presented [Tdoc SMG 1064/97](#), stating that T1P1.5 have reviewed the alpha and delta concept groups and are continuing to evaluate all technologies for their suitability for the North American needs.

4.1.5.6 SMG2 Operators' Interest Group

Keith Mayes presented [Tdoc SMG 1027/97](#), a position paper of the Operators' Interest Group, a technical grouping of 18 operators within SMG2 discussing common concerns of

operators and pooling their technical resources as regards UTRA issues. The OIG identified several major questions to still be open, e.g. guard band issues.

4.1.5.7 ARIB position

Akio Sasaki presented [Tdoc SMG 906/97](#), *Current Situation and principle attitude of standardisation Activities on Radio Transmission Technology for IMT-2000 in ARIB*. ARIB is preparing a WCDMA solution for the IMT-2000 radio access, in a phased approach of specification between 1997 and 1999 and commercial service from the beginning of the year 2001 onwards. ARIB is willing to modify their WCDMA concept at any stage in the extent necessary to reach a world wide IMT-2000 system based on WCDMA. For IPR related issues in the document, see [4.1.3](#).

It was clarified at present that several radio interface approaches in different levels are studied in ARIB, a WCDMA solution in producing detailed specifications, an IS-95 evolution proposal to merge with the ARIB WCDMA and an OFDMA solution for judgement whether to enter the detailed specification process in ARIB.

Juha Rapeli asked whether the ARIB IMT-2000 has already been decided and/or which would be the ARIB event where the IMT-2000 would be further discussed (where SMG delegates could participate).

Answer Akio Sasaki: ARIB has agreed a draft specification version 0 on WCDMA. A draft specification has a draft nature until the defined completion date when a formal approval will be requested. The decision for a DS-SS-CDMA was made in ARIB meeting in January 1997. SMG delegates were not able to participate in the discussion for that decision because at that time there was no rule of mutual participation between ETSI/SMG and ARIB. But they can participate in the discussion on parameters of the solution.

In this matter, Akio Sasaki presented the *Meeting schedule of IMT-2000 study committee in ARIB* in [Tdoc SMG 1117/97](#). Hamid Amir-Alikhani indicated that the dates for the OFDMA related activities are missing in that paper.

Note: OFDMA (called BDMA in ARIB.) related activities are considered by ARIB to be out of scope for mutual participation targets. As for an information, the exact date for discussion on OFDMA is Dec. 22, 1997.

Andy Watson predicted WCDMA to be in operation (in the first phase, for basic telephony) for two or three years before UMTS like operation starts.

Answer Akio Sasaki: The step one of IMT-2000 commercial services from the spring of the year 2001 will offer multi media services with a capability of at least up to 384 kbit/s data rates.

Gunnar Sandegren: Why does Siemens support WCDMA in Japan?

Answer Dr. Kohnhäuser/Dirk Weiler: Siemens supported WCDMA only in the scope of the FRAMES project (where Siemens, Nokia, Ericsson participated and where the technology foresaw different modes in WCDMA and TD/CDMA).

Fumiyuki Adachi, NTT DoCoMo, presented [Tdoc SMG 1037/97](#), a letter from NTT DoCoMo to SMG. Main issues:

- Memorandum of Understanding NTT DoCoMo - Telecom Italia Mobile - Telecom Finland for co-operation on a 3rd generation communication system
- NTT DoCoMo's support of WCDMA and the evolved GSM Core Network
- Co-operation with other parties in Asia and Oceania
- IPR policy of NTT DoCoMo.

Andy Bell presented [Tdoc SMG 999/97](#), *Supporting ETSI/ARIB co-operation on WCDMA*, source NEC, Panasonic, Fujitsu, Mitsubishi Electric, indicating that the source companies are contributing to the standardisation of WCDMA both in ETSI and ARIB, support the principle of regional standardisation activities put forward in [Tdoc SMG 906/97](#), where the regional body is solely and completely responsible for the approval and publication of regional standards according to their own requirements. However, these companies actively encourage any mutually beneficial convergence of the ETSI and ARIB (and any other) WCDMA standards as has already successfully happened in the ETSI Alpha Concept and ARIB WCDMA working groups.

Heikki Ahava argued PDC to require very low license fees. He reported the technical co-operation between Nokia/Ericsson and ARIB having been very good, and proposals to have been evaluated strictly on technical grounds.

Pietro Porzio-Giusto: After a selection of the alpha concept, standardisation in SMG should start as it was the case in GSM after the decision on basic radio interface parameters. The difference is that other bodies like ARIB would have to get the possibility to co-operate.

Josef Huber, Dirk Weiler: As regards [Tdoc SMG 1037/97](#): TD/CDMA has not been discussed in Japan. The statement that Japan will select WCDMA whatever solution is taken in ETSI, is hardly compatible with the claim to go for ITU standardisation.

Hamid Amir-Alikhani: Isn't it premature to state that the choice must be WCDMA?

Answer: Service should start in 2001. The decision of DoCoMo is WCDMA.

Hamid Amir-Alikhani: [Tdoc SMG 906/97](#): Is there no other technology studied in ARIB than WCDMA for the IMT-2000 radio access?

Answer Akio Sasaki: No other technology than WCDMA is studied in detail as a proposal; OFDMA is studied and at the end of this month it will be decided whether to open a detailed OFDMA study. In reality very few members in ARIB want to study OFDMA, but such a decision is necessary.

Hamid Amir-Alikhani: Hence, as OFDMA has a TDMA component, TDMA is studied as an alternative approach?

Sasaki: ARIB decided that W-TDMA cannot be a basis for a proposal to ITU.

Summary: In ARIB there is broad support and major progress in WCDMA, but other proposals are also on the table.

Rémi Thomas: We have so many new information in this meeting that a decision is not yet possible. Both papers state that ARIB will chose WCDMA whatever ETSI decides. Service is planned for 2000/2001, but this will be basic telephony only, and of no use for the GSM world. Do GSM operators want to get rid of GSM?

Radivoj Kar explained the decisions in Japan having been misunderstood in Europe; The basic decision having been WCDMA; then the government having obliged the Japanese Mobile world to look for a world wide standard; the first contacts having been to Europe and the expectation to be that - if WCDMA is selected in ETSI - the solution to be harmonized. IPRs: Japanese companies, in particular Mitsubishi, don't use their IPRs for making money but for protection (cross-licensing).

Fred Hillebrand: Such statements should be made official in written form to ETSI. There is a mismatch in the schedules in Europe and Japan, due to the pressure of the Japanese Ministries to allocate new spectrum only in a new technology. Certainly the co-operation between SMG and ARIB should be increased; in particular, the schedules should be aligned in future.

Akio Sasaki agreed to write a letter to SMG/ETSI with a clear IPR statement, in particular whether the conditions apply only to ARIB members. See also [Tdoc SMG 1116/97](#).

Juha Rapeli: Can SMG members participate at the ARIB meeting later this month?

Akio Sasaki responded that participation is welcome according to the agreement ARIB/SMG, and that several meetings are scheduled. The necessary information was made available during SMG#24, see [Tdoc SMG 1117/97](#).

Kiritkumar Lathia: [Tdoc SMG 1037/97](#), signed by the President of NTT Mobile Communications Network (DoCoMo), says: "Our decision as of this point is that NTT DoCoMo will not select TD/CDMA, even if ETSI selects this technology." Over the page the document states that introduction in the year 2000 is a must for DoCoMo. Questions: Will DoCoMo support WCDMA whatever ETSI will chose? Question 2: Will the core network be attached to an evolved GSM core network? Or will, in 2000/1, the radio be attached to the PDC core network?

Fumiyuki Adachi: NTT DoCoMo strongly believes that WCDMA is the best solution, that opinion is also shared in Asia. GPRS like services, namely Voice, Internet, Multimedia services, are planned in 2000. An overlay and parallel use with interworking function of PDC and the evolved GSM Core Network is planned for 2001.

Bengt Nordström: The application of the GSM Core Network evolution is a good success, the alternative being an IS41 evolution.

Fred Hillebrand: The approaches in TTC are not evidently in line with the positions expressed by DoCoMo in [Tdoc SMG 1037/97](#). Could a document be provided (after SMG#24) what the policy on Core Network development in Japan is? How will the integrity of the GSM platform be guaranteed?

Fumiyuki Adachi: Such a document will be provided by NTT DoCoMo. Alistair Urie: The information should be complete, e.g., as regards selling systems to third parties, IPRs in the proposal outside of DoCoMo.

Kiritkumar Lathia: There must be a roll-out plan for Japan. The building up of an overlay network will take around two years. Which GSM Core network specifications will be used? How can GPRS be included?

Don Jayasuriya: Time scales: The UMTS Forum proposed a European roll-out in 2002, this was confirmed by the UK consultation and the EC consultation results. CEPT proposed to make the necessary steps for providing the frequencies in time. Licensing certainty in UK is planned for end 1998. IPR matters must be clarified, discussions must be continued not only in ETSI, also, e.g., DG IV must be engaged in that discussion.

Clarification of time scales: Japanese schedules talk about spring of the year 2001 for start of commercial service, this means 8-9 Months ahead of Europe depending on the start in January 2002.

Alistair Urie: The Japanese IMT-2000 version 1 might go in direct competition with GSM in Asia, and this is already visible.

Paul Simmons: How can compatibility and convergence be feasible in the time scales, seeing the different solutions for IMT-2000 which will be realised and the requested compatibility with second generation systems?

4.1.6 Presentation of contributions to the concept groups

The contributions to the concept groups were discussed in a controversial manner. SMG#24 did not conclude on technical points in addition to the SMG2 results nor on a modification of criteria.

4.1.6.1 Alpha concept

Antti Toskalla presented [Tdoc SMG 1069/97](#), *Dual mode GSM/UMTS terminal complexity*, source Nokia, Ericsson. The document argues the WCDMA UMTS radio interface to have as good or better GSM/UMTS dual mode properties as/than any other candidates. This was objected by Michael Färber.

Mikael Gudmundson presented [Tdoc SMG 939/97](#), *Performance comparison based on SMG2 evaluation reports: WCDMA vs. WB-TDMA/CDMA*, source Ericsson. The paper argues the WCDMA concept to give, on basis of the prioritised test cases and of those cases where both concepts have submitted results to SMG2 and on results of the SMG2 evaluation reports and related documentation, to give better system capacity results than TD/CDMA in all cases, especially in low-speed environments. Michael Färber referred to [Tdoc SMG 1023/97](#) giving a different interpretation. Patrick Blanc, Hamid Amir-Alikhani and Simon Pike commented on the validity of technical approaches, evaluation backgrounds and methods and on missing support in SMG2 for discussing such aspects.

Andy Bell presented [Tdoc SMG 1000/97](#), *Supporting the selection of WCDMA for UTRA*, source NEC. The paper argues W-CDMA to be the superior choice based on coverage, capacity, flexibility, cost, and development risks related criteria. Andy Watson argued this position to concentrate on basic speech application. Paul Simmons repeated the argument about the Japanese time scales to risk to narrow the 3rd generation services. Dirk Weiler asked where extensive W-CDMA field tests have been performed in Europe. Andy Bell answered that demonstrators have been used in the Frames project and in Japan, and that IS-95 is a good field test for CDMA. Keith Mayes, Vodafone, stated that real world tests are missing. Rémi Thomas raised doubts on WCDMA having lower development risks, due to the high priority of compatibility with GSM and the narrow range of services in the Japanese phase 1. He stated there not to be a test bed for frames mode 2 in the test bed. Alistair Urie argued that, if IS-95 is taken as reference field test, the lesson to learn would be real capacity to be much lower than theoretically predicted (load margin factor).

Teuvo Jarvela presented [Tdoc SMG 1071/97](#), *Radio interface selection for UMTS*, source Nokia. The document states Nokia to have concluded, based on extensive tests, W-CDMA to be the best choice for the continuous evolution of GSM to UMTS/IMT-2000.

Gunnar Sandegren presented [Tdoc SMG 1072/97](#), *Aspects of selecting Radio Access technology for the 21st century*, source Ericsson. The paper argues W-CDMA to have advantages due to coverage, capacity, support for multimedia and Internet, complexity and maturity, migration and re-farming aspects and gives marketing and commercial backgrounds/forecasts on GSM and UMTS. Kiritkumar Lathia: Other commercial aspects include Return on investment (in cellular systems after not less than 7 years, 15 years to write off investments). Gunnar Sandegren pointed out that Ericsson, in addition to elaborate on UTRA, is also driving the GSM radio access development.

Andrew W.D. Watson presented [Tdoc SMG 1022/97](#), *Alpha concept evaluation - An alternative view*, source Motorola. Motorola's position is that the basics (channel modelling etc.) for the alpha concept have taken a large number of simplifications and that therefore the predicted performance must be seriously questioned. This was objected by Mikael Gudmundson, Ericsson.

4.1.6.2 Beta group

No additional documents were presented.

4.1.6.3 Gamma group

No additional documents were presented.

4.1.6.4 Delta group

Alistair Urie argued the importance of compatibility of 3rd generation systems with corresponding 2nd generation systems to be very high. He presented [Tdoc SMG 1067/97](#), *TD-CDMA (delta), the best of both worlds*, source Alcatel, Bosch, Italtel, Motorola, Nortel, Siemens and Sony, favouring the TD-CDMA solution.

Paul Crichton and Michael Färber presented [Tdoc SMG 1023/97](#), *Enhanced TD-CDMA, A revolution for UMTS and an evolution of GSM*, source Alcatel, Bosch, Italtel, Motorola, Nortel, Siemens, Sony. Johan Sköld argued the enhanced TD-CDMA to have been presented only recently; he criticised numbers in the document. Sunil Vadgama responded other groups also to have made progress leading to changes in the last few weeks. Kiritkumar Lathia challenged Johan Sköld's argument asking why SMG should not allow progress in the delta concept just because the W-CDMA solution being frozen. Johan Sköld responded that this is the idea of the refinement phase.

Vagan Shakhgildian argued that seeing the work of SMG2 mainly concentrating within 6 months, a 2 weeks old result could not be called "too recent". He draw the attention to [Tdoc SMG 1022/97](#), *WB-CDMA - an alternative view*, source Motorola, were evaluation methods of the alpha solution are challenged.

Sunil Vadgama presented [Tdoc SMG 1087/97](#), *TD-CDMA performance degradation with the new OQPSP spreading*, and [Tdoc SMG 1088/97](#), *Simulation Results in the detectability of WB-BCCH pilot signal of the delta concept*, both source Fujitsu, contradicting elements of [Tdoc SMG 1023/97](#).

Jean-Louis Dornstetter presented [Tdoc SMG 1093/97](#), *Clarification with Respect to the documents on TD-CDMA Performance Tdoc 1087/97 and tdoc 1088/97 by Fujitsu*, source Nortel, Motorola, contradicting positions in document [Tdoc SMG 1087/97](#) and [Tdoc SMG 1088/97](#), referring to SMG2 papers of the Cork meeting.

Joseph Huber recommended [Tdoc SMG 1023/97](#) to be studied by SMG2; he argued the TD-CDMA approach to inherently contain a Time Division Duplexing solution (for the unpaired band).

Paul Simmons emphasized two reasonings used in [Tdoc SMG 1023/97](#), soft handover not to be required and lower costs of ownership.

Johan Sköld challenged the table at the bottom of page 10 in [Tdoc SMG 1023/97](#).

Jean-Louis Dornstetter sees the decision between a clean break for a W-CDMA solution or the (r)evolution of GSM to TD-CDMA where the theoretical performances are governed by physical laws. He stated the new detector in the TD-CDMA solution not to be a new technical aspect, but rather an improvement of evaluation; major points relevant for the performance of the radio access - outside of the area of multiplexing/modulation - not to have been examined by SMG2.

Niels Peter Skov Andersen defended the technical parts of the SMG2 work. He asked for consensus of manufacturers on improving the solution based on a decision for any concept group. Talking as an operator, he saw less importance of the minimum required block size for re-farming where 2Mbit/s services require a relatively big allocation of frequency.

Josef Huber argued important criteria to be minimum bandwidth required, closeness to GSM, asymmetric cases, IPR, improvement capacities for reuse factor.

Patrick Blanc presented [Tdoc SMG 1042/97](#), *France Telecom position on UTRA concept*, and [Tdoc SMG 1019/97](#), *Technical Analysis and Comparison of UTRA concept*, both source France Télécom. The position is:

- France Télécom regrets that there is no technical report from SMG2 regarding the evaluation and comparison of these concepts;
- there were no independent evaluation of the concepts. The France Télécom internal simulations results appeared to be significantly different from those presented by the concept groups, especially for capacity evaluation by system simulations;
- Support of high bit rate services to be given by TD-CDMA but not by W-CDMA.
- IPR from Qualcomm on fast power control and soft handover issued from IS'95, and there being probably other Japanese IPR on WCDMA;
- environment for GSM compatible evolution given for TD-CDMA, not CDMA;
- equivalence in stability;
- no validation of the operational aspects of the different concepts using experimental networks in Europe. (These experimental networks could provide some answers to the concerns expressed during the evaluation procedure, where simulations might not be fully convincing.)
- lack of experience of operation of CDMA solutions in Europe.

Juha Rapeli presented [Tdoc SMG 1073/97](#), *UMTS Deployment by Private Operators*, source Philips, seeing an advantage of

- TDMA (with less than 400 kbit/s) in a single transceiver without duplex filters and without shielding

against

- CDMA requiring a duplex filter, separation of receiver and transceiver, shielding, separation of digital processing from analogue/digital I/F.

In easy terms: time division of sending and receiving to allow smaller and cheaper terminals, these differences not disappearing with mass production (objected by Robert Vass, Ericsson, but maintained by Rapeli because the additional chip would not disappear). Also an equivalence of the four proposals, but ignoring latest antenna developments (SDMA on the fixed side, two antennas in the terminal). This being less applicable for spreaded signals where the source can only be localised after de-spreading.

Juha Rapeli presented [Tdoc SMG 1074/97](#), *UMTS Radio Access for cost efficiency and consumer features of UMTS terminal*, source Philips, raising the TDD question, giving an evaluation of feasibility for alpha and delta, concluding it to be intrinsic in delta.

4.1.6.5 ODMA

Keith Mayes presented [Tdoc SMG 1028/97](#), *Information on ODMA*, source Vodafone, Siemens, Ericsson. Potential of ODMA were investigated (due to resource constraints, only for the alpha and delta group, but the results are also applicable for beta and gamma) for UTRA. It was concluded that the ODMA relaying techniques allow very wide area high data rate coverage, increased capacity and reduction of transmitted power.

4.1.7 Results of Voting of indication of intent

The voting was held on the following question:

“The members of SMG² are requested to indicate by their vote what would have been the technical solution among the technical proposals related to UTRA they would have chosen, had a formal selection by vote been conducted. Abstentions should be indicated in the voting form but they will only be recorded for information.”.

Result of the voting: 141 ETSI full members participated.

alpha: 58.45%, 716 votes

beta: 0%

gamma: 0%

delta: 41.55%, 509 votes

abstentions: 19 members with a total weighting of 167 votes.

Note: The number of members voting for each alternative were not counted, because that might disclose the votes. This was challenged by some delegates. The legal advisor confirmed this position after further examinations.

4.1.8 Further discussion of UTRA

Hamid Amir-Alikhani stated that the OFDMA concept group maintains their proposal.

4.2 UMTS SERVICES

Alan Cox presented [Tdoc SMG 983/97](#) which includes a short summary of the decisions required from SMG#24 by SMG1. Derek Richards presented the following documents for approval and information:

ETS 22.01 “Service Principles” CRs A005 and A006 to ETS 22.01 “Service Principles” in [Tdoc SMG 966/97](#) and [Tdoc SMG 967/97](#) were approved.

Eric Ljungberg, Telia, presented [Tdoc SMG 1008/97](#), *Comments on CR to TS 22.01 Service principles regarding multiple subscriptions*, proposing to remove the requirement to allow multiple subscriptions per IC card where this involves more than one Service Provider of equal status; this was supported by several operators. Derek Richards explained that the CR in [Tdoc SMG 966/97](#) does not introduce this requirement but rather clarifies an existing requirement. Alan Cox recalled that he had

² The members of SMG are ETSI full members registering in an SMG meeting.

raised similar concerns in SMG1, but there had been little support for his concerns; he recommended to follow the SMG1 conclusion to keep the requirement and to come back if and when difficulties were identified; Gary Jones supported that view.

Eric Ljungberg was asked to prepare in a side group during SMG#24 a paper with a more concrete proposal. This turned out not to reach agreement, so SMG1 was invited to study this aspect again, taking note of the views expressed in SMG.

UMTS TR 22.60 v.1.0.0 - Mobile multimedia services including mobile Intranet and Internet services in [Tdoc SMG 960/97](#) was presented for information.

Service Continuity and Provision of VHE via GSM/UMTS: This new work item and its work item description in [Tdoc SMG 1044/97](#) were approved by SMG#24; updating and completion of the WID is expected.

Service aspect proposed for Chapter 9 of UMTS 30.01 Version 3.1.0: Inclusion of the text in [Tdoc SMG 1041/97](#), source SMG1, into the UMTS Baseline document UMTS 30.01 was approved.

UMTS 22.25, *Quality of Service and Network Performance*, in [Tdoc SMG 959/97](#) was presented in its version 2.0.0. Niels Peter Skov Andersen will review the network parameters in section 5.1.2, Simon Pike in 5.6.1; in particular the requirement of synchronisation (skew) of media components < 10 ms might be too ambitious; the update rate of the video should be considered. The specification was approved.

UMTS 22.80 version 2.0.1, *UMTS Relationship to other Standards*, in [Tdoc SMG 964/97](#) was noted. Derek Richards emphasized that as visible in the document, contacts to other bodies and fora (e.g. on Internet) would be necessary. It will be used for the mission on SMG globalisation and work in SMG1 will be suspended while this activities goes on. As a result, the report was not formally approved.

UMTS 22.05, *Services and Service Capabilities*, in [Tdoc SMG 955/97](#), was presented for information. Derek Richards commented that further work is needed, for example in sections like 5.3; Niels Peter Skov Andersen proposed a clearer separation of bearer/teleservice requirements (addressing the data rates etc. as perceived by the user) from radio transmission attributes where some freedom exists how to fulfil the service requirements.

UMTS 22.07, *Terminal and smart card concepts*, version 1.0.0) in [Tdoc SMG 956/97](#), was presented for information. Derek Richards urged in particular operators to review whether their requirements are neatly expressed.

UMTS 22.24, *New Charging and Accounting Mechanisms* in [Tdoc SMG 958/97](#) and UMTS 22.71, ***Automatic Establishment of Roaming Relationships*** in [Tdoc SMG 962/97](#) were presented for information and should be studied carefully by SMG delegates. They will be passed for comments to MoU 3GIG and to ETNO.

UMTS 22.70, *Virtual Home Environment*, in [Tdoc SMG 961/97](#), was presented for information. In its further elaboration, contact to Information Technology groups might be necessary.

UMTS 22.75, *Advanced Addressing*, in [Tdoc SMG 963/97](#), was presented for information.

Further UMTS work items are in preparation; SMG1 was advised to create the work item descriptions and to come with short papers on strategic issues to SMG for guidance before starting detailed reports.

The role model approaches in TG.25 and UMTS 22.01 are related to each other in a figure in [Tdoc SMG 968/97](#). The discussion on the role model is also carried out with the UMTS group of NA6 with good mutual understanding.

SMG1 was thanked to their good efforts and success to implement SMG#23 wishes.

4.3 UMTS NETWORKS ASPECTS

Michel Mouly presented a *Proposal for a contribution to ITU on the interface section of Q.FIN Annex D* in [Tdoc SMG 1100/97](#). It was approved.

Ansgar Bergmann presented [Tdoc SMG 882/97](#), *GSM-UMTS Core Network definition pivoting GSM Core Network evolution*. It was approved.

Eckehard Valta questioned consequences on the fixed/mobile convergence ad hoc group of the ETSI General Assembly (GA). Fred Hillebrand stated that the ideas of fixed/mobile convergence in ETSI are vague. In the activity to study that convergence, clear work items would have to be identified. These could then be elaborated by the responsible Technical Bodies. Michel Mouly added that the proposed managerial means are meant for phase 1 whereas convergence would be picked up in phase 2. Alistair Urie indicated the possibility to distinguish within SMG3 a project for GSM-UMTS Core Network phase 1 and phase 2. Neil Lilly indicated further requirements from 3GIG to be forwarded to GSM in early 1998.

Jonas Sundborg presented [Tdoc SMG 1043/97](#), *Migration and evolution from GSM*, source Ericsson. Several speakers emphasized the necessity of evolution and compatibility which becomes more ambitious, the more advanced features are introduced into UMTS. The paper proposes three points,

- SMG to state migration and evolution as a formal requirement, including a definition or guiding principles for what this shall mean,
- SMG to state which group, preferably SMG1, shall be responsible for specifying the details of this requirement and
- SMG to state guiding principles for how conflicts shall be resolved if all requirements for migration/evolution and functionalities/capabilities respectively can not be met.

It was argued that evolution should certainly be a formal requirement. For the responsibilities on evolution aspects between the STCs, also proposals were brought up (by François Courau and Armin Toepfer) to establish SMG3 SA as an STC. Due to lack of time, the discussion of [Tdoc SMG 1043/97](#) did not reach formal conclusions. It was also discussed in an SMG-CG ad hoc during SMG#24 plenary and will be further discussed between the STC Chairmen.

New Access Network to Core Network (BSS-NSS) interface: Michel Mouly presented [Tdoc SMG 1112/97](#), the WID of a new work item *New Access Network to Core*

Network (BSS-NSS) interface. It was approved in principle and forwarded to SMG3 for revision if needed and final approval in SGM#25.

Dirk Weiler raised the general comment that WIDs should first be seen by the STCs.

NTT DoCoMo plans for migration to third generation core network: Masami Yabusaki, NTT DoCoMo, presented the NTT DoCoMo plans for migration to third generation core network in [Tdoc SMG 1118/97](#). The basic idea is to attach the IMT-2000 radio access to the GSM-UMTS Core Network and to provide an interworking function between the PDC Core Network and IMT-2000 Core Network. The first commercial phase beginning in 2001 would be based on the GSM specifications with the draft UMTS evolution. The second commercial phase beginning in 2001 and 2002 would be based on the evolved GSM-UMTS specifications.

This position has been identified in TTC as a possible input to SG11; further information is given in [Tdoc SMG 1085/97](#), a letter from Tokuo Iida, TTC Executive Managing Director. TTC sees INAP as a long term ultimate solution.

4.4 UMTS PROGRAM MANAGEMENT

4.4.1 UMTS Specifications

Concerning the following documents:

- ETR271 UMTS Objectives and overview
- ETR309 Vocabulary for UMTS
- ETR291 UMTS System requirements
- ETR312 Scenarios and considerations for the introduction of the UMTS
- TCR TR 015 "Work programme for the standardization of the Universal Mobile Telecommunications System (UMTS)"
- TC TR 004 "Work programme for the standardization of the Universal Mobile Telecommunications System (UMTS) (UMTS 00.01)

the following handling was proposed by Antun Samukic in [Tdoc SMG 1052/97](#) and approved by SMG#24:

- These ETRs should be stored on the ETSI server under sub-directory "SMG5" with the note on the status of the documents.
- To clarify the actual positions on UMTS these documents should be formally withdrawn.

UMTS 30.20, *Technical characteristics, capabilities and limitations of mobile satellite systems applicable to the UMTS* (draft version 3.1.0) in [Tdoc SMG 1055/97](#) was approved.

4.4.2 UMTS 30.00 (UMTS work program)

Antun Samukic presented [Tdoc SMG 1053/97](#), the updated UMTS work program in UMTS 30.00 which was approved by SMG#24 as version 3.3.0.

4.4.3 New UMTS Work items:

Service Continuity and Provision of VHE via GSM/UMTS: This new work item and its work item description in [Tdoc SMG 1044/97](#) were approved by SMG#24; updating and completion of the WID is expected. (Cf. section 4.2.)

Further UMTS work items are in preparation; SMG1 was advised to create the work item descriptions and to come with short papers on strategic issues to SMG for guidance before starting detailed reports. (Cf. section 4.2.)

New Access Network to Core Network (BSS-NSS) interface: Michel Mouly presented [Tdoc SMG 1112/97](#), the WID of a new work item *New Access Network to Core Network (BSS-NSS) interface*. It was approved in principle and forwarded to SMG3 for revision if needed and final approval in SMG#25. (Cf. section 4.3.)

4.4.4 UMTS baseline document

Antun Samukic presented [Tdoc SMG 1054/97](#), the draft updated UMTS baseline document in UMTS 30.01.

Hans Hauser stressed section 9.3, Charging aspects, of the baseline document: "Some conflicting elements of charging related aspects in UMTS 22.24 and TG.24 with MoU BARG which currently plans to establish UMTS charging principles have been discovered. Discussions leading to clarifications are needed." He quoted BARG plans to contribute in 1999 to the matter; that would be too late. Outside of the meeting he identified that BARG is now intending to study the issue in 1998 and tries to establish for that purpose a joint working party similar to the way it was done for CAGE 2+.

It was agreed to update the information in section 9 on location services.

Comment Simon Pike: Some statements in 30.01 are background information and not decisions of SMG.

It was agreed that section 10.8, section 14.3 first paragraph and section 14.4 should be deleted.

The version including all agreed comments will be distributed as version 3.2.0 after SMG#24.

[Tdoc SMG 1009/97](#), *Proposed changes to UMTS 30.01*, source Telia, was presented. It was agreed to collect further comments to UMTS 30.01 during the week of SMG#24; however to update UMTS 30.01 only corresponding to decisions that had already been made; that companies wanting to change positions or agree new positions, should provide standalone papers on the proposals (without indication of changes to UMTS 30.01).

UMTS documentation on the Web: Antun Samukic presented [Tdoc SMG 1057/97](#) for information, giving information where to find electronic versions of the UMTS documentation on the Web.

4.5 ITU CONTRIBUTIONS

ITU Workplan for SMG: David Williams presented the updated *Workplan for SMG contributions to ITU* in [Tdoc SMG 1010/97](#), source David Williams and Makis Kokkos. Due to a formatting problem with a figure in section 4, the document was re-issued as [Tdoc SMG 1129/97](#). Regarding a question from Harald Dettner, it was clarified that any SMG member can identify the need for contribution.

SMG#24 approved [Tdoc SMG 1129/97](#), revising [Tdoc SMG 1010/97](#).

[Tdoc SMG 1094/97](#), *ITU-T contributions table*, was presented for information and noted by SMG#24.

Regarding the length of discussions on ITU contributions in SMG plenary, Niels Peter Skov Andersen suggested to have initial discussions of the ITU inputs in side events during SMG plenaries.

Contributions to ITU-T SG11: [Tdoc SMG 1011/97](#), a change request to Q.FIN to update the table of IMT-2000 capabilities and features was objected by [Tdoc SMG 997/97](#), presented by Alain Sultan; [Tdoc SMG 997/97](#) proposes to use the terms of a circular letter (8/LCCE/47) issued by TG8/1, specifying the IMT requirements for bearer capabilities in IMT-2000, in particular “at least 2 Mbit/s”. This was supported by different speakers, Peter Adams, Neil Lilly, Patrick Blanc, Gary Jones, and contradicted by Timo Ali-Vehmas, Derek Richards, and others. It was agreed that a change of an approved SMG position (namely to change “at least 2 Mbit/s”, as stated in the UMTS baseline document, UMTS 30.01, to “up to 2 Mbit/s”) would require a proper input. [Tdoc SMG 1011/97](#) was approved with the modification to go back to the requirement of at least 2 Mbit/s.

[Tdoc SMG 932/97](#), source SMG Chairman, was presented by Ansgar Bergmann as a proposed SMG policy paper (to be reflected in the baseline document).

[Tdoc SMG 1012/97](#) is a subset of [Tdoc SMG 932/97](#) presented for approval as a change request to Q.FIN. Derek Richards presented [Tdoc SMG 1026/97](#) proposing to delete figure 1 and the latter 2 paragraphs in section 4 of [Tdoc SMG 1012/97](#). Reason is not to restrict ITU work. Gary Jones supported [Tdoc SMG 1012/97](#) and objected against [Tdoc SMG 1026/97](#). [Tdoc SMG 1012/97](#) was agreed by SMG#24, with Lucent stating disagreement, with the following modification: To replace the circles in the figure by straight lines. The revision presented in [Tdoc SMG 1125/97](#), however, was not agreed to implement the decision so that no approved document emerging from [Tdoc SMG 1012/97](#) was established at SMG#24.

For [Tdoc SMG 932/97](#), it was agreed that section 2.3 would need elaboration to include network concepts; the table in section 2.2 was felt too restricted, it was commented that it should refer to at least 2Mbit/s and should better reference requirements in other (ITU) papers than to repeat some of them. (Comments from Harald Dettner, Alistair Urie, Neil Lilly).

It was agreed to replace section 3 of [Tdoc SMG 932/97](#) by the sections 6.4 ff. in [Tdoc SMG 1012/97](#).

[Tdoc SMG 1132/97](#), revising [Tdoc SMG 932/97](#), was approved with one modification: “The interested parties representing the various” instead of “The possible network operators of different”.

Contribution to ITU-T SG11 on the interface section of Q.FIN: A change request to Q.FIN on IMT-2000 interfaces, source SMG3, was presented by Michel Mouly. [Tdoc SMG 1013/97](#) is a misprint not showing necessary revision marks. The correct printing is in Annex D of the SMG3 status report in [Tdoc SMG 1100/97](#). SMG#24 approved the document in Annex D of [Tdoc SMG 1100/97](#) to be presented to SG11 on behalf of SMG.

[Tdoc SMG 1014/97](#), proposing a new definition of the IMT-2000 family concept and describing the role of SMG, was presented by David Williams. It was agreed to delete the word “concept” in the title of section 1: “IMT-2000 Family”. Derek Richards presented [Tdoc SMG 1025/97](#), source Lucent, objecting a restriction of ITU from detailed protocol definition. It was supported by British Telecom and Alcatel. Didier Chauveau proposed deletion of the words “GSM phase 2+ and” in [Tdoc SMG 1014/97](#) arguing that GSM phase 2+ is outside of the interest of ITU. Due to lack of time, SMG#24 did not take a final decision on [Tdoc SMG 1014/97](#).

Contributions to TG8/1: Niels Peter Skov Andersen presented Annex 5 and 6 of the Status report of SMG2 to SMG#24 ([Tdoc SMG 1017/97](#)), two SMG2 documents to be presented to ITU meetings for information purposes. SMG#24 approved these documents to be presented to TG8/1 on behalf of SMG.

[Tdoc SMG 1111/97](#), *Proposed SMG Contribution to TG8/1 on IMT-2000 Family*, was presented by Chris Wildey on behalf of the SMG ITU-R Co-ordinator.

Patrick Blanc proposed such papers to be communicated between TG8/1 members. He asked, if the document is approved by SMG, how it could be modified by TG1 in Mainz.

It was clarified that SMG approved positions cannot be changed by ITU members. Chris Wildey commented further that the family concept must be explained, this does not require passing through TG1.

There were requests for clarifications on section 5 from Patrick Blanc, Steve Hayes and Simon Pike, to section 6 from Didier Chauveau and Peter Adams, the latter arguing a publication within ITU to be helpful for e.g. IPR questions. Bob Tompkins proposed more harmonisation with [Tdoc SMG 1014/97](#). Simon Pike asked such papers to be forwarded to SMG and SMG2 in time.

A revision of [Tdoc SMG 1111/97](#) in [Tdoc SMG 1128/97](#) was approved by SMG#24 to be presented to TG8/1 on behalf of SMG.

Chris Wildey presented [Tdoc SMG 1097/97](#), a proposed LS to ERC TG1 responding to the ERC TG1 LS to SMG on WRC-99 Agenda item on Global Radio Control Channel. [Tdoc SMG 1097/97](#) was approved by SMG#24 with minor modifications (the revised version to be issued as [Tdoc SMG 1163/97](#)).

A Liaison Statement to ITU-R TG8/1 on speech codecs, Source SMG11, in [Tdoc SMG 954/97](#), was presented by Phil Gaskell. SMG approved the document to be presented to TG8/1 on behalf of SMG.

Co-operation with other Standards Organisations: Ansgar Bergmann presented [Tdoc SMG 1109/97](#), *Draft Summaries of two telephone conferences TIA/SMG/T1P1*. The document was noted.

Fred Hillebrand presented [Tdoc SMG 1110/97](#) (replacing [Tdoc SMG 1058/97](#)), *IMT-2000 Co-ordination*, proposing dates and agendas for IMT-2000 co-ordination meetings with TTC, ARIB, T1P1, TIA and TTA. The document was approved by SMG#24 with editorial corrections, see [Tdoc SMG 8/98](#) (issued after SMG#24).

4.6 OTHER UMTS ISSUES

SMG2 is planning a workshop on UTRA after the decision on a concept has been made by SMG.

5 GSM MATTERS OF STCS

Results of Change Requests presented to the meeting are in Annex 2. Therefore the results are not always repeated in this part B.

Discussion of STC GSM matters in SMG#24 was restricted to essential decisions (focus R97) requested from SMG plenary. Status reports of STCs on GSM matters were not foreseen in SMG#24. In this report, only a reference to the status reports (where available) is given.

5.1 SMG1

5.1.1 Phase 2 change Requests

GSM 02.81: All CRs in [Tdoc SMG 978/97](#) were approved.

5.1.2 Release 96 Change Requests

Both CRs in [Tdoc SMG 970/97](#) on GSM 02.01 were approved.

A CR to GSM 02.30 in [Tdoc SMG 974/97](#) was revised during SMG#24. The revised version in [Tdoc SMG 1149/97](#) was approved by SMG#24.

Both CRs in [Tdoc SMG 972/97](#) (to 02.42 and 02.07 regarding the indication of time in addition to time zone) were approved.

A CR In [Tdoc SMG 975/97](#) on GSM 02.41 was approved.

5.1.3 Release 97

GSM 02.66, *Support of Mobile Number Portability (MNP) Stage 1*, was approved.

GSM 02.95, *Support of Private Numbering Plan (SPNP) Stage 1*, in [Tdoc SMG 980/97](#) was approved to become part of R97.

GSM 02.96, 03.96 and 04.96, *Name Identification Supplementary Service Stage 1, 2 and 3* together with CR 04.80-A007 r2 in [Tdoc SMG 1081/97](#) were approved.

In this matter, Derek Richards presented [Tdoc SMG 1065/97](#), *Stage 1 of the CNAP*, asking for methods to include needs from markets other than the North American one.

It was clarified that variants for other market needs are expected to be added in future.

Release 97 Change Requests:

[Tdoc SMG 976/97](#), [Tdoc SMG 977/97](#), [Tdoc SMG 979/97](#) were approved.

[Tdoc SMG 973/97](#) contains CR 02.11-A009 introducing the requirement that roaming from one GSM PLMN area to another shall be possible without interruption of GPRS services, and that the availability is subject to inter-PLMN agreements.

Niels Peter Skov Andersen asked whether consequences on charging, registration etc. have been studied; also it was objected that at the end of the GPRS phase 1 specification an essential new requirement appears. Niels Peter Skov Andersen stated the position of Tele Denmark, that introduction of handover between PLMNs should not be introduced on a partial basis but only after a broad study for all services, also taking into account regulatory situations. Mikko Kanerva indicated that for some time the GPRS stage 1 and 2 has not excluded GPRS service continuation between PLMNs (under the proviso of agreements between operators).

[Tdoc SMG 973/97](#) is not approved. Maintenance of GPRS sessions when changing networks may be studied within the scope of inter-PLMN handover.

All CRs related to network alerting in [Tdoc SMG 971/97](#) were approved by SMG#24.

5.2 SMG2

The **GSM related part of the SMG2 Status report** in [Tdoc SMG 1017/97](#) was presented by Niels Peter Skov Andersen.

The situation for hosts is still earnest, in particular for subgroup meetings hosts are needed.

For priority in PT SMG of establishment of the new versions of specifications against support of meetings (letter from SMG2 to PT SMG leader in Annex I of [Tdoc SMG 1017/97](#)), see section 3.2.

Liaison from SMG2 to SMG on Cell re-selection enhancements (Annex II of [Tdoc SMG 1017/97](#)): Noted.

Change requests: The following change requests to the GSM standard were presented to SMG#24 for approval:

| | | |
|---------|-----|---|
| 97-985 | R97 | CR 03.64 A031r1 Clarification on the use of hysteresis for cell re-selection |
| 97-946 | R97 | CR 04.03 A005 r2 Introduction of GPRS |
| 97-946 | R97 | CR 04.04 A001 r2 Introduction of GPRS |
| 97-941 | R97 | CR 04.08 A181 r5 System Information type 10 |
| 97-941 | R97 | CR 04.08 A246 Frequency redefinition procedure for multislot configuration |
| 97-941 | R97 | CR 04.08 A247 r2 Clarification to SACCH procedures for multislot configuration |
| 97-942 | R97 | CR 04.08 A251 r1 Mobile assisted frequency allocation |
| 97-940 | R96 | CR 08.08 A090 Correction of Circuit Pool Description |
| 97-940 | R97 | CR 08.08 A092 r1 Clean-up for WI Improved Transcoder Handling |
| 97-639 | R97 | CR 08.58 A022 r1 Mobile assisted frequency allocation |
| 97-1002 | R97 | CR 05.01 A010 r1 Introduction of GPRS |
| 97-1003 | R97 | CR 05.02 A020 r1 Corrections and clarifications to GPRS |
| 97-1003 | R97 | CR 05.02 A021 Multislot classes for GPRS |
| 97-1003 | R97 | CR 05.02 A022 r1 System information for GPRS on BCCH |
| 97-1003 | R97 | CR 05.08-A023 r2 Alignment of 51- and 52-multiframe PCCCH |
| 97-1004 | 2 | CR 05.05 A058 r1 Improvement to DCS MS sensitivity |
| 97-1004 | R97 | CR 05.05 A059 r1 Improvement to DCS MS sensitivity |
| 97-1004 | R97 | CR 05.05 A063 r2 Reference performance for GPRS |
| 97-1005 | 2 | CR 05.08 A039 Allowed time to decode BCCH data |
| 97-1005 | R96 | CR 05.08 A040 Allowed time to decode BCCH data |
| 97-1005 | R96 | CR 05.08 A041 Dual band MS cell re-selection enhancement |
| 97-1005 | R97 | CR 05.08 A042 r3 Mobile Assisted Frequency Allocation |
| 97-1005 | R97 | CR 05.08 A043 Channel Quality Report in GPRS |
| 97-1006 | R97 | CR 05.50 A005 r1 Introduction of simulation results for GPRS receiver performance |

All CRs in the table were approved by SMG#24 except CR 05.08-A042r3.

CR A042r2 to GSM 05.08 R97 in [Tdoc SMG 1144/97](#) was approved by SMG#24.

GSM 04.14, *Individual equipment type requirements and interworking Special conformance testing functions* in [Tdoc SMG 1018/97](#) was presented to SMG#24 for information.

General Packet Radio Services: The following specifications were approved: GSM 08.14 in [Tdoc SMG 943/97](#), GSM 08.16 in [Tdoc SMG 944/97](#) and GSM 08.18 in [Tdoc SMG 945/97](#). They should be published after SMG#25.

Improved Data Rates through Optimised Modulation: Based on the feasibility study report on Improved Data Rates through Optimised Modulation (EDGE), SMG are asked to decide whether to continue the work on this work item or not ([Tdoc SMG 1015/97](#) and [Tdoc SMG 1016/97](#)). A new linear high level modulation scheme together with improved link layer management, symbol rate 361 kbit/s has been evaluated for use in

- GPRS (EGPRS): 11.2 - 65.2 kbit/s in one timeslot paid by 3-4 dB loss of sensitivity and 6-7 dB loss of C/I performance; the scheme could allow 50% of users to double their data rate if the present cell planning is re-used. If that is not acceptable a new cell planning would be necessary.
- Circuit switched data (ECSD) for transparent and non-transparent service

A time schedule could be feasible allowing the completion of EDGE specifications mid 1999. Quarter Amplitude Modulation (QAM) is actually used.

An RF amplifier in the mobile station would require a certain linearity, but this is dependent of the finally selected modulation scheme and the roll-out. Simulations are shown on page 17 of [Tdoc SMG 1016/97](#). The power amplifier is certainly one of the topics to be regarded if the WI is accepted. It is understood that transceivers with the new and old modulation scheme be mixed.

It was clarified that the feasibility study concentrated on radio aspects. Service and network aspects would have to be studied.

Phil Gilchrist presented [Tdoc SMG 1107/97](#), *Enhanced Data rates for GSM Evolution (EDGE)*, source Motorola. It argues that EDGE should concentrate on the GPRS application, mainly in order to avoid service diversification and because the ISDN based core networks of today don't offer high rate circuit switched data. Niels Peter Skov Andersen commented that the radio access lower layers should be as generic as possible. Paul Simmons pointed out that also the switching part of the BSS would need modifications for the switching part in the BSS.

Johan Sköld presented a WID for EDGE in [Tdoc SMG 996/97](#), source Ericsson, Nokia and Airtouch.

Dirk Weiler presented [Tdoc SMG 1068/97](#), *Handling of Work Item 184 (Improved Data Rates through Optimised Modulation)*, source DeTeMobil, Mannesmann, Bosch, Sony, Siemens proposing proposed that SMG2 should perform a comparative study with the UTRA radio interface.

SMG#24 decided to split the work item into a part on GSM radio access and a work item on Core network aspects; synergies with other work items, such as GPRS, UTRA and AMR, should be considered in the work on the EDGE-BSS work item. A priority of application of EDGE to GPRS was suggested; Niels Peter Skov Andersen stated that still a Circuit oriented radio access can be combined for fixed network packet and vice versa.

Updated WIDs in [Tdoc SMG 1147/97](#) and [Tdoc SMG 1148/97](#) were approved by SMG#24.

[Tdoc SMG 1162/97](#) was noted: Nokia will host a workshop on EDGE in the first quarter of 1998 (planned to be on the 16-17 February, 1998 in Helsinki).

Capacity of the BCCH: As asked by SMG, SMG2 reported on ways to extent the capacity of the BCCH. The answer is found in Annex IV of [Tdoc SMG 1017/97](#). The method identified is to exploit phase 1 layer 2 error handling. As experience has shown that implementations have deviated from parts of error handling, SMG2 will invite GSM-MoU TWG for assistance regarding the checking of the compatibility of existing mobile stations in relation to the proposals for BCCH evolution; SMG7 should assist by providing the necessary test descriptions.

SMG is invited note:

- SMG2 is going to study general means of improving cell re-selection (Annex II).
- SMG2's attempt together with the PT to prioritise the work of the PT (Annex I). See section 3.2 (PT SMG status report).
- SMG2 is considering the introduction of packet radio channels as a step of platform for the radio interface. Consequently the handling of Release '97 for the radio part should use the mechanism foreseen in the version management for a new platform.

5.3 SMG3

Michel Mouly presented [Tdoc SMG 1100/97](#), the *SMG3 status report*.

There are still urgent needs for hosts for SMG3 and its subgroups. Fred Hillebrand and Michel Mouly will send a letter asking relevant companies for hosting of SMG3 (subgroup) meetings.

AP PT SMG To prepare a letter asking relevant companies for hosting of SMG3 (subgroup) meetings.

CAMEL Phase 2: CR 03.78-A008r8 on CAMEL Phase 2 Stage 2 in [Tdoc SMG 909/97](#): Work is ongoing, the CR was presented for information to allow monitoring of the progress in CAMEL phase 2.

GSM 09.60 GPRS Tunnelling Protocol (GTP) across the Gn and GPRS Interface in [Tdoc SMG 910/97](#), CR in [Tdoc SMG 911/97](#): approved by SMG#24.

[Tdoc SMG 912/97](#): two CRs for the introduction of Shared Inter-Working Function (SIWF), completing the work of SMG3 on SIWF. The CRs were approved by SMG#24. SMG#24 confirmed the completion of SMG3 work on work item SIWF.

[Tdoc SMG 913/97](#): Camel phase 1 and SOR: Change requests for R96. All approved by SMG#24.

Specification SPS 03052-1, *INAP Protocol specification for CAMEL Phase 1* and SPS 03052-2, *INAP PICS for SSF for CAMEL Phase 1* in [Tdoc SMG 914/97](#): Both specifications were

approved by SPS. As foreseen in the subcontract SMG-SPS, they were presented for approval at SMG. SMG#24 approved the specification.

CRs in [Tdoc SMG 915/97](#) were approved by SMG#24.

[Tdoc SMG 916/97](#), GSM 10.78, *CAMEL Project scheduling and open issues version 1.5.0* was approved by SMG#24 as an excellent example of project monitoring specification.

[Tdoc SMG 917/97](#), Change requests for R96. One of the CRs fulfils a requirement of SMG#23 to make contest free monitoring of MAP interfaces possible.

GSM 03.53, *TFO stage 2* in [Tdoc SMG 929/97](#), was presented for information to SMG#24.

| | |
|--|--|
| PI Rémi Thomas, William Navarro (Nortel) | To clarify a question on Tdoc SMG 929/97 regarding handover. |
|--|--|

[Tdoc SMG 937/97](#) and [Tdoc SMG 938/97](#) contain many CRs on GPRS (03.60 and 03.64). It was not possible to print out these documents for every delegate. They were available in electronic form and in paper form on request.

SMG#24 approved the CRs in [Tdoc SMG 937/97](#) and [Tdoc SMG 938/97](#). Corrections if necessary could be made by use of change requests for SMG#25. The reason for this extraordinary procedure is to allow the GPRS experts to work immediately after SMG#24 on a stable text.

All CRs in [Tdoc SMG 909/97](#), [Tdoc SMG 971/97](#), [Tdoc SMG 986/97](#), [Tdoc SMG 987/97](#) and [Tdoc SMG 988/97](#) were approved by SMG#24.

Group/broadcast calls over more than one MSC: CRs to ASCI phase 2 in [Tdoc SMG 989/97](#) were approved by SMG#24. This completes the function to allow group/broadcast calls over more than one MSC.

[Tdoc SMG 990/97](#), a set of CRs on 04.65, was approved by SMG#24.

CR 04.08-A249r2 on Clarification on audio connection (Phase 2) in [Tdoc SMG 991/97](#) was approved by SMG#24. A corresponding CR in [Tdoc SMG 986/97](#) had also been approved by SMG#24.

CRs for R95 and R96 on GSM 03.81 for handling of number parameters related to line identification services in [Tdoc SMG 991/97](#) were approved by SMG#24.

CR 04.88-A004 on Call Barring after reconnection (Release 97-CAMEL) in [Tdoc SMG 1047/97](#) was approved by SMG#24.

[Tdoc SMG 1048/97](#) had been approved already by SMG#24.

A CR to 03.02 on GPRS in [Tdoc SMG 1086/97](#) was approved by SMG#24.

Status report Annex A, a liaison statement from SMG3 WPC on version management: see section [5.12.3](#).

Status report Annex B: SMG3 informs SMG about limitations of the proposed solution for filtering Short Messages at the HLR. SMG decided that SMG3 should continue their work with

that solution as a working assumption, that means, members could still propose a complete solution with less limitations to SMG3.

CNAP stage 2: It was clarified that the solution described is only applicable in certain regions. Alternative solutions may be specified when needed.

CRs on CAMEL (phase 1) R96 A003 and A010 to GSM 03.78 v.5.1.0, A102 to GSM 09.02 v.5.6.0, A013, A015, A016, A018 to GSM 09.78 v.5.1.0 in [Tdoc SMG 888/97](#) were approved.

5.4 SMG4

Non strategic Change requests:

Change Requests for **HSCSD and 14.4 kbit/s** in [Tdoc SMG 921/97](#), for 03.40 on SMS screening and SIM toolkit security headers in [Tdoc SMG 918/97](#), for R96 corrections on Cell Broadcast SMS in [Tdoc SMG 919/97](#) were approved by SMG#24.

[Tdoc SMG 920/97](#) contains change requests on shared interworking function. They were approved by SMG#24. The SIWF work item is considered as completed as the stage 3 changes of SMG3 were approved as well.

Various corrections to GSM 07.05 and 07.07 in [Tdoc SMG 922/97](#) were approved.

A CR to GSM 07.60 on GPRS in [Tdoc SMG 1030/97](#) was approved.

Cordless Telephony System: SMG4 informs SMG that SMS is not addressed in the CTS work, see liaison statement to SMG, SMG1 and SMG9 in [Tdoc SMG 1050/97](#). Robert Vass raised concerns on the proposed inclusion of SMS in CTS phase 1, referring to [Tdoc SMG 1126/97](#), and proposed to forward the issue to SMG 1. On more general principles, Alistair Urie presented [Tdoc SMG 1143/97](#), requesting a harmonization of services supported by CTS with the GSM services. This more general request was forwarded to SMG1 for further study as well as the concerns raised by SMG4.

Mobile Station Application Execution Environment: Stefan Aprath presented [Tdoc SMG 1032/97](#), the initial version of GSM 10.57, *Project scheduling and open issues: Mobile Station Execution Environment (MExE)*. The document is the first outline of the project schedule for that work item.

A proposed liaison statement to MNCRS (a US centred group developing JAVA), *Definition of Java enabled GSM terminal*, in [Tdoc SMG 1050/97](#) was approved, but SMG wants more information on that group, participation conditions, structure, deliverables and so on. SMG4 is mandated to liaise directly with MNCRS.

| | |
|------------------|---|
| AP Stefan Aprath | To provide the requested information on MNCRS to SMG. |
|------------------|---|

Liaison with WAP: As a response to the letter from SMG ([Tdoc SMG 879/97](#)) to the WAP consortium a liaison statement from WAP in [Tdoc SMG 1101/97](#) had been received. It was presented by Timo Ali-Vemos.

A proposed LS: *Response to LS from WAP Consortium* in [Tdoc SMG 1114/97](#), Source: Alcatel, Nortel, Siemens, was presented by Brian Day. It was approved.

Another LS in to WAP Consortium in [Tdoc SMG 1032/97](#), proposed by SMG4, was postponed either to SMG#24bis, or, if SMG#24bis is not convened or doesn't treat the issue, to SMG4.

SMG4 was mandated to liaise with WAP on condition of open participation and access to their documents. Robert Vass indicated the intention of the WAP consortium to make those provisions in January 1998.

Infra red interface in the MS: A proposed liaison statement on MS/TE infra red interface to the IrDA special interest group in [Tdoc SMG 1040/97](#) was approved by SMG#24.

[Tdoc SMG 1050/97](#) proposes that CRs agreed for R97 are introduced for R96. Approved.

Strategic CRs

A CR in [Tdoc SMG 1029/97](#) to GSM 07.08 on GSM API was approved by SMG#24; the voting process on the specification is to be continued.

GSM 07.10, *Multiplexing protocol*, in [Tdoc SMG 1031/97](#): there were objections to perform editorial improvements before approval. Rémi Thomas presented [Tdoc SMG 1080/97](#), source France Telecom, stating that the specification is based on proposals from two manufacturers. France Télécom would prefer to change the specification to design a single protocol with a choice between two options; also it is criticised that the specification had not been presented to SMG for information. Peter Neumann presented [Tdoc SMG 1134/97](#), source Ericsson and Siemens, proposing:

1. "in the first place is to approve GSM TS 07.10 as it is proposed by SMG4 *and*, if found suitable, to encourage further extension of multi-mode protocol sets, allowing operation on any physical bearer, like infrared links.

Should this proposal not be found as acceptable due to the remaining containment of several protocols in 07.10, then another proposal

2. in the second place is to remove the HDLC mode from 07.10, leaving the basic mode, thereby allowing simple implementations based on standards, and not on proprietary solutions. In addition we support the development of *another* standard for an advanced protocol, exceeding the capabilities of the HDLC mode and suited for applications carried on any bearer, including half duplex infrared links.

In both cases we strongly recommend that the specifications are not remitted back to SMG4, but that SMG#24 endorse the technical content of the specification, however allows editorial restructuring by the rapporteur of the text to accomplish a level of integrity acceptable to all parties, to be presented and approved at SMG#25."

Vodafone said that they would oppose any suggestion to remove the HDLC mode and would prefer to remove the Basic Mode if removal of one or other mode was deemed necessary.

The SMG4 Chairman's view is that the changes proposed are editorial, and that there were no suggestions that the technical content of the specification should be changed.

The meeting was made the proposal to

- approve the specification or
- send it back to SMG4

A show of hands showed 15 for the first, five for the second option. A possible vote in SMG#25 will be indicated. This might need to consider removal of one or other of the two Modes if SMG4 is unable to merge them or otherwise amend GSM 07.10 editorially to the satisfaction of SMG#25.

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| AP | A possible vote in SMG#25 will be indicated in the agenda. |
|----|--|

As the objections were sustained, it was concluded that the functional contents were approved by SMG#24, that the technical contents of the document were accepted by a broad majority in SMG#24 and that 07.10 is considered as having been presented for information to SMG#24.

A CR in [Tdoc SMG 1031/97](#) was approved by SMG#24.

For version handling, see section [5.12.3](#).

5.5 T1P1 WORK ITEMS

The revised work plan for PCS 1900 Service Provider Number Portability in [Tdoc SMG 1084/97](#) was noted.

T1P1 Harmonization Workplan: The *T1P1 Harmonization Workplan* in [Tdoc SMG 1083/97](#) was endorsed.

Mel Woinsky presented [Tdoc SMG 1082/97](#) on the need for a small process refinement which would specify that T1P1 would report to the SMG plenary on CR's and related documents for which it is the designated lead, after reaching endorsement of the appropriate STCs. In response, SMG#24 approved a Liaison Statement to T1P1 in [Tdoc SMG 1145/97](#), *Response to Letter on Process Refinements*: SMG#24 agrees that T1P1.5 present their technical work to SMG; it should be visible that the items have been agreed in the relevant STCs as well.

SMG#24 agrees that T1P1.5 present their technical work to SMG; it should be visible that the items have been agreed in the relevant STCs as well.

5.6 SMG6

Gisela Hertel, SMG6 Chair, presented [Tdoc SMG 890/97](#), Network and Service Management Requirements for UMTS (UMTS 21.06) for information. It is planned for approval at SMG#25.

Iñaki Cabrera, Chairman of TMN WG5, stated that TMN WG5 sees no need to modify the content of specification UMTS 21.06.

Iñaki Cabrera presented [Tdoc SMG 1089/97](#) and [Tdoc SMG 1090/97](#).

[Tdoc SMG 1089/97](#) informs that

- TMN5 has appointed a liaison officer to EP SMG (Iñaki Cabrera, Airtel Móvil SA)
- TMN5 will appoint a liaison officer to SMG6
- TMN5 invites SMG6 to follow a similar approach, participating in TMN5, TC TMN and TC TMN Management Team Meetings.

Fred Hillebrand clarified that there is no agreement between SMG and TMN(5) about joint meetings or mutual participations between SMG6 and TMN5, because such things are in the autonomy of SMG6. He also clarified that whether SMG6 sends liaison persons to TMN5 or not is a decision of SMG6.

[Tdoc SMG 1090/97](#) informs about the TMN5 intention to adopt the SMG6 specification UMTS 21.06 and UMTS 32.01 and to approve them as TMN specifications arguing this to be in line with the ETSI Board decision on responsibility split between TMN and SMG.

The SMG6 Chair informed SMG6 having difficulties to understand an intention to take over and publish under one's name specifications from a group which has done the work.

Ian Doig explained that TMN cannot approve UMTS 21.06 because it is in the (ETSI approved) work program of SMG.

SMG commented the decision quoted in the document ("Until the transfer by the ETSI Board of UMTS network management from SMG6 to TC TMN") not to be correctly quoted.

It was decided not to discuss in SMG papers in the SMG6 area which were not presented to SMG6. SMG expects SMG6 to continue their work program.

5.7 SMG7

Rémi Thomas presented the SMG7 status report in [Tdoc SMG 923/97](#).

All CRs in [Tdoc SMG 924/97](#) and [Tdoc SMG 925/97](#) (Corrections of signalling tests, addition of a test on L2 pseudo-length), in [Tdoc SMG 926/97](#) and [Tdoc SMG 927/97](#) (Corrections of RF/non-signalling tests), were approved.

The CRs to TBRs on EFR are approved but on hold; the CRs to TBRs to change the reference versions of 11.10 are postponed.

CR TBR31-A004 and CR TBR19-A010 in [Tdoc SMG 928/97](#), both titled *Inclusion of HSCSD Multislot test cases*, propose, among other changes, a replacement of the reference to GSM 11.10 phase 2 by GSM 11.10 phase 2+. The consequences of such an action require further analysis, therefore both Change request were postponed.

CR TBR19-A009 and CR TBR31-A003 in [Tdoc SMG 928/97](#), proposing a reduction of test repetitions, were approved but put on hold. This is in order to fulfil a recent request from the European Commission (EC) to have a common planning between ETSI and the EC on updating TBRs. A meeting with Mark Bogers, DGXIII of the EC, on type approval matters is planned for early February 1998.

Input to ACTE: On request of EC DGXIII, an input to ACTE justifying updates for TBR 19 and TBR 31 in [Tdoc SMG 1033/97](#) has been provided by PT SMG. The document was presented for information.

Phase 2+ mobile station testing requirements outline: [Tdoc SMG 1034/97](#) outlines the MS Phase 2+ testing requirements, it is based upon the SMG 10.00 specification and the Phase 2+ Work items database. This document is indicative for the moment, its purpose is to provide a first estimate of Phase 2+ impact on the Type Approval and MS test specification processes. It was presented for information. SMG#24 noted the document.

RLP testing: CRs in [Tdoc SMG 1122/97](#) and [Tdoc SMG 1123/97](#) aim to remove problems in certain RLP tests due to which the tests were not implementable and hence declared “special condition tests” (this means that a manufacturer conformance declaration replaces the tests). These CRs were approved. Some difficulties to gather a joint expertise of SMG4 and SMG7 experts on this matter were reported. If necessary a session dedicated to RLP testing can be organised during the next signalling sub group meeting to be held on January 12-13, 1998 in Paris, SMG4 experts are welcome at this meeting.

TTCN signalling test cases: SMG#24 endorsed SMG7’s proposal:

- Anite can bring to SMG7 TTCN translations of HSCSD signalling test cases,
- SMG7 will review these translations if there is nothing more urgent to be tackled,
- once such TTCN translations would be agreed by SMG7, it will be up to SMG to decide whether the relevant ATs are informative or normative.

SMG7 asked SMG to take care of the definition of a GPRS regulatory framework. Delegates are asked to consider the issue so that SMG#25 can cause the necessary actions.

Comments of SMG7 on version management: See section [5.12.3](#).

5.8 SMG8

SMG8 didn’t request any decisions from SMG#24.

5.9 SMG9

All CRs in [Tdoc SMG 886/97](#) were approved by SMG#24. Non strategic CR A044 to GSM 11.14, missing in the paper version of [Tdoc SMG 886/97](#), was also approved.

[Tdoc SMG 886/97](#) does wrongly indicate R97 for CR 11.11-A053, it is R96.

GPRS: What shall the Mobile Equipment (ME) do if the SIM doesn’t support GPRS (that is, the GPRS security related information)? A proposal is discussed at present in SMG9 to allow

the ME use of security relevant information stored in the ME, if the IMSI stored in the ME and SIM are equal. See [Tdoc SMG 889/97](#) for information.

Klaus Vedder informed that on 20-23 January SMG9 will convene the 50th SIMEG/SMG9 meeting in Sophia Antipolis.

R97 is planned in SMG9 for SMG#25.

Auxiliary device access using SIM application toolkit: [Tdoc SMG 887/97](#), proposed 98 work item description for *Auxiliary device access using SIM application toolkit*, was presented. Robert Vass and Timo Ali-Vehmas argued against acceptance of the work item. SMG#24 noted the proposal as an interesting one and asked SMG9 to discuss it further and come with a proposal back to SMG#25.

Note: 02.17 and 11.11 already foresees two-SIM ME.

GSM-API for SIM Toolkit applications based on JAVA: [Tdoc SMG 1059/97](#), *GSM-API for SIM Toolkit applications based on JAVA*, and a corresponding WID in [Tdoc SMG 1063/97](#), both source T-Mobil, were presented by Hans Hauser. SMG#24 approved the WI in principle, SMG9 will take the lead and will look for all necessary information exchange and discussion with other groups. SMG9 will present a revised WID to SMG#25.

5.10 SMG10

SMG10 didn't request any decisions from SMG#24.

5.11 SMG11

Phil Gaskell presented the contentious issues requiring decisions by SMG#24.

Requirements and Objectives of AMR: [Tdoc SMG 953/97](#), *AMR performance requirements (AMR-3)*, presents performance requirements and objectives for the speech quality of the GSM AMR system under static and dynamic test conditions.

Rémi Thomas presented [Tdoc SMG 1105/97](#), *Some comments on AMR*, source France Télécom, proposing that the AMR performance requirements for dynamic conditions are set to guarantee that the AMR has really an improved robustness compared to the EFR, especially in bad channel conditions.

William Navarro argued on behalf of Nortel, no definition of dynamic conditions to be known yet. He explained that Nortel has no problem with the proposals for static conditions, but feels that further work on the dynamic conditions are necessary.

[Tdoc SMG 1096/97](#), AMR performances specifications, source BellSouth, was presented by Alain Ohana. The document recommends as the primary objective to provide the best possible performances in full rate and half rate modes for the ideal case under static conditions, and to request that in half rate mode, candidates to aim at EFR performances. He proposed SMG#24 to accept [Tdoc SMG 953/97](#) as far as the static conditions are concerned; for the dynamic conditions to wait for the input from SMG2 WPB (promised for March 1998).

Tdoc SMG 953/97 was approved. For the purpose of the selection phase SMG11 was mandated by SMG to elaborate the performance requirements for dynamic conditions taking into account the proposed scenarios from SMG2 WPB when the scenarios themselves will become available.

The status of the study phase for wideband AMR was presented. The completion of the study phase is expected by June 1998.

CRs in Tdoc SMG 949/97, Tdoc SMG 950/97 and Tdoc SMG 952/97 were approved by SMG#24.

Inband Tandem Free Operation (TFO) of Speech Codecs; Service Description; Stage 3 in Tdoc SMG 1007/97 was presented for information to SMG#24.

5.12 GSM PROGRAM MANAGEMENT

5.12.1 Release 97

SMG#24 agreed to complete Release 97 at SMG#25. GSM and UMTS program management will be on the agenda of SMG#24bis.

5.12.2 New and completed work items

Improved Data Rates through Optimised Modulation (EDGE, split into EDGE-NSS and EDGE-BSS): WIDs in Tdoc SMG 1147/97 and Tdoc SMG 1148/97 were approved by SMG#24. Cf. section 5.2.

GSM-API for SIM Toolkit applications based on JAVA: SMG#24 approved the WI in principle, SMG9 will take the lead and will look for all necessary information exchange and discussion with other groups. SMG9 will present a revised WID to SMG#25 based on Tdoc SMG 1063/97. Cf. section 5.9.

Auxiliary device access using SIM application toolkit: SMG#24 noted the proposal of this '98 work item in Tdoc SMG 887/97 as an interesting one and asked SMG9 to discuss it further and come with a proposal back to SMG#25.

Shared Inter-Working Function (SIWF): This work item has been completed at SMG#24, cf. sections 5.3 and 5.4.

5.12.3 Version management

Liaison statements from SMG3 and SMG7 as well as comments from SMG2 and SMG4 on version management were not presented at SMG#24 due to lack of time. However, Tdoc SMG 1135/97, *Report on implementation of Version Management decided by SMG#23 version 6.0*, source PT SMG, intends to take all comments received from STCs and experts into account.

SMG#24 decided to apply Tdoc SMG 1135/97 until a review in SMG#25. The document elaborates the two options to develop a specification, either in a new platform

(and hence a new major version) or by indication of all options in the present major version 5.

6 ANY OTHER BUSINESS

6.1 SMG#24BIS

Fred Hillebrand presented [Tdoc SMG 1138/97](#), the *DRAFT Voting procedure for UTRA*, source SMG Co-ordination Group.

It was asked what the further proceeding in case of simple majorities could be.

It was clarified that SMG can't force a concept group to withdraw; there is also nobody entitled to withdraw a concept group.

It was clarified that there is no rule requesting a representative of a member to be an employee of that member. As the voting by proxy is explicitly forbidden in section 1.7.1.1 of the ETSI Technical Working Procedures.

Mannesmann Mobilfunk stated a sustained opposition against using one vote per ETSI member for the voting for SMG#24bis (cf. ETSI Technical Working Procedures sub-clause 1.7.1).

Modifications of [Tdoc SMG 1138/97](#):

- Third paragraph of section 1: replace “SMG2” by “SMG”.
- In the heading of 3.4, delete “, no proxy voting”.
- In section 3.4, delete sentence “Voting by proxy will not be permitted.”
- Revised section 3.5 to reflect the use of weighted voting

With these modifications, [Tdoc SMG 1138/97](#) was approved by SMG#24. The revised version is in [Tdoc SMG 1157/97](#).

Agenda of SMG#24bis: Fred Hillebrand presented [Tdoc SMG 1137/97](#), the *DRAFT agenda of SMG#24bis*. The following modification were agreed:

- Replace “Future Program report” by “Report”. Agenda Item 4 to become the second sub-item of Agenda Item 5.
- Add location, beginning and end of the meeting (Paris, 28th January, 1998, 9:00h, end 29th January, 16:00h).

With these modifications, [Tdoc SMG 1137/97](#) was approved. The revised version is in [Tdoc SMG 1156/97](#).

7 NEXT MEETINGS

SMG's plenary and Co-ordination Group dates 1998/1999 in [Tdoc SMG 1155/97](#) (a revision of [Tdoc SMG 1136/97](#)) now foresee three (ordinary) plenaries a year, because otherwise STCs wouldn't have sufficient time for consolidated outputs between the third and fourth meeting in the year. [Tdoc SMG 1155/97](#) was approved, the information is repeated below:

| Meeting No. | Plenary Date | Plenary Venue | SMG Co-ord. Group |
|-------------|--------------------|--------------------------|--|
| SMG#24bis | 28-29 Jan 98 | Paris, Alcatel | 23 Jan 98 Frankfurt (Steigenberger Airport Hotel) |
| SMG #25 | 16 - 20 March 98 | Warsaw, Poland | 5 - 6 March 98 London, Vodafone |
| SMG #26 | 22 - 26 June 98 | Finland | 11-12 June 98 Slough, Cellnet |
| SMG #27 | 12 - 16 Oct. 98 | Praha, Czech Republic | 1 - 2 Oct. 98 Dusseldorf |
| SMG#28 | 8 - 12 February 99 | | 26 - 27 January 99 |
| SMG#29 | 21 - 25 June 99 | | 8 - June 99 Stockholm, Ericsson |
| SMG#30 | 18 - 22 October 99 | | 5 - 6 October 99 |

Note : In order to finalise documents, produce electronic versions and prepare Plenaries properly, STCs should not meet during the two weeks before every Plenary.

Italtel offered to host SMG#28 (or SMG#29).

- Annex 1: List of participants
- Annex 2: Status of CRs presented to the meeting
- Annex 3: List of documents
- Annex 4: Liaison statements
- Annex 5: Status of SMG specifications after SMG#24
- Annex 6: Roadmap for the finalisation of GSM phase 2+ work items - version 24.0
- ANNEX 7: SYSTEM description Summaries of the Concept groups ([Tdoc SMG 894/97](#),
[Tdoc SMG 897/97](#), [Tdoc SMG 900/97](#), [Tdoc SMG 903/97](#))
- ANNEX 8: SMG-CG reports
- ANNEX 9: PT SMG STATUS REPORT AT SMG#24
- ANNEX 10: Tdoc SMG 8/98, IMT 2000 Co-ordination (Meetings in Japan, February 1998)

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Status List of CHANGE REQUESTS presented to

SMG#24

Introduction :

This following list contains the final status of all Change Requests, that were presented to SMG#24.
The statistics (see below) is based on that list.

New specifications that were submitted for approval are also listed.

CRs under responsibility of the following STCs have been submitted by the time of printing : *27-Jan-98*

- 21 CRs presented by SMG 1
- 25 CRs presented by SMG 2
- 83 CRs presented by SMG 3
- 39 CRs presented by SMG 4
- 97 CRs presented by SMG 7
- 14 CRs presented by SMG 9
- 3 CRs presented by SMG 11

282 CRs presented in total

Statistics

27-Jan-98

Phase 2

| | | |
|----|-----|------------------|
| 64 | CRs | approved |
| 1 | CRs | approved, on hol |
| 1 | CRs | postponed |

Phase R96

| | | |
|-----|-----|------------------|
| 104 | CRs | approved |
| 1 | CRs | approved, on hol |
| 1 | CRs | postponed |
| 1 | CRs | revised |

Phase R97

| | | |
|----|-----|------------------|
| 98 | CRs | approved |
| 3 | CRs | approved, on hol |
| 2 | CRs | information |
| 2 | CRs | rejected |

Phase UMTS

| | | |
|---|-----|----------|
| 4 | CRs | approved |
|---|-----|----------|

282 CRs were presented in total

| Status_new_Specs | | | | | | |
|------------------|-------|------|--|------------|--------|--------|
| TDoc | SPEC | PHAS | SUBJECT | STATUS | NEW_VE | SOURC |
| 97-981 | 02.66 | R97 | Support of Mobile Number portability | approved | 5.0.0 | SMG1 |
| 97-110 | 30.06 | UMTS | UTRA Evaluation Report | approved | 3.0.0 | SMG2 |
| 97-945 | 08.18 | R97 | BSS GPRS Protocol (BSSGP) | approved | 5.0.0 | SMG2 |
| 97-944 | 08.16 | R97 | Gb interface, Network Service | approved | 5.0.0 | SMG2 |
| 97-943 | 08.14 | R97 | Gb interface Layer 1 | approved | 5.0.0 | SMG2 |
| 97-929 | 03.53 | R97 | Transcoder free operation (TFO) | informatio | 1.0.0 | SMG3 |
| 97-910 | 09.60 | R97 | Draft GSM 09.60 v.2.0.0 | approved | 5.0.0 | SMG3 |
| 97-103 | 07.10 | R97 | GSM 07.10 v. 2.0.0 TE-MS Multiplexing protocol | postponed | | SMG4 |
| 97-108 | 04.96 | R97 | Name Identification Supplementary Services | approved | 5.0.0 | TIP1.5 |
| 97-108 | 03.96 | R97 | Name Identification Supplementary Services | approved | 5.0.0 | TIP1.5 |
| 97-108 | 02.96 | R97 | Name Identification Supplementary Services | approved | 5.0.0 | TIP1.5 |
| 97-982 | 02.96 | R97 | Name Identification Supplementary Services | revised | 5.0.0 | TIP1.5 |

| Spec | CR | rev | Phase | Cat | SUBJECT | TDoc | Status | NEW_VERS |
|--------------|--|-----|-------|-----|---|---------|----------|----------|
| 02.01 | Principles of Telecommunication Services Supported by a GSM Public Land Mobile Network(PLMN). | | | | | | | |
| | A007 | | R96 | F | If a user subsc'd to General Bearer Service (e.g. BS 20) requires in a ca | 97-970 | approved | 5.3.0 |
| | A008 | | R96 | D | Editorial corrections | 97-970 | approved | 5.3.0 |
| 02.07 | Mobile Station (MS) Features. | | | | | | | |
| 'strategic' | A015 | | R97 | B | Network Alerting in the MS: Feature applicable to mobile terminating | 97-971 | approved | 5.4.0 |
| 'strategic' | A016 | | R96 | B | Alignment of NITZ - Network name, time and timezone information w | 97-972 | approved | 5.4.0 |
| 02.11 | Service Accessibility. | | | | | | | |
| | A009 | | R97 | B | Requirement for possibility of roaming between PLMNs without GPRS | 97-973 | rejected | |
| 02.30 | Man-machine Interface (MMI) of the Mobile Station (MS). | | | | | | | |
| | A021 | | R96 | D | Spec 02.30 contains many refs to the Dir Num w/o clearly defining w | 97-974 | revised | 5.7.0 |
| 'strategic' | A021 | 1 | R96 | D | Spec 02.30 contains many refs to the Dir Num w/o clearly defining w | 97-1149 | approved | 5.7.0 |

| Spec | CR | rev | Phase | Cat | SUBJECT | TDoc | Status | NEW_VERS |
|--------------|--|-----|-------|-----|--|---------|----------|----------|
| 02.41 | Operator Determined Barring | | | | | | | |
| | A008 | R96 | D | | Clarification of the ODB Barring Categories for ECT:To allow the inv | 97-975 | approved | 5.2.0 |
| 02.42 | Network Identity and Timezone (NITZ); Service Description, Stage 1 | | | | | | | |
| | A002 | R96 | B | | Alignment of NITZ (Network Identity and Time Zone) Correct in consi | 97-972 | approved | 5.1.0 |
| 02.53 | A001 | R97 | F | | CR to GSM 02.53 Modifications to Annex A (informative): Limitation | 97-950 | approved | 5.1.0 |
| 02.60 | General Packet Radio Service Stage 1 Description | | | | | | | |
| | A002 | R97 | D | | Clarification of GPRS release 1997 content and minor editorial improv | 97-976 | approved | 5.2.0 |
| | A003 | R97 | C | | Clarification/Improvement of definition of Quality of Services aspects | 97-976 | approved | 5.2.0 |
| 02.78 | Customized Applications for Mobile network Enhanced Logic (CAMEL); Service definition (Stage 1) | | | | | | | |
| | A014 | R97 | B | | changes are purely editorial and apply to both, CAMEL R96 and R97, | 97-977 | approved | 5.4.0 |
| 02.81 | Line Identification Supplementary Services - Stage 1. | | | | | | | |
| | A006 | R97 | F | | Seen in Goteborg - Presentation of add'l calling party number if receive | 97-978 | approved | 4.6.0 |
| | A007 | R97 | A | | Same CR applied to R97 | 97-978 | approved | 5.1.0 |
| | A008 | R97 | F | | With CR A006 to GSM 02.81 the concept of the additional line identiti | 97-978 | approved | 4.6.0 |
| | A009 | R97 | A | | Same CR applied to R97 | 97-978 | approved | 5.1.0 |
| 02.93 | Completion of Calls to Busy Subscriber (CCBS) Service Description - Stage 1 | | | | | | | |
| | A017 | R97 | C | | The priority in queue handling has been removed by earlier CRs. The s | 97-979 | approved | 5.5.0 |
| | A018 | R97 | C | | Inclusion of the interaction between CCBS and CAMEL Phase2. | 97-979 | approved | 5.5.0 |
| 03.02 | Network Architecture | | | | | | | |
| | A005 | R97 | B | | Changes needed for GPRS regarding Network Architecture | 97-1086 | approved | 5.3.0 |
| 03.10 | GSM Public Land Mobile Network (PLMN) Connection Types. | | | | | | | |
| | A007 | R96 | F | | Removal of 2*14,4=19.2 Transparent configuration | 97-921 | approved | 5.4.0 |
| 03.18 | Basic Call Handling | | | | | | | |
| | A004 | R97 | B | | Network's indication of Alerting Categories | 97-971 | approved | 5.3.0 |
| | A007 | R96 | F | | Sending ACM & similar messages only once for a call | 97-911 | approved | 5.3.0 |
| | A009 | R96 | D | | Concentration of description of core call handling functions in 03.18, C | 97-913 | approved | 5.3.0 |
| | A011 | R97 | B | | Modification due to the introduction of SIWF | 97-912 | approved | 5.3.0 |
| | A012 | R96 | F | | Interaction between OR of late call forwarding & CAMEL | 97-915 | approved | 5.3.0 |
| 03.40 | Technical Realization of the Short Message Service (SMS) Point-to-point(PP) | | | | | | | |
| | A064 | R97 | B | | Security headers | 97-918 | approved | 5.8.0 |
| | A065 | R97 | B | | Transmission of the SME OA | 97-918 | approved | 5.8.0 |

| Spec | CR | rev | Phase | Cat | SUBJECT | TDoc | Status | NEW_VERS |
|--------------|---|-----|-------|-----|--|--------|----------|----------|
| 03.41 | Technical Realization of Short Message Service Cell Broadcast (SMSCB). | | | | | | | |
| | A045 | R96 | F | F | Failure reasons | 97-919 | approved | 5.8.0 |
| | A046 | R96 | F | F | Recovery indication | 97-919 | approved | 5.8.0 |
| | A047 | R96 | D | C | SET-DRX | 97-919 | approved | 5.8.0 |
| | A048 | R96 | C | C | Clarification of the Update field in the Write Replace PDU | 97-919 | approved | 5.8.0 |
| | A049 | R96 | D | D | Unknown-Error/Unspecified-Error | 97-919 | approved | 5.8.0 |
| | A050 | R96 | D | D | Unrecognised Information Elements | 97-919 | approved | 5.8.0 |
| | A051 | R96 | D | D | Use of high priority messages and reserved slots | 97-919 | approved | 5.8.0 |
| | A052 | R96 | C | C | Schedule period length | 97-919 | approved | 5.8.0 |
| 03.49 | Example Protocol Stacs for Interconnecting Cell Broadcast Centre (CBC) and Base Station Controller (BSC) | | | | | | | |
| | A026 | R96 | F | F | ASN.1 corrections and 03.41 alignment | 97-919 | approved | 5.7.0 |
| | A027 | R97 | F | F | Cell list structures | 97-919 | approved | 5.7.0 |
| | A028 | R96 | C | C | UNBIND and BIND-FAILURE | 97-919 | approved | 5.7.0 |
| | A029 | R96 | C | C | Version control for the CBC-BSC interface | 97-919 | approved | 5.7.0 |
| | A030 | R96 | D | D | Definition of parameters | 97-919 | approved | 5.7.0 |
| | A031 | R96 | C | C | Schedule period length | 97-919 | approved | 5.7.0 |
| 03.50 | Transmission Planning Aspects of the Speech Service in the GSM Public Land Mobile Network (PLMN) System. | | | | | | | |
| | A009 | 2 | B | B | CR to GSM 03.50 Allow use of artificial ear Type 3.2 for ME tests | 97-949 | approved | 4.3.0 |
| | A011 | R96 | D | D | CR to 03.50 Correction of wrong reference to ITU-T Recommendation | 97-949 | approved | 5.0.3 |
| 03.54 | High Speed Circuit Switched Data (HSCSD) - Stage 2 | | | | | | | |
| | A004 | R97 | D | D | Clarification on the MAP Dialogue | 97-920 | approved | 5.2.0 |
| | A005 | R97 | F | F | Correlation of ISUP messages | 97-920 | approved | 5.2.0 |
| | A006 | R97 | F | F | Dedicated services (BS4x or BS5x) should not be restricted to the non | 97-920 | approved | 5.2.0 |
| | A007 | R97 | F | F | RR parameters over the K-interface | 97-920 | approved | 5.2.0 |
| 03.60 | General Packet Radio Service (GPRS) Service description; Stage 2 | | | | | | | |
| | A011 | 1 | R97 | C | Idle mode and connected mode | 97-937 | approved | 5.2.0 |
| | A012 | 1 | R97 | C | SMS delivery path | 97-937 | approved | 5.2.0 |
| | A013 | 3 | R97 | D | Editorial changes on 03.60 | 97-937 | approved | 5.2.0 |
| | A014 | 5 | R97 | C | Editorial changes and clarifications on GSM 03.60 | 97-937 | approved | 5.2.0 |
| | A015 | 4 | R97 | C | MS purge for GPRS | 97-937 | approved | 5.2.0 |
| | A016 | 3 | R97 | C | Maximum N-PDU size | 97-937 | approved | 5.2.0 |
| | A017 | 4 | R97 | C | To align the anonymous PDP context activation with the non-anonymo | 97-937 | approved | 5.2.0 |
| | A018 | 5 | R97 | C | Routing area update procedure | 97-937 | approved | 5.2.0 |
| | A019 | 3 | R97 | C | Clarification of the routing area update procedure and cell identifier | 97-937 | approved | 5.2.0 |
| | A021 | 2 | R97 | B | TLLI reallocation | 97-937 | approved | 5.2.0 |
| | A022 | 3 | R97 | B | Additional PDP configuration options | 97-937 | approved | 5.2.0 |

| Spec | CR | rev | Phase | Cat | SUBJECT | TDoc | Status | NEW_VERS |
|--------------|--|-----|-------|-----|--|---------|-------------|----------|
| | A023 | 3 | R97 | F | GSN number and address | 97-937 | approved | 5.2.0 |
| | A024 | 4 | R97 | B | Access point name | 97-937 | approved | 5.2.0 |
| | A025 | 2 | R97 | C | More robust network-requested PDP context activation procedure | 97-937 | approved | 5.2.0 |
| | A026 | 1 | R97 | C | Addition of a reset indication message from the SGSN to the VLR | 97-937 | approved | 5.2.0 |
| | A028 | 5 | R97 | C | Handling of CS paging requests by the SGSN after a failure | 97-937 | approved | 5.2.0 |
| | A030 | 5 | R97 | C | QoS definitions | 97-937 | approved | 5.2.0 |
| | A031 | 2 | R97 | C | Alert and monitoring procedures at the MSC/VLR for class A and B | 97-937 | approved | 5.2.0 |
| | A032 | 1 | R97 | C | Further description of the network-requested context activation proced | 97-937 | approved | 5.2.0 |
| | A033 | | R97 | C | Detach indication from the SGSN to the VLR | 97-937 | approved | 5.2.0 |
| | A035 | 2 | R97 | C | No more combined (GPRS+non-GPRS) "Ready for SM" notification t | 97-937 | approved | 5.2.0 |
| 03.64 | Overall description of the GPRS radio interface; Stage 2 | | | | | | | |
| 'strategic' | A031 | 1 | R97 | C | Clarification on the use of hysteresis for cell re-selection | 97-985 | approved | 5.2.0 |
| 03.68 | Voice Group Call Service (VGCS) - Stage 2 | | | | | | | |
| | A011 | | R97 | B | Update of 03.68 to cover inter-MSC Voice group calls | 97-989 | approved | 5.4.0 |
| 03.69 | Voice Broadcast service (VBS) - Stage 2 | | | | | | | |
| | A010 | | R97 | B | Update of 03.69 to cover inter-MSC Voice Broadcast Calls | 97-989 | approved | 5.4.0 |
| 03.78 | CAMEL Phase 1 (stage 2) | | | | | | | |
| | A008 | 8 | R97 | B | Support of CAMEL phase 2 (stage2) | 97-909 | information | 6.0.0 |
| | A009 | 4 | R96 | D | Concentration of description of core call handling functions in 03.18, C | 97-913 | approved | 5.3.0 |
| | A011 | | R96 | F | Removal of CallingPartyNumber from Connect | 97-915 | approved | 5.3.0 |
| | A013 | | R96 | F | Removal of the CalledPartyNumber for MO calls from IDP | 97-915 | approved | 5.3.0 |
| | A014 | 1 | R96 | F | Use of the CallReference Number & GMSC address in SRI | 97-915 | approved | 5.3.0 |
| 03.79 | Support of Optimal Routing phase 1 (stage 2) | | | | | | | |
| | A004 | 3 | R96 | D | Concentration of description of core call handling functions in 03.18, C | 97-913 | approved | 5.2.0 |
| 03.81 | Line Identification Supplementary Services - Stage 2. | | | | | | | |
| | A004 | 3 | 2 | F | Handling of number parameters related to the line identification service | 97-1045 | approved | 4.7.0 |
| | A005 | 1 | R96 | A | Handling of number parameters related to the line identification service | 97-1045 | approved | 5.1.0 |
| 04.03 | Mobile Station - Base Station System (MS - BSS) Interface Channel Structures and Access Capabilities. | | | | | | | |
| 'strategic' | A005 | 2 | R97 | B | Introduction of GPRS | 97-946 | approved | 5.3.0 |
| 04.04 | Layer 1 - General Requirements. | | | | | | | |
| 'strategic' | A001 | 2 | R97 | B | Introduction of GPRS | 97-946 | approved | 5.1.0 |
| 04.07 | Mobile Radio Interface Signalling Layer 3 - General Aspects | | | | | | | |
| | A008 | 5 | R97 | B | Inclusion of GPRS | 97-988 | approved | 5.3.0 |