

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Nokia of America Corp., Ericsson Inc., AT&T Services, Inc., Cellco Partnership
d/b/a Verizon Wireless, Google LLC, and T-Mobile USA, Inc.,

Petitioners

v.

KT Corporation (Patent Owner) and Pegasus Wireless Innovation LLC (Exclusive
Licensee)

Patent Owner

Case No. IPR2025-00036

U.S. Patent 11,627,631

Ex. 1012 – DECLARATION OF CRAIG BISHOP

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I. INTRODUCTION

I, Craig Bishop, declare as follows:

1. I have been retained as an independent expert witness on behalf of Nokia of America Corp., Ericsson Inc., AT&T Services, Inc., Cellco Partnership d/b/a Verizon Wireless, Google LLC, and T-Mobile, USA, Inc., (to whom I will refer to as Petitioners) for this *inter partes* review proceeding (which I may refer to at times as an “IPR”).

2. I am being compensated for my work in this matter at my accustomed hourly rate. I am also being reimbursed for reasonable and customary expenses associated with my work and testimony in this investigation. My compensation is not contingent on the results of my study, the substance of my opinions, or the outcome of this matter.

3. In the preparation of this expert report I have reviewed the documents cited herein, each of which is a type of material that experts in my field would reasonably rely upon when forming their opinions, as well as all of the Appendices attached hereto.

4. In forming the opinions expressed within this expert report, I have considered:

- The appendices listed above; and

- My own academic background, knowledge, and professional experiences in the field of wireless communications.

5. Although I have attempted to organize the information presented in this report into helpful sections and/or divisions, my opinions are supported by the information in the report in its entirety.

II. QUALIFICATIONS

6. My complete qualifications and professional experience are described in my *curriculum vitae*, a copy of which is attached as **Appendix 1**. The following is a summary of my relevant qualifications and professional experience.

7. I earned my Bachelor of Electronic Engineering degree with Honors from Polytechnic of Central London in 1989. In 2006, I earned my MSC in Computer Science with Distinction from the University of Kent.

8. After graduating with my first degree, I worked as an operations engineer at the British Broadcasting Corporation (BBC) for 4 years, then as a civil servant at the UK Radiocommunications Agency until 1996, during which time I became involved in telecommunications standardization in the European Telecommunication Standards Institute (“ETSI”), working in particular in Technical Committee Radio Equipment and Systems (TC RES2) concerned with the standardization of Private Mobile Radio (PMR). From 1994 through 1996, I acted

as Rapporteur for voice and data related PMR standards ETS 300 113, ETS 300 219 and ETS 300 390. I participated as the only TC RES2 delegate on behalf of the UK Radiocommunications Agency, generating proposals in support of UK administration and business requirements, downloading and reviewing other meeting input documents, and proposing changes as necessary to ensure input documents and the resulting specifications were in line with said requirements.

9. In 1996, I joined Samsung Electronic Research Institute as a Senior Standards Engineer where I worked for 16 years, eventually becoming Director of Standards and Industry Affairs in 2011. My work at Samsung mainly focused on the standardization of Global System for Mobile Communications (GSM)/ General Packet Radio Service (GPRS), Universal Mobile Telecommunications System (UMTS), the IP Multimedia subsystem (IMS), and Long-Term Evolution (LTE)/ Evolved Packet System (EPS) systems. Initially, I participated in ETSI Special Mobile Group (SMG) committees SMG1, SMG2, SMG4, SMG5, and SMG9, and relevant UMTS related sub-committees working on the air interface radio access network protocols, service, and terminal aspects of UMTS and GSM/GPRS until 1999. In particular, I was a participant in the ETSI SMG2 meetings leading up to selection of Wideband Code Division Multiple Access (WCDMA) as the radio access technology for the Frequency Division Duplex (FDD) mode of UMTS.

10. Beginning in 1998, I worked as a Principal Standards Engineer on the 3rd Generation Partnership Project (3GPP) on UMTS. I attended the inaugural 3GPP Technical Specification Group (TSG) meetings held in December 1998, and I began attending Working Group (WG) meetings in 1999. Specifically, I was a regular participant in Radio Access Network (RAN) WG1, Services & System Aspects (SA) WG1, Terminals (T) WG2, but I also attended TSG RAN and T plenary meetings and sometimes other Working Groups and covering similar technical aspects as in my previous work in ETSI. As an example, RAN WG2 was, and is, a Working Group responsible for the specification of layer 2 and layer 3 Radio Resource, protocols for the UE. As part of this work, I would prepare meeting contributions in support of Samsung's research and development activities. Also, by way of preparation for each meeting, I would download all contributions and review those of interest to Samsung, and where necessary, prepare additional input to the meeting based on said review.

11. Beginning in 2000, I acted as project manager and then as system engineering manager at Samsung, providing technical requirements for the team working on Samsung's UMTS modem development. This involved scrutiny of ongoing standardization work, particularly in RAN WG1, RAN WG2, and TSG Core Network (CN) WG1, from which I would download, and assess the impact of,

contributions on Samsung's development projects, ensuring that Samsung's development team was kept informed about the latest developments as layers 2 and 3 of the UMTS standard were stabilized.

12. During this period, in addition to authoring and presenting technical contributions for the 3GPP standard, and producing technical requirements for the radio modem, I acted as Rapporteur for 3GPP Technical Reports covering User Equipment ("UE") capability requirements (3GPP TR 21.904) from 1999–2000, and the Evolution of the 3GPP System (3GPP TR 21.902) in 2003 (the first Study Item to consider the 3GPP system beyond UMTS towards LTE/EPS).

13. In 2005, I became Head of Advanced Technologies, Standards, and Regulation (ATSR) at Samsung. In addition to my managerial duties which included responsibility for standards, research, and regulatory engineers—including three standards engineers who were regularly attending 3GPP RAN WG2 and Core Network and Terminals (CT) WG1 Working Groups—I personally continued to work on 3GPP standardization issues. From 2005 until 2008, I regularly attended and participated in SA WG2 meetings, mainly focusing on IP Multimedia Subsystem (IMS) including voice over IMS but also looking at wider Evolved Packet System (EPS) related issues. From 2008 until 2011, I regularly attended and participated in SA WG1 meetings. I also attended SA plenary meetings from 2008 until I left

Samsung in 2013. As well as generating contributions in support of Samsung's research and development as preparation for each meeting, I would download and review documents from other 3GPP members, identifying those of interest to Samsung and, where necessary, preparing additional contributions on behalf of Samsung. The work required a sound working knowledge of the broader 3GPP system to ensure effective management of the ATSR team, effective participation in meeting discussions, expert assessment of third-party standards contributions, and provision of implementation guidance to Samsung developers.

14. From 2005 until I stopped attending SA WG1 meetings in 2011, I authored and presented over 100 contributions to SA WG2 and SA WG1 meetings at 3GPP and appeared as an author/co-author on 18 patent applications related to User Equipment operation in the IMS and the 3GPP Core Network.

15. In 2011, I became Director of Standards and Industry Affairs at Samsung, and in November of that year I was elected to the Board of ETSI on which I served for a term of 3 years until November 2014. In this position I gained further perspective on the organisation, management, and activities of ETSI and its Technical Committees and Partnership Projects including 3GPP.

16. Since leaving Samsung in January 2013, I have formed my own consulting company which is a member of ETSI, and as part of various projects

undertaken, I have continued to regularly access the ETSI and 3GPP document servers, and to keep abreast of ETSI and 3GPP document handling and publication practices.

17. Through my extensive work in ETSI and on 3GPP standardization issues over the years, I have become very familiar with ETSI and 3GPP practices for when and how the technical standards (including revisions thereto) and other standards-related contributions are made publicly available, including in the 1999–2012 timeframe when I was attending or monitoring various 3GPP Working Groups, including RAN WG1 and RAN WG2, and since 2013 in support of my work as an independent standardisation consultant.

18. For purposes of my analysis in this declaration, I have been informed that a person of ordinary skill in the art (“POSITA”) would have been a person with knowledge of the relevant 3GPP standards at the time. That person would have had at least a Bachelor of Science degree in electrical engineering, computer engineering, or related discipline and had at least two years of experience in a field involving wireless communications.

III. PUBLIC AVAILABILITY OF 3GPP STANDARDS PROPOSALS AND OTHER DOCUMENTS

19. Based on my years of experience working in various capacities in 3GPP and on 3GPP standards issues, I am familiar with the regular business practices of

the 3rd Generation Partnership Project (3GPP) relating to technical documents including specifications, draft standards and proposals, and standards-related technical contributions, as well as the business practices through which 3GPP makes these documents public.

A. Prominence and Purpose of 3GPP

20. 3GPP was inaugurated in December 1998 to produce Technical Specifications and Technical Reports for the Universal Mobile Telecommunications System (UMTS), a 3G Mobile System based on evolved GSM core networks and a new radio access network known as UTRA (UMTS Terrestrial Radio Access). **Appendix 2** at 2, 3 (“[3GPP] Partnership Project Description”); **Appendix 3** at 1; **Appendix 4** at 5. At that time, various standards organisations agreed to cooperate to produce a “complete set of globally applicable Technical Specifications” that would then be transposed into standards by the relevant standardization bodies (also known as Organizational Partners). **Appendix 2** at 3, 5 (“[3GPP] Partnership Project Description”). 3GPP “attracted a very strong commitment from organisations and companies around the world, reflecting the truly global nature of the project.” **Appendix 4** at 7.

21. 3GPP is a global initiative partnership made up of Organizational Partners, Market Representation Partners, and Individual Members. **Appendix 5** at

8, 9; **Appendix 2** at 10. Today, 3GPP unites seven telecommunications standard development organisations (“Organizational Partners”) from around the world: the Association of Radio Industries and Businesses (ARIB) and the Telecommunication Technology Committee (TTC) from Japan, the China Communications Standards Association (CCSA) from China, the Telecommunications Standards Development Society, India (TSDSI) from India, the Telecommunications Technology Association (TTA) from Korea, the European Telecommunications Standards Institute (ETSI), and the Alliance for Telecommunications Industry Solutions (ATIS) from the United States. These Organizational Partners are regional standards organisations that have the authority to define, publish, and set standards for their respective regions. **Appendix 2** at 12. 3GPP also includes “Market Representation Partners” that represent various industry perspectives and offer market advice. **Appendix 5** at 9 (3GPP Working Procedures, “Market Representation Partnership”); **Appendix 2** at 14; **Appendix 4** at 5. Additionally, 3GPP includes individual member companies (“Individual Members”) that participate in 3GPP through their membership in a 3GPP Organizational Partner. **Appendix 5** at 9 (3GPP Working Procedures, “Individual Membership”); **Appendix 6** at 5 (textbook including a chart showing 3GPP structure at the time of publication); **Appendix 8** at 9. As an example of how prominent 3GPP was (and remains) in the industry, there

were 583 participating Individual Members in 2017. **Appendix 7** at 9 (3GPP Project Coordination Group document showing 3GPP membership numbers to 2018). There were 835 individual members as of August 2024. **Appendix 9**.

22. As noted in paragraph 20, a primary goal of 3GPP is to provide an environment to produce Technical Specifications and Technical Reports that define and standardize technologies covering cellular telecommunications networks, including User Equipment or Mobile Device (UE) technologies, Radio Access Network (RAN) technologies, Core Network (CN) technologies, and service and system capabilities such as work on codecs, security, and quality of service. The specifications also provide hooks for interworking with non-3GPP networks including, but not limited to, Wi-Fi networks. **Appendix 2** at 32–40; **Appendix 3** at 2.

23. Given the prominence of 3GPP in the wireless communication industry, beginning in 1999 and continuing through today, interested POSITAs were tracking the developments of the latest 3GPP specifications and reports to ensure timely development of products and services by their companies that were consistent with the standards being developed. In other words, it is my opinion that a POSITA would have to be familiar with 3GPP and with the specification-related documents produced as part of the 3GPP process in order to properly perform his or her job.

Without access to and knowledge of the 3GPP documentation, including, for example, the substantive contents of 3GPP technical specifications, an engineer could not develop products that were interoperable with the worldwide 3G, 4G, and 5G standards. Because 3GPP documents were an important aspect of a POSITA's professional experience, textbooks and articles about cellular communications commonly directed readers to the 3GPP website for information regarding standards development. **Appendix 4** at 9 (directing readers to the 3GPP website at the conclusion of the chapter on the success of 3GPP in the standards development process). As a POSITA myself, I would regularly visit the 3GPP website for the latest developments in mobile communications standards setting and refer colleagues involved in the development of such devices to the 3GPP website as a valuable reference.

24. My personal experience at Samsung confirms 3GPP's prominence in the wireless industry. For example, engineers and managers at Samsung who were responsible for implementing 3GPP compliant modem software (and who were not attending 3GPP meetings or involved with development of the 3GPP standard in any direct way) would often enquire as to which version of a given 3GPP specification they should be developing. Further, between 2000 and 2004, part of my role at Samsung involved advising software engineers implementing the 3GPP standard on

the correct interpretation of the specifications and ensuring that they were made aware of any changes and proposals made during the 3GPP standards development process that would impact their work. I also for a time maintained an internal company database that tracked 3GPP-approved changes to help the software engineers at Samsung implementing the 3GPP standard more readily stay informed as to changes that would impact their work. The database also included links to relevant 3GPP documents so that engineers could access the documents directly. In short, the technical output of 3GPP was, and continues to be, well known at 3GPP member companies, even by engineers who were not directly involved with designing the 3GPP system or contributing to the 3GPP standard process.

B. 3GPP's Policy of Making Documents Public

25. 3GPP's policy was to make 3GPP documents available to the public, including to interested POSITAs. The free availability of 3GPP documents to any interested member of the public was widely recognized in the industry. As an example of the prominence of 3GPP and its place in the wireless standards industry, I note that textbooks directed readers to the 3GPP website for information about relevant standards. For example, **Appendix 6** at 6, 9 (“The latest specifications can be obtained from 3GPP [9]”, “[9] <http://www.3GPP.org>”); **Appendix 8** at 10 (“3GPP TSs and TRs are publicly available at the 3GPP web site at either of the

following URIs: <http://www.3gpp.org/specs/specs.htm> [or] <http://www.3gpp.org/ftp/Specs/archive/>). Because the purpose of 3GPP is the worldwide adoption of a common standard, no restrictions on distribution or discussion have ever been placed on 3GPP documents. **Appendix 10** at 8 (“No password is needed to access any information on the 3GPP Web site, all information is openly published”).

C. 3GPP Structure and Standards Development Process

26. Within 3GPP, responsibility for producing specifications was delegated to the Technical Specification Groups (TSGs). **Appendix 5** at 10, 13 (3GPP Working Procedures, “TSG tasks”). At its inception, 3GPP was divided into four Technical Specification Groups (TSGs), each covering a particular category of technology. **Appendix 2** at 31 (3GPP Partnership Project Description); **Appendix 6** at 5, 6 (textbook listing four TSGs and noting the subsequent addition of a fifth TSG); **Appendix 4** at 6, 11, 12. Each TSG is further divided into a number of Working Groups (WGs). **Appendix 8** at 8, 9; **Appendix 4** at 6; *see also* **Appendix 5** at 13 (3GPP Working Procedures). Two of the TSGs from 1999 are still in existence in 2024: TSG Radio Access Networks (RAN) and TSG Service & Systems Aspects (SA). The activities of two other TSGs, TSG Core Networks (CN) and TSG Terminals (T), were amalgamated under Core Network and Terminals (CT)

following the closure of TSG T in 2005, with responsibility for terminal test specifications being moved to a RAN working group (RAN WG5). The fifth TSG, GSM EDGE Radio Access Networks (GERAN), was responsible for evolution of the GSM radio technology from 2000 until that TSG closed in 2016 and its work was transferred to a RAN working group (RAN WG6) which was itself closed in July 2020.

27. The TSGs held quarterly plenary meetings where members' contributions, draft specifications/reports, and other documents that had been agreed upon by the Working Groups were presented for discussion and approval. **Appendix 5** at 23 (3GPP Working Procedures, "Deliverable types," stating that Technical Specifications and Technical Reports are "drawn up by the TSGs" and are approved by TSGs); **Appendix 8** at 9 ("3GPP Deliverables"). Once a Technical Specification was, or Change Requests creating a new version of a Technical Specification were, formally approved by TSG plenary, the latest version of said Technical Specification would be created by the Mobile Competence Centre (MCC) and uploaded to the file server. **Appendix 10** at 6, 7; **Appendix 11** at 1. In that way, the conclusion of 3GPP TSG plenary meetings serves as notice that new versions of specifications incorporating Change Requests approved by the TSG meeting will shortly be made available on the public 3GPP server.

28. As part of the standards development process, delegates could submit contributions on behalf of the Individual Members. Members had an incentive to stay updated on 3GPP developments because those members usually wanted to contribute to the standard and make suggestions as to what technology and/or features should (or should not) be included. Delegates also attended 3GPP meetings to keep their employers abreast of developments related to the standards that would ultimately apply to those members and the products those members (*e.g.*, companies) produced. 3GPP members around the world, and the interested POSITAs employed by them, would have been motivated to stay up to date regarding 3GPP technology evolution to ensure their research and development programmes remained relevant to the systems being specified and that their products were compliant with the published 3GPP specifications. In light of this need to follow the standards development process, delegates often distributed 3GPP-related documents far beyond the attendees at 3GPP meetings. This was certainly my experience at Samsung.

D. 3GPP Documents

1. Technical Specifications and Reports

29. The Technical Specifications and Reports developed by 3GPP were, and still are, driven by the technical contributions of 3GPP members. As part of that

development process, various types of documents were produced. The 3GPP process involved the consideration of temporary documents (“TDocs,” also referred to as “contributions”), many of which constituted technical proposals for how the system should be implemented and some of which were adopted as the basis for parts of the Technical Specifications.

30. As I noted in paragraphs 20 and 22, a primary purpose of 3GPP is to prepare, approve, and maintain globally applicable Technical Specifications and Technical Reports. **Appendix 5** at 7 (3GPP Working Procedures, “Purpose”). A “Technical Specification” as defined by 3GPP is “[a] 3GPP output document containing normative provisions approved by a Technical Specification Group.” **Appendix 5** at 28. 3GPP would (and still does) periodically freeze a complete set of standards (referred to as a “Release”), and each set would include some new specifications. **Appendix 10** at 6. 3GPP would also make publicly available draft specifications that would usually be included as part of the next Release once approved.

31. It was widely known that Technical Specifications (and Technical Reports) were publicly available on 3GPP’s website. It was also well known that the latest version of a given specification that was under change control would be made available following each TSG Plenary meeting responsible for that specification, and

that TSG Plenary meetings usually occur four times per year. **Appendix 10** at 6, 7; **Appendix 11** at 1.

32. Latest and previous versions of Technical Specifications could be easily accessed from the 3GPP website. The specifications page provided direct links to the specifications area in the 3GPP website's file repository. **Appendix 11** at 1. In the 2017 timeframe, the specifications page listed the specifications by the date of the approval of the latest versions reflecting the TSG plenary meeting date. *E.g.*, **Appendix 11** at 1.

33. Additionally, the 3GPP specifications followed a clear numbering scheme to help the public, including interested POSITAs, identify the subject matter of each specification. **Appendix 12** at 1. As described on the 3GPP Numbering Scheme webpage, all 3G and GSM specifications had a specification number of 4 or 5 digits, where the first two digits defined the series. **Appendix 12** at 1. The Numbering Scheme webpage included a table showing the subject matter corresponding to each series. **Appendix 12** at 1. For example, the "38 series" focused on "Radio technology beyond LTE" aspects (*i.e.*, 5G NR). **Appendix 12** at 1. An interested POSITA could narrow down the relevant specifications based on whether the specification applied to only 5G NR, evolved UTRA (*i.e.*, 4G or LTE), 3G, GSM, or to GSM, 3G and evolved UTRA (GSM-only specifications were

transferred from ETSI to 3GPP in July 2000). **Appendix 12** at 1. For a specification in the 21–35 series, this could be determined based on the third digit of the specification number, where a “0” indicates that the specification applies to both systems. Specifications outside the 21–38 series in 2017 – 2016 applied only to GSM systems. **Appendix 12** at 1.

34. The specifications were stored on the 3GPP website’s file repository as zipped files, where the filenames followed the structure: SM[-P[-Q]]-V.zip. This format corresponded to the numbering scheme discussed in paragraph 33. **Appendix 12** at 2. “S” represented the series number; “M” represented the mantissa (the part after the series number); “P” represented an optional part number; “Q” represented an optional sub-part number; and “V” represented the version number (without the separating dots). **Appendix 12** at 2.

35. The Working Groups would create incremental versions of the draft specifications (*e.g.*, V0.2.1, V1.0.0, V1.1.0, etc.). These versions were made available on the 3GPP website’s file repository which is accessible from the 3GPP specifications page. The version numbering scheme for Technical Specifications and Technical Reports was standardized by 3GPP. The version number included three fields: the major version field, the technical version field, and the editorial version field. **Appendix 13** at 3. The major version field reflects the stage of the

specification, with “0” representing an immature draft and a value of “3” or greater representing a specification that has been approved by the relevant TSG and thus placed under change control. **Appendix 13** at 3. The technical version field begins at zero and is incremented every time a technical change is made to the specification (either as part of the drafting process or as part of an approved change request). **Appendix 13** at 3. The editorial version field begins at zero and is incremented each time a non-technical change is made to the specification (*e.g.*, to fix a typographical or formatting issue). **Appendix 13** at 3.

36. I understand that the alleged invention in the ’631 patent relates to cellular telecommunications networks, and more particularly mobility across Registration Areas in a wireless communications system. Any POSITA interested in such mobility would have been monitoring 3GPP’s activities in this area and would probably have been already participating as a full or associate member or observer in the standard development process, or would have at least known that information regarding the proposed revisions to the technical specifications under discussion were available through 3GPP.

2. 3GPP TDocs

37. As mentioned in paragraph 29, the technical specifications and reports developed by 3GPP were and are driven by the technical contributions of 3GPP

member companies. As part of that development process, various types of documents were produced and submitted. Relevant to this case, the 3GPP process involved the consideration of temporary documents or “TDocs,” which are also referred to as proposals, contributions, or change requests. The agreement of proposals submitted as TDocs results in the production of technical specifications.

38. Prior to each Working Group meeting, members of the Working Group would prepare TDocs to identify, discuss, and/or propose a new feature or change(s) to an existing feature or to identify a technical issue for discussion. Interested POSITAs would have known that TDocs could be a helpful source of technical information regarding the 3GPP specifications.

39. Each TDoc was assigned a TDoc number, according to a standard format set by 3GPP.¹ As described in the 3GPP Working Procedures, the numbering system followed the format xminnnzzzz. **Appendix 5** at 19. This general naming convention has been in use since at least 1999 with only minor variations. Within that format, “x” referred to the relevant TSG. **Appendix 5** at 20. For example, “R” was used for TSG RAN. **Appendix 5** at 20. Likewise, “m” referred to the relevant Working Group. **Appendix 5** at 20. A document for RAN WG2 would therefore

¹ Documents other than technical contributions (such as meeting reports) were also assigned TDoc numbers for ease of reference.

begin with “R2.” **Appendix 5** at 20. The “i” is normally a hyphen character but may take on other values depending on the meeting to which the Tdoc is submitted. The two digits “nn” represented the year (*e.g.*, 17), and the digits “zzzz” represented the unique document number. **Appendix 5** at 20. This document number was used as the TDoc’s filename. **Appendix 5** at 20.

40. Each TDoc would include in its header the meeting at which the contributor intended the TDoc to be discussed. Most TDocs were uploaded to the 3GPP website for public viewing prior to the relevant Working Group meeting listed on the TDoc, although some TDocs, including those created at meetings, were uploaded during or after the meeting. **Appendix 10** at 8. The documents were uploaded to the public file repository in an area allocated to the particular Working Group, *e.g.*, **Appendix 14** at 2 (RAN WG3 homepage with link to WG3’s “Meeting documents”). Immediately upon upload, any member of the public could download and access the TDocs and other documents offered for discussion. This process has been in place since I began attending Working Group meetings in 1999.

E. The 3GPP Website’s Public File Repository

41. All TDocs, Technical Reports, and Technical Specifications were also freely available to interested members of the public through the public file repository accessible via the 3GPP website. Interested members of the public would have been

well aware of 3GPP and of the 3GPP website. 3GPP documents were accessible to any member of the public through the 3GPP website without providing any login credentials or other exclusive access criteria. **Appendix 10** at 8.

42. Any interested member of the public could locate relevant documents of interest on the 3GPP website using reasonable diligence based on the website's indexing scheme or the TDoc's naming convention. The documents on the 3GPP website were (and remain) organized according to the relevant Working Groups within 3GPP (each of which focused on particular subject matter) and then further organized based on the meetings of those groups. The Technical Specifications and Reports were (and remain) organized according to their subject matter as indicated by their series number and version. POSITAs would have known which Working Groups focused on particular subject matter.

43. An interested member of the public could locate documents of interest by first navigating a web browser to the 3GPP website (www.3gpp.org). In the 2016 - 2017 timeframe, to locate documents from the 3GPP home page, a user could have clicked "Specification Groups" **Appendix 15**. The corresponding webpages contained links to the 3GPP's public file repository (*e.g.*, through the "Meeting documents" link of a Working Group page). **Appendix 14**. To locate specifications, a user could have clicked "Specifications" and followed links as described in section

III.D.1 above. Instead of accessing the 3GPP file repository from the 3GPP website home page, a user could have also accessed the file repository through the web address www.3gpp.org/ftp or directly using ftp client software connected to [ftp.3gpp.org](ftp://ftp.3gpp.org). A POSITA was also able to search for relevant documents using keywords on the search facility on the 3GPP website from at least 2000, and from at least 2015 using the 3GPP search portal (<https://portal.3gpp.org/#/>), where an interested person could search for documents by title and source, among other things.

44. The top two levels of indexing within the file repository were based wholly on subject matter, as reflected by the division of subject matter among the various TSGs and Working Groups, or into various Specifications. Specifically, an individual could select the relevant TSG (or specification series) covering the subject matter of interest. **Appendix 16.**

45. For example, if the individual were interested in the radio access aspects of 3GPP, they would click “tsg_ran.” From there, the individual would click on the particular RAN Working Group covering the subject matter of interest. **Appendix 17.**

46. Then, if the individual were interested in the Radio Access Network Architecture and Interfaces, the individual would know to choose the folder for WG3. **Appendix 17.** Once a user is in the relevant Working Group folder (RAN

WG3 in this example), an individual would see a list of all meetings held by RAN WG3. **Appendix 18.**

47. As shown in **Appendix 18**, a folder existed for each meeting. For example, “TSGR3_97” corresponded to TSG RAN WG3 meeting #97 held in August 2017.

48. A POSITA would know which meeting(s) would have covered particular subject matter based on the working groups area of responsibility (*e.g.*, for RAN WG3 - **Appendix 14**), and from publicly available meeting agendas available via the meeting directory by following the “Agenda” link. **Appendix 19.** Many POSITAs received notification a draft copy of the meeting agenda via the 3GPP Working Group email reflector list directly to their inbox prior to the meeting. **Appendix 20.** Further, an individual could ascertain what subject matter was addressed at each meeting by reviewing the report issued after each meeting, linked in the meeting directory. **Appendix 19.**

49. In my experience, whilst the servers used for 3GPP file repository and many of its directories have been updated since 1999, and directories may as a result have later dates associated with them (*e.g.*, reflecting the last time they were modified in some way or their contents were updated), the original upload date for files including specifications has always been preserved, providing a true and

accurate indication of their earliest availability for download.

50. Once an individual navigated to the desired meeting folder, for example “TSGR3_97” the individual could then select the “Docs” folder to view the documents associated with that meeting. **Appendix 19, Appendix 21.** The documents within this folder were listed by TDoc number, and interested members of the public would have known to review the meeting report for each meeting to confirm which topics were discussed at that meeting. *E.g.*, **Appendix 22.**

51. Many TDocs were uploaded to the public file server for public viewing prior to the relevant meeting (although some TDocs, particularly those created during meetings, were uploaded during or soon after the meetings). **Appendix 10** at 8. Throughout and since my participation in 3GPP, it has been recommended that delegates attending a meeting download the relevant set of documents from the 3GPP file repository onto their personal computers prior to each meeting. **Appendix 10** at 7. Given that any interested member of the public could and was likely to subscribe to the Working Group email reflector, it would also have been simple to locate the location of relevant TDocs on the 3GPP server based on the information sent out over said email reflector.

52. 3GPP’s public file repository provides a reliable mechanism for identifying the date and time a document was uploaded to the website and then

available to download for public viewing. When a document is uploaded, the file server automatically assigns the document a time stamp—*i.e.*, an accurate and automatically computer-generated electronic record of when the document was uploaded—as part of the regular business practices of 3GPP. **Appendix 10** at 8 (3GPP FAQs). This has been the practice regarding uploading documents to the 3GPP file repository since 3GPP was inaugurated, and my personal experience confirms that the time stamps have always been a reliable way to determine when a file was uploaded to the 3GPP website and immediately available for public download.

53. Following each 3GPP meeting, the secretary would often distribute the meeting minutes via the corresponding email list with a request for comments. *E.g.*, **Appendix 36**. Said email would effectively therefore inform subscribers that the meeting had taken place, would inform subscribers of the documents that had been treated (or not), and in the event that the meeting was a TSG plenary meeting, serve as notice that new versions of specifications incorporating Change Requests approved by the TSG meeting, would shortly be made available on the 3GPP public server. Further, an interested member of the public following a certain topic would have known to check said report for related contributions.

IV. 3GPP EXHIBITS

A. Ex-1011: 3GPP Tdoc R3-173152: "Xn based mobility across RA", 3GPP TSG RAN WG3 #97

54. R3-173152 is a technical contribution submitted to the 3GPP TSG RAN WG3, meeting #97 which was held between August 21 - 25, 2017. It follows the general naming format ("xminnnzzzz") described in paragraph 39. Accordingly, "R3" indicates that the contribution was submitted to RAN WG3, "17" indicates the year (2017) that this technical contribution was submitted, and "3152" is the unique number that was assigned to this contribution document. It is titled "Xn based mobility across RA".

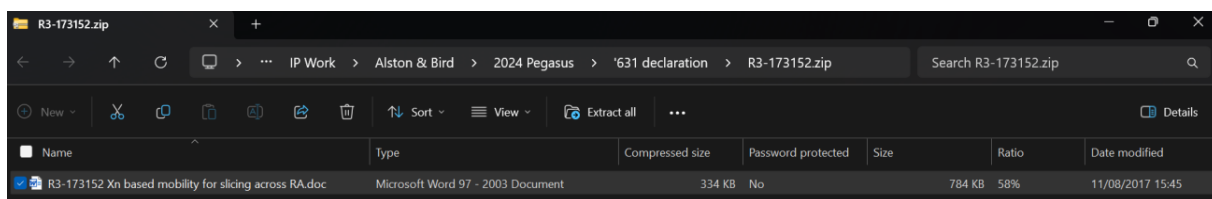
55. As I mention in paragraph 41 above, it has always been, and was in the 2017 timeframe, standard practice to make 3GPP meeting documents publicly available on the 3GPP public file server from where an interested member of the public exercising reasonable diligence could freely access them. To confirm the availability of R3-173152 on the 3GPP document server in the 2017 timeframe, I navigated to the 3GPP website at <http://www.3gpp.org>, selected "3GPP Groups" from the drop down menu, and then selected the "RAN3 – UTRAN/E-UTRAN/NG-RAN Architecture and Related Network Interfaces" from the 3GPP Groups page, and the "Meeting documents" link to access the public file server where documents for the TSG-RAN Working Group 3 are stored, and from where I navigated to the documents for RAN WG3 #97. A true and correct copy of the relevant portion of the

Documents directory listing produced by the file server website is provided below

and in **Appendix 21** at 15.

 R3-173151.zip	2017/08/11 23:57	32,6 KB
 R3-173152.zip	2017/08/11 14:03	333,4 KB
 R3-173153.zip	2017/08/11 14:03	111,3 KB

56. The Docs directory index stated that R3-173152 was uploaded on “2017/08/11. I selected the link for “R3-173152.zip” and downloaded a ZIP file of the same name. The ZIP file contained a Microsoft Word document, “R3-173152 Xn base mobility for slicing across RA.docx,” with a date stamp of “11/08/2017” (European date format) the same day that the ZIP file was uploaded.



57. A true and correct copy of the document within the ZIP file (R3-173152.doc) is provided as Ex-1011. Based on my experience, I understand that these date stamps mean that R3-173152.zip was uploaded to 3GPP’s publicly available website on August 11, 2017, prior to the RAN WG3 #97 meeting, and that any member of the public could have downloaded the ZIP file, extracted the Power Point document enclosed, and viewed the contents of said document without

restriction on August 11, 2017 and thereafter. The draft report from RAN WG3 #97 confirms the availability of R3-173152 at the meeting (**Appendix 22** at 20). I have no reason to believe that either the date stamp or the report from RAN WG3 #97 are inaccurate. I have therefore determined that R3-173152 was publicly available on the file server no later than August 11, 2017.

58. Based on the information above, it is my opinion that R3-173152, titled “Xn based mobility across RA” and provided as Ex-1011, was publicly available to download from the 3GPP file server no later than August 11, 2017 and could have been distributed thereafter without restriction. Further, it was publicly available at the 3GPP TSG RAN WG3 #97 meeting held August 21 – 25, 2017.

B. Ex-1013: 3GPP TR 38.801 v0.4.0: “3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Study on New Radio Access Technology; Radio Access Architecture and Interfaces (Release 14)”

59. 3GPP TR 38.801 v0.4.0 is a draft Technical Report titled “3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Study on New Radio Access Technology; Radio Access Architecture and Interfaces (Release 14).

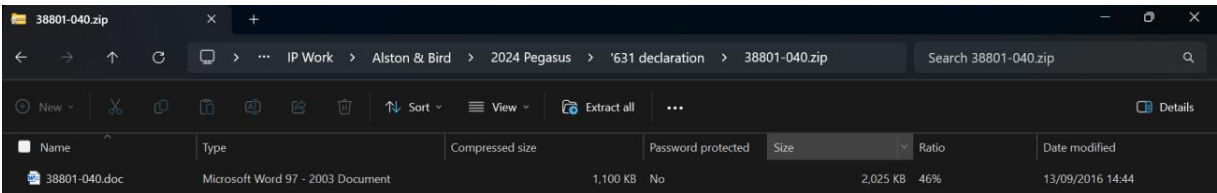
60. The date on the face of the report (“2016-08”) corresponds to the year (2016) and month (August) that this draft version of the report was agreed by 3GPP TSG RAN WG3 and subsequently made publicly available.

61. 3GPP TR 38.801 v0.4.0 being a draft Technical Report on the study of the radio access architecture and interfaces for New Radio, was agreed in Tdoc R3-161962 following TSG RAN WG3 #93 held August 22-26, 2016. The creation of the draft TR 38.801 v0.4.0 is confirmed in section 10.1.1 of the draft meeting report from TSG RAN3 #93 (**Appendix 23** at 29).

62. The 3GPP file server is and always has been open to all and free from restriction such as username or password. By way of example of how an interested member of the public could access the TR 38.801 v0.4.0 technical report from the 3GPP website, I accessed the file server by going to the 3GPP website at <http://www.3gpp.org/>, selected “Specifications & Technologies” from the menu bar, and then selected “Specifications by series” from the dropdown menu. I then selected the “38 Series” link to access the public file server where the specifications are stored. I then searched for “38.801” in the specification number search bar, and for the TR 38.801 report selected the eyeglasses icon that says “See details” when a cursor is placed on it. From there, I selected “Click to see all versions of this specification,” which took me to the archive housing all versions of TR 38.801 found at the following URL: https://www.3gpp.org/ftp/Specs/archive/38_series/38.801. A true and correct copy of the relevant portion of the directory listing produced by the file server website is provided below and in **Appendix 24** at 1.

	38801-030.zip	2016/09/13 12:42	561,7 KB
	38801-040.zip	2016/09/13 12:44	1099,4 KB
	38801-050.zip	2016/12/08 10:18	1726,9 KB

63. The archive directory index stated that TR 38.801 v0.4.0 was uploaded on “2016/09/13”. Selecting the link for “38801-040.zip”, I downloaded a zip file of the same name. The zip file contained a Microsoft Word document titled “38801-040.doc” with a date stamp of “13/09/2016” (European date format). An excerpt of the zip file directory is provided below.



Name	Type	Compressed size	Password protected	Size	Ratio	Date modified
38801-040.doc	Microsoft Word 97 - 2003 Document	1,100 KB	No	2,025 KB	46%	13/09/2016 14:44

64. I have confirmed that the document “38801-040.doc” is TR 38.801 v0.4.0. A true and correct copy of the Microsoft Word document titled “38801-040.doc” is the TR 38.801 v0.4.0 that is provided in Ex-1013.

65. In addition, as mentioned in paragraph 61 above, TR 38.801 v0.4.0 was agreed in R3-161962 following the RAN WG3 #93 meeting. As **such**, it was also made publicly available as a Tdoc in the RAN3 #93 documents directory and distributed via email to the RAN WG3 email reflector on September 7, 2016.

Appendix 25 at 13, **Appendix 26.**

 R3-161961.zip	2016/08/26 23:05	12,1 KB
 R3-161962.zip	2016/09/07 13:36	1115,5 KB
 R3-161966.zip	2016/08/26 23:05	416,7 KB

66. Based on my experience, I understand these date stamps to mean that 38.801-040.zip was uploaded to 3GPP's publicly available website on September 13, 2016, and that an interested member of the public could have downloaded the zip file, extracted the Word document enclosed, viewed the contents of the Word document, and further disseminated said document without restriction on September 13, 2016 and thereafter.

C. Ex-1024: 3GPP TS 36.300 v13.4.0 (2016-06) 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Overall description; Stage 2 (Release 13)

67. 3GPP TS 36.300 v13.4.0 is a Technical Specification titled "3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Overall description; Stage 2 (Release 13)".

68. The date on the face of the specification ("2016-06") corresponds to the year (2016) and month (June) that this version of the specification was approved by 3GPP TSG RAN and subsequently made publicly available.

69. 3GPP TS 36.300 v13.4.0 being an approved version of the Release 13

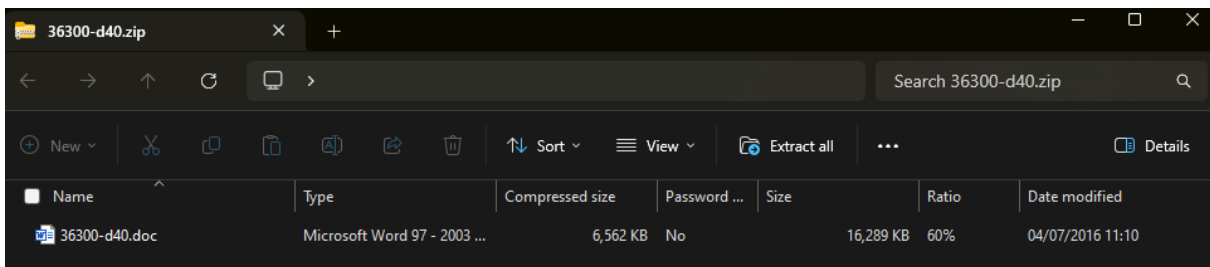
E-UTRAN overall description stage 2, was approved by TSG RAN #72 held June 13 – 16, 2016. An interested member of the public would know that the latest version of an approved specification or report would be available following the plenary meeting responsible for that specification (in this case TSG RAN) in accordance with 3GPP standard practice as described in paragraphs 31. The approval of the TS 36.300 v13.4.0 is confirmed by the approval of the Change Requests to TS 36.300 v13.3.0 documented in the TDoc list of the meeting report from TSG RAN #72 (**Appendix 27**, CRs_RAN_72 tab, indices 597 – 617 excepting 603).

70. The 3GPP file server is and always has been open to all and free from restriction such as username or password. By way of example of how an interested member of the public could access the TS 36.300 v13.4.0 technical specification from the 3GPP website, I accessed the file server by going to the 3GPP website at <http://www.3gpp.org/>, selected “Specifications & Technologies” from the menu bar, and then selected “Specifications by series” from the dropdown menu. I then selected the “36 Series” link to access the public file server where the specifications are stored. I then searched for “36.300” in the specification number search bar, and for the TS 36.300 specification selected the eyeglasses icon that says “See details” when a cursor is placed on it. From there, I selected “Click to see all versions of this specification,” which took me to the archive housing all versions of TS 36.300 found

at the following URL: https://www.3gpp.org/ftp/Specs/archive/36_series/36.300. A true and correct copy of the relevant portion of the directory listing produced by the file server website is provided below and in **Appendix 28** at 3.

 36300-d30.zip	2016/04/01 16:12	6428,3 KB
 36300-d40.zip	2016/07/07 9:30	6562 KB
 36300-d50.zip	2016/09/29 7:48	6687,3 KB

71. The archive directory index stated that TS 36.300 v13.4.0 was uploaded on “2016/07/07”. Selecting the link for “36300-d40.zip”, I downloaded a zip file of the same name. The zip file contained a Microsoft Word document with the filename “36300-d40” and having date stamps of “04/07/2016” (European date format). An excerpt of the zip file directory is provided below.



Name	Type	Compressed size	Password ...	Size	Ratio	Date modified
36300-d40.doc	Microsoft Word 97 - 2003 ...	6,562 KB	No	16,289 KB	60%	04/07/2016 11:10

72. I have confirmed that the Word document with the filename “36300-d40” is TS 36.300 v13.4.0. A true and correct copy of the compiled Microsoft Word documents with the filename “36300-d40” is the TS 36.300 v13.4.0 that is provided in Ex-1024.

73. Based on my experience, I understand these date stamps to mean that 36300-d40.zip was uploaded to 3GPP's publicly available website on July 7, 2016, and that an interested member of the public could have downloaded the zip file, extracted the Word document enclosed, viewed the contents of the Word document, and further disseminated said document without restriction on July 7, 2016 and thereafter.

D. Ex-1018: 3GPP TR 21.905 v13.1.0 (2016-06) 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP Specifications (Release 13)

74. 3GPP TR 21.905 v13.1.0 is a Technical Specification titled "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP Specifications (Release 13)".

75. The date on the face of the specification ("2016-06") corresponds to the year (2016) and month (June) that this version of the specification was approved by 3GPP TSG SA and subsequently made publicly available.

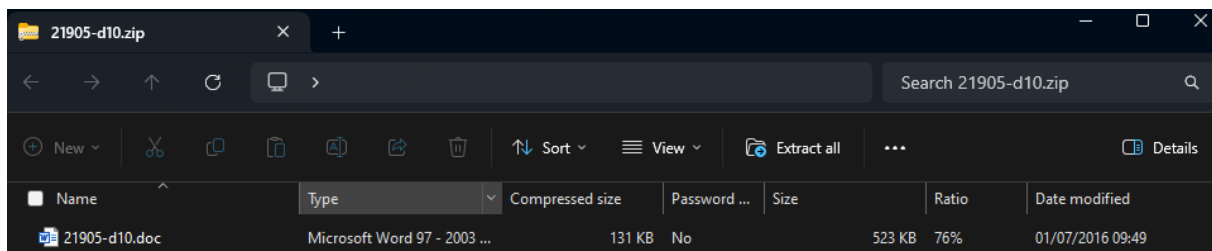
76. 3GPP TR 21.905 v13.1.0 being an approved version of the Release 13 Vocabulary for 3GPP specifications, was approved by TSG SA #72 held June 15 – 17, 2016. An interested member of the public would know that the latest version of an approved specification or report would be available following the plenary meeting responsible for that specification (in this case TSG SA) in accordance with

3GPP standard practice as described in paragraphs 31. The approval of the TR 21.905 v13.1.0 is confirmed by the approval of the Change Request to TR 21.905 documented in the meeting report from TSG SA #72 (**Appendix 29** at 54).

77. The 3GPP file server is and always has been open to all and free from restriction such as username or password. By way of example of how an interested member of the public could access the TR 21.905 v13.1.0 technical report from the 3GPP website, I accessed the file server by going to the 3GPP website at <http://www.3gpp.org/>, selected “Specifications & Technologies” from the menu bar, and then selected “Specifications by series” from the dropdown menu. I then selected the “21 Series” link to access the public file server where the specifications are stored. I then searched for “21.905” in the specification number search bar, and for the TR 21.905 specification selected the eyeglasses icon that says “See details” when a cursor is placed on it. From there, I selected “Click to see all versions of this specification,” which took me to the archive housing all versions of TR 21.905 found at the following URL: https://www.3gpp.org/ftp/Specs/archive/21_series/21.905. A true and correct copy of the relevant portion of the directory listing produced by the file server website is provided below and in **Appendix 30** at 2.

	21905-d00.zip	2015/12/17 17:00	129,3 KB
	21905-d10.zip	2016/07/01 7:51	130,5 KB
	21905-e00.zip	2017/03/24 9:06	130,1 KB

78. The archive directory index stated that TR 21.905 v13.1.0 was uploaded on “2016/07/01”. Selecting the link for “21905-d10.zip”, I downloaded a zip file of the same name. The zip file contained a Microsoft Word document with the filename “21905-d10.doc” and having date stamps of “01/07/2016” (European date format). An excerpt of the zip file directory is provided below.



79. I have confirmed that the Word document with the filename “21905-d10” is TR 21.905 v13.1.0. A true and correct copy of the compiled Microsoft Word documents with the filename “21905-d10” is the TR 21.905 v13.1.0 that is provided in Ex-1018.

80. Based on my experience, I understand these date stamps to mean that 21905-d10.zip was uploaded to 3GPP’s publicly available website on July 1, 2016, and that an interested member of the public could have downloaded the zip file,

extracted the Word document enclosed, viewed the contents of the Word document, and further disseminated said document without restriction on July 1, 2016 and thereafter.

E. Ex-1019: 3GPP Tdoc R2-1707748: "draft 3GPP TS 38.300 v0.6.0 (2017-08), Technical Specification Group Radio Access Network; NR; NR and NG-RAN Overall Description; Stage 2 (Release 15)", 3GPP TSG RAN WG2 #99

81. R2-1707748 is a technical contribution submitted to the 3GPP TSG RAN WG2, meeting #99 which was held between August 21 - 25, 2017. It follows the general naming format ("xminnz") described in paragraph 39². Accordingly, "R2" indicates that the contribution was submitted to RAN WG2, "17" indicates the year (2017) that this technical contribution was submitted, and "07748" is the unique number that was assigned to this contribution document. It is titled "draft 3GPP TS 38.300 v0.6.0 (2017-08), Technical Specification Group Radio Access Network; NR; NR and NG-RAN Overall Description; Stage 2 (Release 15)".

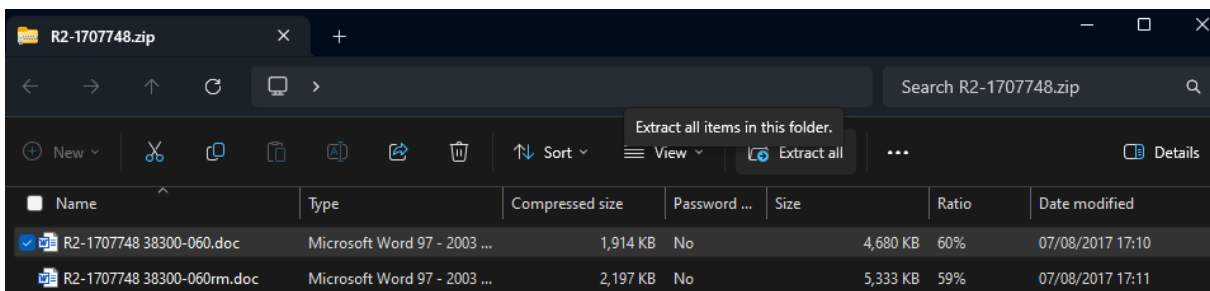
82. As I mention in paragraph 41 above, it has always been, and was in the 2017 timeframe, standard practice to make 3GPP meeting documents publicly available on the 3GPP public file server from where an interested member of the public exercising reasonable diligence could freely access them. To

² Note that from 2017 RAN2 added another digit to the unique identifier "z" field to cater for the increasing number of Tdocs being submitted.

confirm the availability of R2-1707748 on the 3GPP document server in the 2017 timeframe, I navigated to the 3GPP website at <http://www.3gpp.org>, selected “3GPP Groups” from the drop down menu, and then selected the “RAN2 – Radio Layer 2 and Radio Layer 3 RRC” from the 3GPP Groups page, and the “Meeting documents” link to access the public file server where documents for the TSG-RAN Working Group 2 are stored, and from where I navigated to the documents for RAN WG2 #99. A true and correct copy of the relevant portion of the Documents directory listing produced by the file server website is provided below and in **Appendix 31** at 5.

 R2-1707747.zip	2017/08/11 2:05	37,1 KB
 R2-1707748.zip	2017/08/07 8:11	4109,8 KB
 R2-1707749.zip	2017/08/11 0:07	74,1 KB

83. The Docs directory index stated that R2-1707748 was uploaded on “2017/08/07. I selected the link for “R2-1707748.zip” and downloaded a ZIP file of the same name. The ZIP file contained two Microsoft Word documents being a revision marked and an unmarked version of the draft specification. The unmarked version had the filename “R2-1707748 38300-060.doc,” and a date stamp of “07/08/2017” (European date format) the same day that the ZIP file was uploaded.



84. A true and correct copy of the document within the ZIP file (R2-170778 38300-060.doc) is provided as Ex-1019. Based on my experience, I understand that these date stamps mean that R2-1707748.zip was uploaded to 3GPP's publicly available website on August 07, 2017, prior to the RAN WG2 #99 meeting, and that any member of the public could have downloaded the ZIP file, extracted the Power Point document enclosed, and viewed the contents of said document without restriction on August 07, 2017 and thereafter. The draft report from RAN WG2 #99 confirms the availability of R2-1707748 at the meeting (**Appendix 32** at 109). I have no reason to believe that either the date stamp or the report from RAN WG2 #99 are inaccurate. I have therefore determined that R2-1707748 was publicly available on the file server no later than August 07, 2017.

85. In addition, being a draft 3GPP Technical Specification, TS 38.300 v0.6.0 was also uploaded to the specifications area of the 3GPP public file repository on August 7, 2017, from where it could be downloaded and redistributed without restriction (see excerpt below).

 38300-050.zip	2017/08/15 13:00	1795,1 KB
 38300-060.zip	2017/08/07 8:11	4109,8 KB
 38300-070.zip	2017/09/01 8:30	3888,1 KB

86. Based on the information above, it is my opinion that R2-1707748, titled “draft 3GPP TS 38.300 v0.6.0 (2017-08), Technical Specification Group Radio Access Network; NR; NR and NG-RAN Overall Description; Stage 2 (Release 15)” and provided as Ex-1019, was publicly available to download from the 3GPP file server no later than August 07, 2017 and could have been distributed thereafter without restriction. Further, it was publicly available at the 3GPP TSG RAN WG2 #99 meeting held August 21 – 25, 2017.

F. Ex-1020: 3GPP TR 23.799 v1.1.0 (2016-10): ”3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Study on Architecture for Next Generation System (Release 14)”

87. 3GPP TR 23.799 v1.1.0 is a draft Technical Report titled “3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Study on Architecture for Next Generation System (Release 14)”.

88. The date on the face of the report (“2016-10”) corresponds to the year (2016) and month (October) that this draft version of the report was agreed by 3GPP TSG SA WG2 and subsequently made publicly available.

89. 3GPP TR 23.799 v1.1.0 being a draft Technical Report on the study of

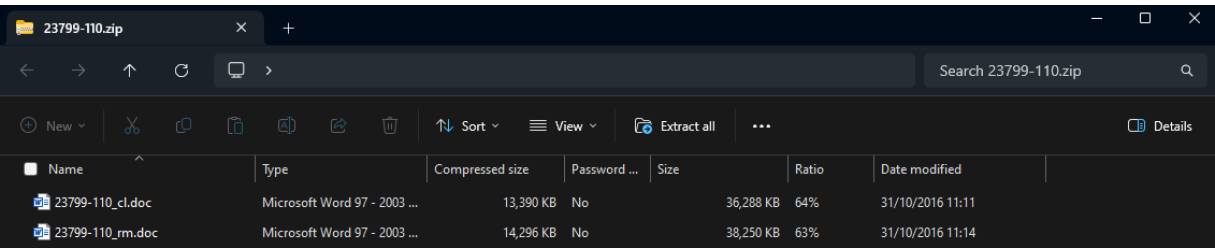
the architecture the next generation system, was agreed following TSG SA WG2 #117 held October 17 – 21, 2016. The creation of the draft TR 23.799 v1.1.0 is confirmed by approval of pseudo Change Requests (P-CRs) to TR 23.799 at and following the SA2 #117 meeting, as documented in Annex B of the SA2 #117 meeting report, and informed to subscribers to the SA2 email reflector by email on October 31, 2016. **Appendix 33** at 274 to 276, **Appendix 34**.

90. The 3GPP file server is and always has been open to all and free from restriction such as username or password. By way of example of how an interested member of the public could access the TR 23.799 v1.1.0 technical report from the 3GPP website, I accessed the file server by going to the 3GPP website at <http://www.3gpp.org/>, selected “Specifications & Technologies” from the menu bar, and then selected “Specifications by series” from the dropdown menu. I then selected the “23 Series” link to access the public file server where the specifications are stored. I then searched for “23.799” in the specification number search bar, and for the TR 23.799 report selected the eyeglasses icon that says “See details” when a cursor is placed on it. From there, I selected “Click to see all versions of this specification,” which took me to the archive housing all versions of TR 23.799 found at the following URL: https://www.3gpp.org/ftp/Specs/archive/23_series/23.799. A true and correct copy of the relevant portion of the directory listing produced by the

file server website is provided below and in **Appendix 35** at 1.

 23799-102.zip	2016/09/30 9:11	28412,4 KB
 23799-110.zip	2016/10/31 15:03	27685 KB
 23799-120.zip	2016/11/29 15:17	31632,6 KB

91. The archive directory index stated that TR 23.799 v1.1.0 was uploaded on “2016/10/31”. Selecting the link for “23799-110.zip”, I downloaded a zip file of the same name. The zip file contained two Microsoft Word documents being a revision marked and a clean version of the draft specification. The clean version had the filename “23799-110_cl.doc” and a date stamp of 31/10/2016 (European date format). An excerpt of the zip file directory is provided below.



Name	Type	Compressed size	Password ...	Size	Ratio	Date modified
23799-110_cl.doc	Microsoft Word 97 - 2003 ...	13,390 KB	No	36,288 KB	64%	31/10/2016 11:11
23799-110_rm.doc	Microsoft Word 97 - 2003 ...	14,296 KB	No	38,250 KB	63%	31/10/2016 11:14

92. I have confirmed that the document “23799-110_cl.doc” is TR 23.799 v1.1.0. A true and correct copy of the Microsoft Word document titled “23799-110_cl.doc” is the TR 23.799 v1.1.0 that is provided in Ex-1020.

93. Based on my experience, I understand these date stamps to mean that 23799-110.zip was uploaded to 3GPP’s publicly available website on October 31,

2016, and that an interested member of the public could have downloaded the zip file, extracted the Word document enclosed, viewed the contents of the Word document, and further disseminated said document without restriction on October 31, 2016 and thereafter.

V. CONCLUSION

94. In conclusion, my opinions are as follows:

- i. 3GPP R3-173152 provided as Ex-1011, was publicly available to download from the 3GPP file server from August 11, 2017.
- ii. 3GPP TR 38.801 v0.4.0 provided as Ex-1013, was publicly available to download from the 3GPP file server from September 13, 2016.
- iii. 3GPP TS 36.300 v13.4.0 provided as Ex-1024, was publicly available to download from the 3GPP file server from July 7, 2016.
- iv. 3GPP TR 21.905 v13.1.0 provided as Ex-1018, was publicly available to download from the 3GPP file server from July 1, 2016.
- v. 3GPP R2-1707748 provided as Ex-1019 and also referred to as TS 38.300 v0.6.0, was publicly available to download from the 3GPP file server from August 7, 2017.
- vi. 3GPP TR 23.799 v1.1.0 provided as Ex-1020, was publicly

available to download from the 3GPP file server from October 31, 2016.

95. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

October 21, 2024



Printed Name: Craig Bishop

APPENDIX 1

Curriculum Vitae

Name: Craig Bishop
Contact Tel No.: +44 (0)7984 564949 (mobile)
Email: craig@bishopcom.co.uk
Current job title: Independent Consulting Engineer, CEO
Address: 43 Ospringe Street, Faversham, Kent, ME13 8TW

Key Skills and Experience

- 35 years Telecoms, Radio and Broadcast experience
- 27 years experience of 2G/3G/4G telecoms standardisation
- Extensive knowledge of 3GPP and ETSI specifications and procedures including document handling and publication practices
- Sound understanding of 3GPP systems, including Radio Access Interfaces and Networks, Access Stratum protocols, Core Networks, Non-Access Stratum protocols, and IMS
- Experience of ETSI role from regulatory perspective (harmonised standards, mandates, spectrum, etc)
- Depositions, reports, and declarations as expert witness in cases on 3GPP technologies and on 3GPP & ETSI practices and procedures.
- Intellectual property analysis including prior art search and evaluation of patent essentiality
- Application of data analytics and machine learning techniques to standards and IP data
- Programming in Java, Python, C, Octave (Matlab)

Career History

Bishop Communications Ltd.

01/13 –

Independent Telecommunications Standards and Intellectual Property Consultant

Company is a full ETSI member

Activities have included:

- Provision of expert support for IPR litigation from standards landscape analysis / background technical reports to expert testimony reports / declarations and depositions on matters including the public availability of 3GPP and ETSI prior art.
- Intellectual property analysis assessing strengths and weaknesses of patents and patent portfolios, conducting searches for prior art, evaluating patent essentiality, and acquiring relevant documentation.
- Provision of expertise for EC funded ETSI Specialist Task Force (STF489) to produce implementation guidelines for Total Conversation for emergency services. Project delivered on time / budget and well received. Output published March 2016 as ETSI TR 103 201.
- Provision of expertise for ETSI Specialist Task Force (STF555) assessing the impact on existing standards of communications involving IoT devices in all types of emergency situations. Project delivered on time / budget and well received. Output published July 2019 as ETSI TR 103 582.
- Provision of standards consultancy services for Samsung Electronics in ETSI including membership of the ETSI Board until November 2014

Technologies covered in patent related work include: 3GPP GSM, UMTS, LTE, 5G NR radio interface technologies (Phy, MAC, RLC, RRC), 3GPP access and core networks (GPRS/UMTS & EPC NAS), IMS. Organisations covered include 3GPP & ETSI.

Clients served / represented include: ADT, Apple, AT&T, Blackberry, Cradlepoint, DELL, Ericsson, Honeywell, HTC, Huawei, LG, Lenovo, Motorola, Nokia, Oneplus, Oppo, Samsung, Sierra Wireless, Thales, T-Mobile, Sprint, Verizon, Vodafone, Xiaomi, ZTE.

Working with: Addy Hart LLP, Alston & Bird LLP, Baker Botts LLP, Banner Witcoff LLP, DLA Piper LLP, European Telecommunications Standards Institute (ETSI), Fish & Richardson P.C., Gibson Dunn LLP, Haynes and Boone LLP, Hillebrand-CE GmbH, Kirkland & Ellis LLP, K&L Gates LLP, MckoolSmith LLP, PV Law LLP, Paul Hastings LLP, Perkins Coie LLP, Powell Gilbert LLP, Sidley Austin LLP, Samsung Electronics Research & Development Institute UK (SRUK), Taylor Wessing LLP, Williams & Connolly LLP, WilmerHale LLP.

Expert testimony through deposition:

- *Huawei Technologies Co. Ltd. vs. T-Mobile US, Inc., et al.*, Case Nos. 2:16-cv-0052-JRG-RSP, 2:16-cv-0055-JRG-RSP, 2:16-cv-0056-JRG-RSP, and 2:16-cv-0057-JRG-RSP (E.D. Tex.). On behalf of T-Mobile US Inc.
- *T-Mobile US, Inc., et al. v. Huawei Technologies Co. Ltd.*, Case Nos. IPR2017-00696 and IPR2017-00697 (PTAB). On behalf of T-Mobile US Inc.
- *LG Electronics, Inc., v. Koninklijke KPN N.V.*, Case No. IPR2018-00558 (PTAB). On behalf of LG Electronics, Inc.
- *Nokia of America Corp. and Ericsson Inc. v. IPCOM, GMBH & Co.*, Case No. IPR2021-00533 (PTAB). On behalf of Ericsson Inc.
- *IPCom, GmbH & Co., Plaintiff, v. AT&T Inc., et al, Defendant, Nokia of America Corp., Intervenor, Ericsson Inc., Intervenor.*, Civil Action No. 2:20-CV-322-JRG, and *IPCom, GmbH & Co., Plaintiff, v. Verizon Communications, et al., Defendant, Nokia of America Corp., Intervenor, Ericsson Inc., Intervenor.*, Civil Action No. 2:20-CV-323-JRG. On behalf of Ericsson Inc.
- *Ericsson Inc. v. Koninklijke KPN N.V.*, Case No. IPR2022-00069 (PTAB). On behalf of Ericsson Inc.

Expert testimony in court:

- *Between IPCom GmbH and Vodafone, et al.*, Claim No. HP-2018-000030 Claim No. HP-2018-000031, High Court of Justice, Business & Property Courts of England and Wales, Intellectual Property List (ChD), Patents Court. Retained by Vodafone.
- *Between (1) Mitsubishi Electric Corporation (2) Sisvel International SA and Oneplus Mobiletech UK Limited, Oppo Mobile UK Ltd, Xiaomi Technology UK Limited, et al.*, Claim No. HP-2019-000014, High Court of Justice, Business & Property Courts of England and Wales, Intellectual Property List (ChD), Patents Court. Retained by Oneplus, Oppo, and Xiaomi (trial held remotely due to COVID-19 restrictions)

Samsung Electronics Research Institute (SERI)

12/96 – 01/13

Director Standards and Industry Affairs

03/11 – 01/13

Mission and Tasks as for previous role plus:

- Proactive member of ETSI Board following election as Board member in November 2011
- Worked with Samsung internal and external legal counsel in response to EC investigation into Samsung suspected abuse of Standards Essential Patents.
- Deposed by Apple as fact witness in ITC investigation 337-TA-794.

Head of Advanced Technologies Standards & Regulation

09/05 - 03/11

Mission: To help position Samsung and SERI at the forefront of mobile telecommunication developments through participation in and leadership of mobile communications standards and European regulatory affairs

Key tasks:

- Developed standards and research strategy and coordinated activities with head office, acting as official Samsung contact for the European Telecommunications Standards Institute.
- Programme managed standardisation and regulation projects covering 3GPP (RAN2, CT1, SA2, SA1, SA, RAN, CT), OMA, and mobile Broadcast strategies and technologies (DVB Forum), European Framework projects (FP7), Spectrum Management (CEPT, ETSI EM, TFES, BRAN, ...) and European Regulatory affairs (Digital Europe, relations with European Commission, ...). - Grew department from 3 to 12 persons to cater for these activities.
- Participated and actively contributed to 3GPP SA1 (11/08 – 11/11), SA2 (10/05 – 08/11), SA and ETSI TC SCP groups on issues including IMS / CS Interworking (VCC / SRVCC, VoLTE, T-ADS, ICS), Local IP Access & Selected IP Traffic Offload (LIPA-SIPTO), MOSAP, M2M/MTC, Embedded / 4FF UICC.
- Drafted and filed communication technology related patents related to 3GPP SA2 and CT1 technologies – 18 filed, mainly IMS and 3GPP NAS related
- Supported Samsung IP team with analysis of Samsung and 3rd party communication technology related patents and claim charts including GSM/GPRS, UTRAN, NAS, and IMS patents
- Chaired SERI Patent Committee from 2007-2009 - SERI achieved patent targets for first time in 2007 and did so in every year following

Standards consultant – part time

09/04 – 09/05

(Whilst studying fulltime for MSC)

During this time, I conducted a review of the wireless communication technologies and the associated standards space, with a particular emphasis on 802.16a, as well as 3G and 802.11 evolutions. I was also involved in analysis of 3rd party patents and claim charts on request from Samsung IP team.

Technology Manager System Engineering group

06/03 – 09/04

Mission: To establish a System Engineering group within SERI to support development of SERI's dual mode GSM/UMTS radio modem platform.

Key Tasks:

- Defined and implemented System Engineering group strategy including recruitment and line management of the group which grew from 3 to 10 engineers during this period.
- Developed detailed system requirements for SERI's dual mode 2G/3G radio modem platform(s) including production of background documentation describing system wide behaviour
- Defined system test programme for platform, including example test cases using off the shelf test equipment. This project outsourced (under my supervision) to a third party company for completion.
- Provided continued support to development engineers in terms of understanding specification and system requirements, particularly with respect to Access Stratum and Non Access Stratum specifications and protocols.
- Instigated and managed studies investigating optimised system architecture for future Samsung mobile platforms.
- Analysed Samsung and 3rd party 3GPP technology related patents and claim charts on request by Samsung IP team and reported on their value and standards essentiality.

Technology Manager Standards & System Group

04/02 – 06/03

Mission: To provide Standards support to SERI development teams and Samsung's global standardisation activities.

Key Tasks:

- Devised and implemented revised strategy to improve the focus of activities and provide improved support for software developers from a system perspective.

- Attended 3GPP TSG SA plenary and occasional SA WG1 meetings - acted as rapporteur for 3GPP Evolution technical report 3GPP TR 21.902.
- Analysed 3rd party GSM/GPRS technology related patents and claim charts on request by Samsung IP team and reported on their value and standards essentiality.
- Line managed 3 engineers, ensuring that the group provided expert support for SERI SW and HW developers in terms of standards interpretation and system requirements, particularly with respect to the Radio Access Network.

Project Manager

04/00 – 04/02

Mission: To establish and manage development of a dual mode GSM/UMTS modem platform.

Key tasks:

- Defined and managed work relating to core technology development for Samsung's 3G handsets.
- Determined major technical architecture and parameters for the platform producing high level system requirements specification and project development plan.
- As a technical authority on UMTS, supported the project in terms of requirements specification and interpretation (L1, MAC/RLC, RRC, and NAS specifications), and contributed towards the training of UMTS project team members.
- Acting in a consultative capacity, interfaced with other departments in Samsung and with external customers/suppliers on issues relating to 2G and 3G technologies
- Responsible for the overall planning, work allocation and co-ordination of engineers for the project, as well as being involved in recruitment – during this period the number of engineers working on the project increased from 10 to over 40.
- Instigated, defined and managed a feasibility study involving HW and SW engineers, as essential preparation for the development of a dual mode GSM/UMTS radio modem platform.

Senior/Principal Standards Engineer

12/96 – 04/00

Mission: To support Samsung standards and development activities in ETSI and 3GPP.

Key Tasks:

- Gathered and disseminated information throughout Samsung concerning latest specifications and trends in telecommunications, providing advice to Senior Management on future strategies for telecommunications development.
- Acted as sole Samsung representative in ETSI TC SMG2 from December 1996 and during the selection phase for the UMTS Radio Access Technology providing training for Samsung engineers on elaborated technologies
- Participated in 3GPP TSG RAN WG1 (UTRA Physical Layer), and RAN WG2 (L2/3) contributing specifically in areas related to FEC, Common Packet Channel, and Transmit Diversity
- In 3GPP TSG T WG2 I initiated and acted as rapporteur for the UE capabilities work item. I also acted as liaison officer between TSG T WG2, TSG RAN WG1 and TSG SA WG1 (Service Aspects) on issues of common interest
- Acted as main spokesperson for and advisor on Samsung strategic activities in, 3GPP TSG RAN from 3GPP's creation until April 2000
- Acted in a consultative capacity advising the company on technical, commercial and regulatory issues relating to 3rd generation telecommunications development and implementation.
- Developed and promoted programme to co-ordinate standards activities throughout Samsung. – Samsung Global Standards Strategy Group established in September 1998.
- Attended ETSI TCs, SMG1, SMG4, SMG5, SMG7, SMG9 and SMG11 as required by Samsung to keep abreast of developments prior to establishment of 3GPP

Radiocommunications Agency

06/93 -11/96

HPTO Spectrum Engineer

- Responsible for the management of spectrum for use by PMR and Wireless LAN technologies.
- Defined and instigated development of an improved assignment methodology for Private Mobile Radio (PMR) channels, promoting increased quality and spectrum efficiency.
- Managed research projects involving the assessment and selection of bids from external companies, submitted under competitive tender.
- Represented the Agency in the National and International fora associated with the use of Land Mobile Radio, acting as rapporteur for PMR voice and data standards in ETSI Sub-Technical-Committee RES02, and as chairman of a sub-working group under ITU WP8A drafting the recommendation for use of the radio spectrum by Radio LANs.
- Involved in CEPT Spectrum Engineering Project Teams, dealing with spectrum for Narrow band PMR technology and co-ordination between that technology and T-DAB transmissions in Band III.
- Dispensed technical advice both within the Agency and to external customers, on national and international PMR standards, assessing requests for additional frequencies, and providing technical justification for assignments and wider spectrum policy

BBC Radio

11/89 – 05/93

Radio Operations Engineer

- Worked on projects requiring the design, development, maintenance and testing of equipment for use within the broadcasting chain.
- Responsible for acceptance testing of new studios for Radio 5, and in particular redesign of outside source circuits for the main sports continuity studio.
- Involved in acceptance testing for NICAM transmission routers. Designed and implemented modifications to synchronise transmission feeds, resulting in seamless switching between routers.

Education

1. MSC in Computer Science from the University of Kent

Awarded (with distinction): 07/2006

Dissertation title: Roles Variables and Program Analysis – Received prize for outstanding achievement

2. B.Eng. (Hons) in Electronic Engineering from the Polytechnic of Central London

Awarded: 07/1989

3. In house and external technical and management training including: Learning Tree courses on System Analysis and Design, User Requirements, UML, and Project Management.
4. On-line courses from: Coursera, Udemy, and Zenva courses covering Machine Learning, Python, Data Science, and Natural Language Processing

APPENDIX 2

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THIRD GENERATION PARTNERSHIP PROJECT (3GPP)

PARTNERSHIP PROJECT DESCRIPTION

**During the meeting held in
Copenhagen, 2 - 4 December 1998
ARIB, ETSI, T1, TTA and TTC agreed this
Partnership Project Description.**

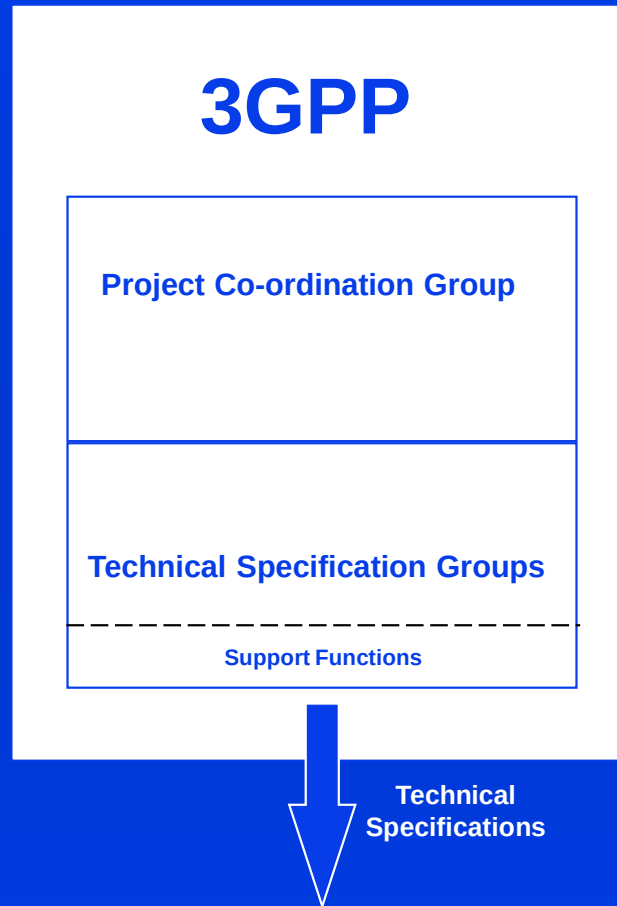
Preamble

Standards organizations and other related bodies have agreed to co-operate for the production of a complete set of globally applicable Technical Specifications for a 3rd Generation Mobile System based on the evolved GSM core networks and the radio access technologies supported by 3GPP partners (i.e., UTRA both FDD and TDD modes).

The Project is entitled the “Third Generation Partnership Project” and may be known by the acronym “3GPP”.

3GPP has been established for the preparation and maintenance of the above mentioned Technical Specifications, and is not a legal entity.

3GPP Overview



Definition of the Third Generation Partnership Project

3GPP will provide globally applicable Technical Specifications for a 3rd Generation Mobile System based on the evolved GSM core network, and the Universal Terrestrial Radio Access (UTRA), to be transposed by relevant standardization bodies (Organizational Partners) into appropriate deliverables (e.g., standards).

Scope and objectives (1)

The Technical Specifications will be developed in view of global roaming and circulation of terminals.

The 3rd Generation Mobile System and its capabilities will be developed in a phased approach. Initially, 3GPP will elaborate, approve and maintain the necessary set of Technical Specifications for the first phase of a 3rd Generation Mobile System including:

- UTRAN (including UTRA; W-CDMA in Frequency Division Duplex (FDD) mode and TD-CDMA in Time Division Duplex (TDD) mode)**
- 3GPP Core Network (Third Generation networking capabilities evolved from GSM . These capabilities include mobility management and global roaming.)**
- Terminals for access to the above (including specifications for a UIM)**
- System and service aspects**

Scope and objectives (2)

The set of global specifications for the first phase of the 3GPP core network and the specifications for the GSM core network should be common to the largest extent possible and should not be needlessly different.

The results of the 3GPP work will form the basis of member contributions to the ITU in accordance with existing procedures.

3GPP will take account of emerging ITU recommendations on interworking between IMT-2000 family members.

In the framework of agreed relationships, 3GPP will elaborate Technical Specifications that will form the basis of standards, or parts of standards, of the Organizational Partners.

Characteristics of 3GPP (1)

3GPP is characterized by the following attributes:

- **Minimum production time for Technical Specifications from conception to approval**
- **Fast, electronic based approval process**
- **Maximum use of modern (electronic) working methods**
- **Minimum number of hierarchical levels with decision making taking place at the lowest appropriate levels**

Characteristics of 3GPP (2)

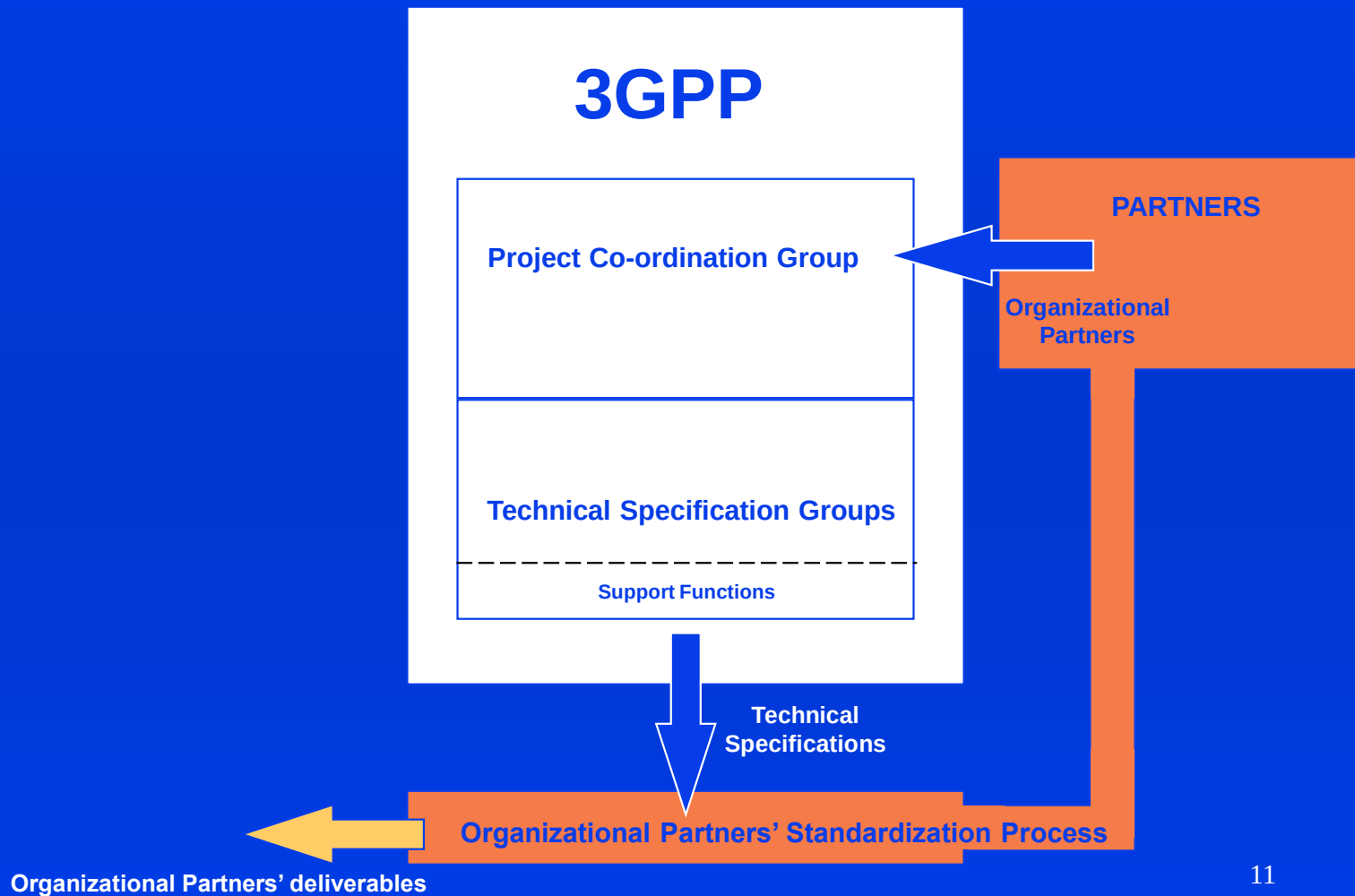
- **A Project Co-ordination function and a Technical Specification function**
- **Task oriented, ensuring that on completion of the tasks the future of the project is re-evaluated**
- **Cost effective use of financial/human resources provided by Partner Organizations (if required)**

Partnership and Membership

3GPP comprises of:

- **Partners:**
 - **Organizational Partners**
 - **3GPP is open to all standards organizations irrespective of the geographical location.**
 - **Market Representation Partners**
- **Individual Members**

Organizational Partners (1)



Organizational Partners (2)

An Organizational Partner is:

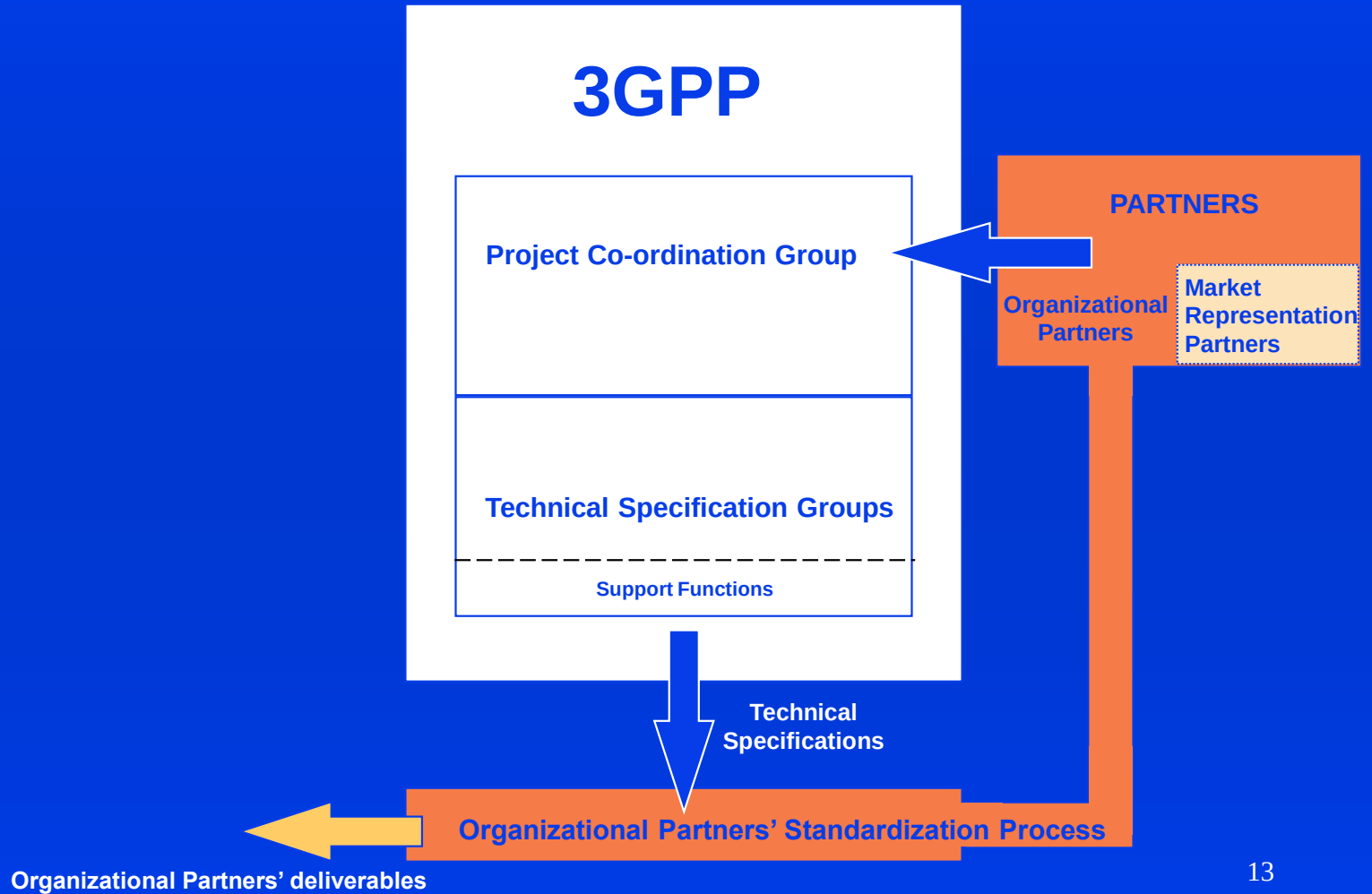
An open standards organization with a national, regional or other officially recognized status (in their country or region)

that:

- has the capability and authority to define, publish and set standards nationally or regionally and**
- has signed (or whose sponsor has signed) the Partnership Project Agreement**

Organizational Partners will meet as appropriate and make decisions by consensus.

Market Representation Partners (1)



Market Representation Partners (2)

Standardization should meet market needs.

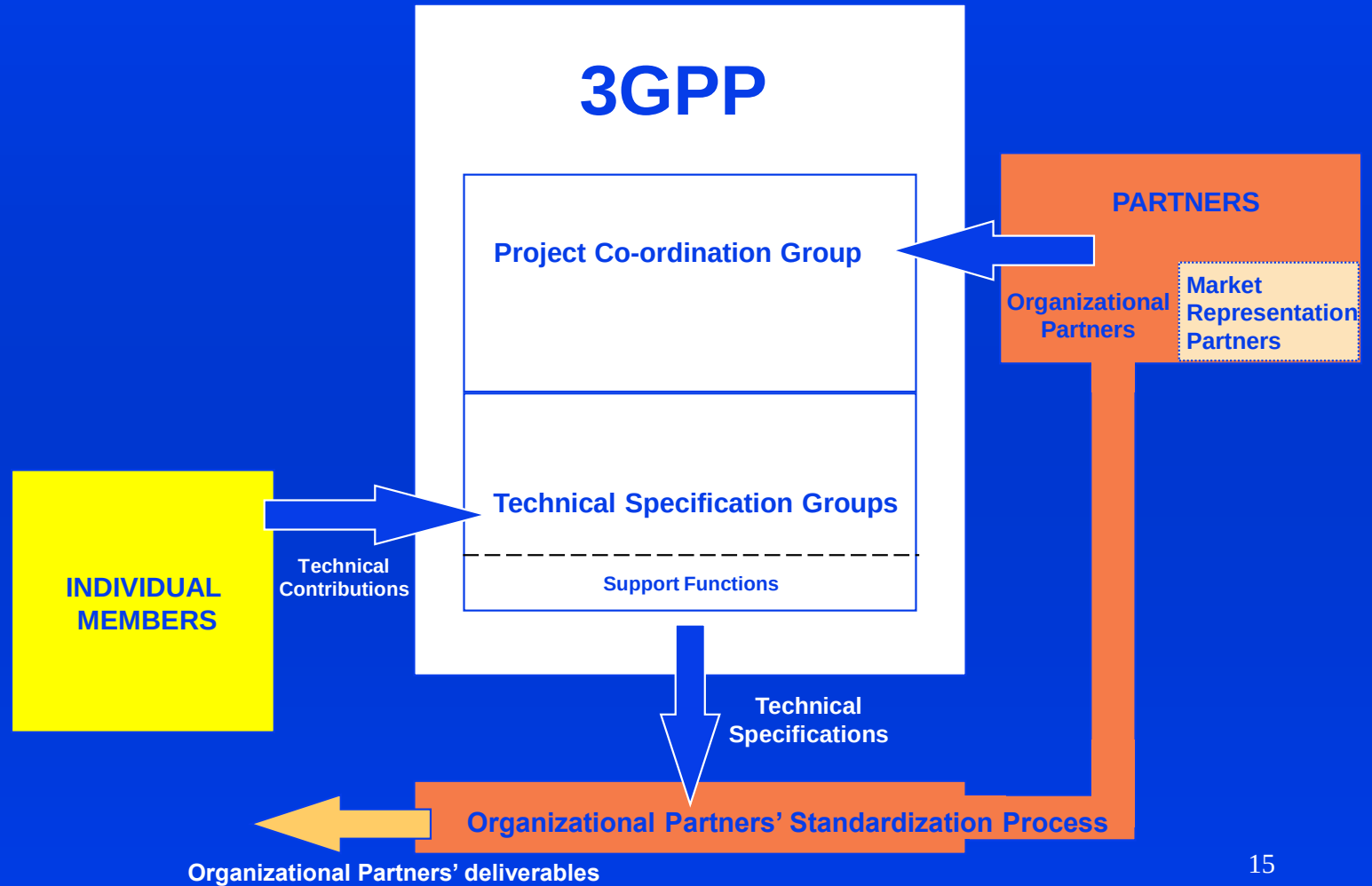
In order to identify market requirements, the high competence of Market Representation Partners should be used.

A Market Representation Partner is an organization invited to participate by the Organizational Partners to offer market advice to 3GPP and to bring into 3GPP a consensus view of market requirements (e.g. services, features and functionality) falling within the 3GPP scope.

A Market Representation Partner:

- does not have the capability and authority to define, publish and set standards nationally or regionally**
- has signed (or whose sponsor has signed) the Partnership Project Agreement**
- has committed itself to the 3GPP scope**

Individual Members (1)



15

3GPP-04/12/1998

Individual Members (2)

Membership in an Organizational Partner is a pre-requisite for Individual Membership in 3GPP.

Individual Membership is open to legal entities committed to support 3GPP and to:

- **contribute technically or otherwise to one or more of the Technical Specification Groups within the 3GPP scope**
- **use the 3GPP results to the extent feasible**

Individual Membership in 3GPP will be terminated by dissolution, abolition, resignation or expulsion from the related Organizational Partner.

Individual Members (3)

All entities registered as members of an Organizational Partner and eligible for participation in the technical work of that Partner, can become Individual Members of 3GPP. Individual members shall apply to their Organizational Partner to participate in 3GPP.

Individual Members act in the 3GPP in their own right; they carry the full responsibility for their contributions.

Individual Membership applicants residing in a country/area without an Organizational Partner can apply for membership in an Organizational Partner according to the rules of each Partner. (e.g. ETSI Associate Membership is available)

Observership

In order to ensure globally applicable Technical Specifications, the status of “Observer” may be granted by the Organizational Partners to an entity which has the qualifications to become a future Organizational Partner. The status of “Observer” includes obligations to:

- identify as early as possible any regulatory requirements that may lead to options within Technical Specifications**
- make their IPR policy available for consideration**
- contribute to the common objective of the 3GPP and avoid duplication of work related to the 3GPP**

The participation rights of an Observer will be decided on a case by case basis.

Documentation for 3GPP

The following 3 documents describe 3GPP:

- **The Partnership Project Agreement**
- **The Partnership Project Description
(this present document)**
- **The Partnership Project Working Procedures**

The Partnership Project Agreement (1)

The Partnership Project Agreement is a concise legal document signed by participating Partners (or their sponsor).

It contains the minimum legal text necessary for 3GPP to function correctly.

The Partnership Project Agreement refers to the Partnership Project Description and the Partnership Project Working Procedures.

The Partnership Project Agreement (2)

The Partnership Project Agreement includes obligations on Organizational Partners to commit themselves to the 3GPP scope:

- **to encourage their members to contribute to the common set of Technical Specifications and to avoid duplication of work**
- **to convert / transpose / adopt all relevant Technical Specifications resulting from 3GPP into their own relevant deliverables through their normal processes**
- **to identify as early as possible, any national / regional regulatory requirements that may lead to options within the Technical Specifications**
- **to make their IPR Policy available for consideration**

The Partnership Project Agreement (3)

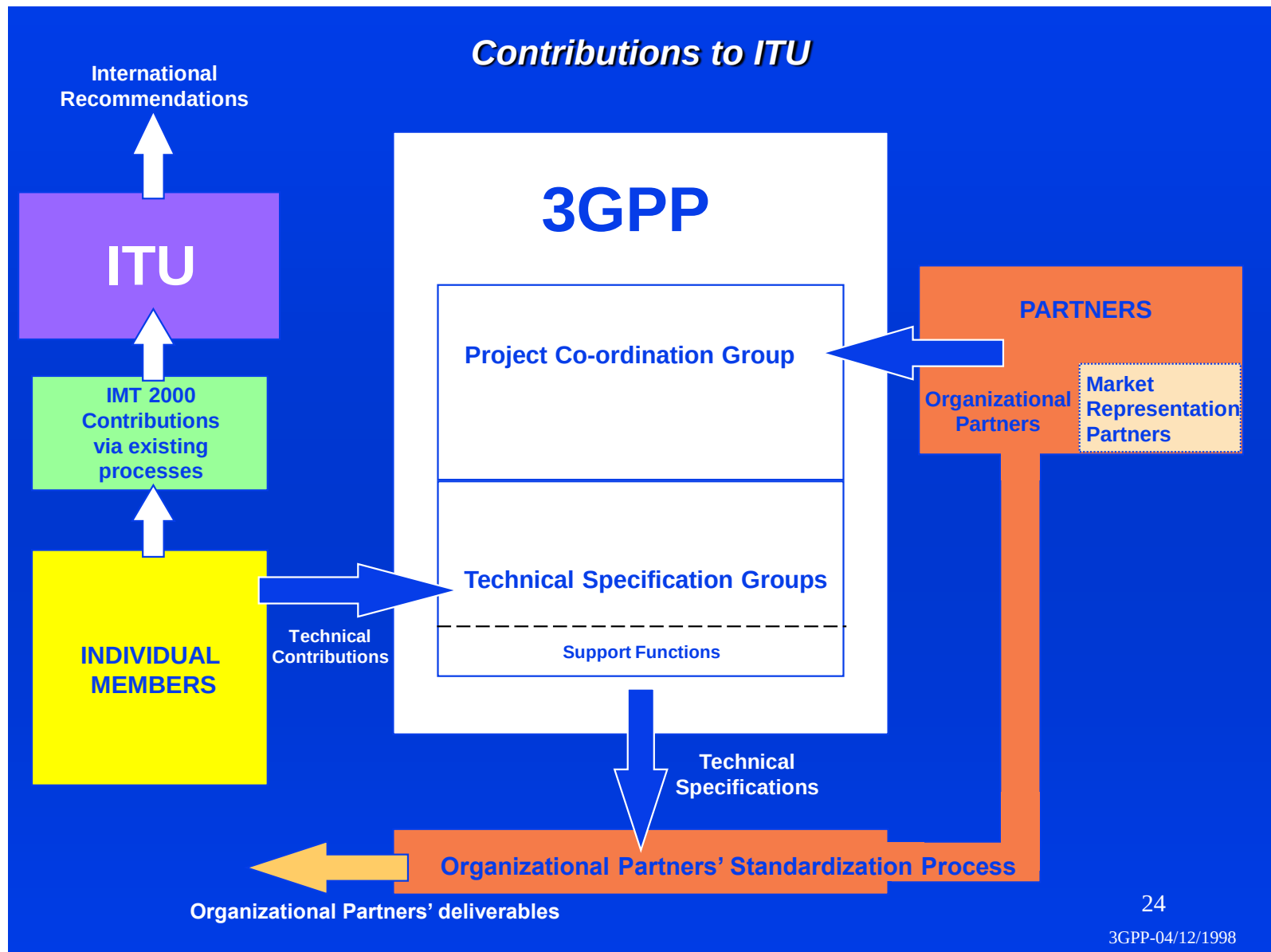
The Partnership Project Agreement includes obligations on Market Representation Partners to identify market and service requirement of 3GPP and to contribute to:

- **the promotion of 3GPP**
- **the definition of 3GPP System and Service scenarios**

The Market Representation Partners should also encourage their members to contribute to the common objectives of 3GPP and to avoid duplication of work.

Ownership of the Partnership Project results

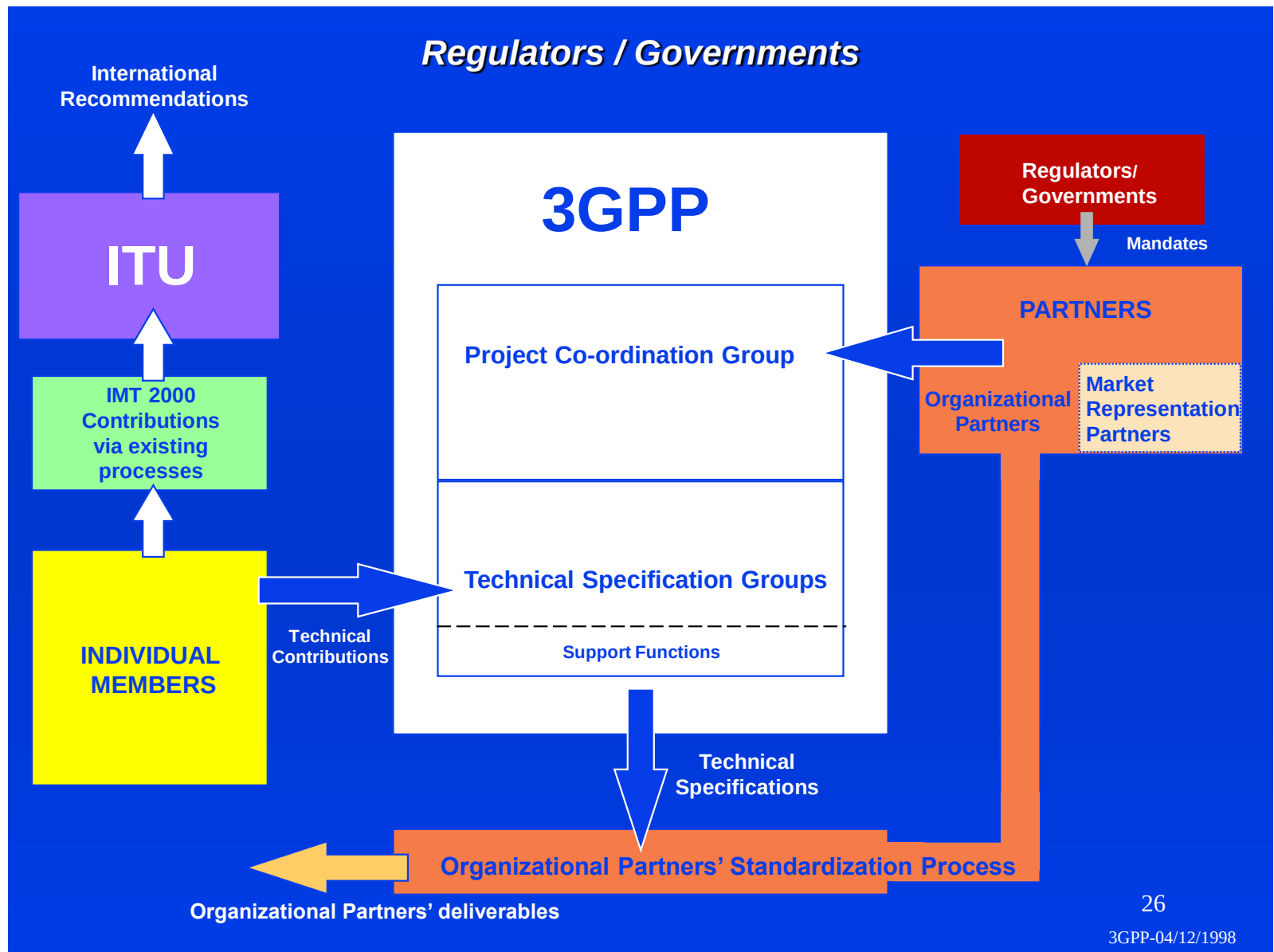
The Organizational Partners of 3GPP will have joint ownership (including copyright) of the Technical Specifications.



Submission of 3GPP results to ITU

3GPP will not contribute directly to the ITU.

Formal contributions to ITU Study Groups are made by ITU members following existing national/regional processes.



National / regional regulatory requirements

Variations imposed by national / regional regulatory requirements will be included in the Technical Specifications as defined by the Technical Specification Groups.

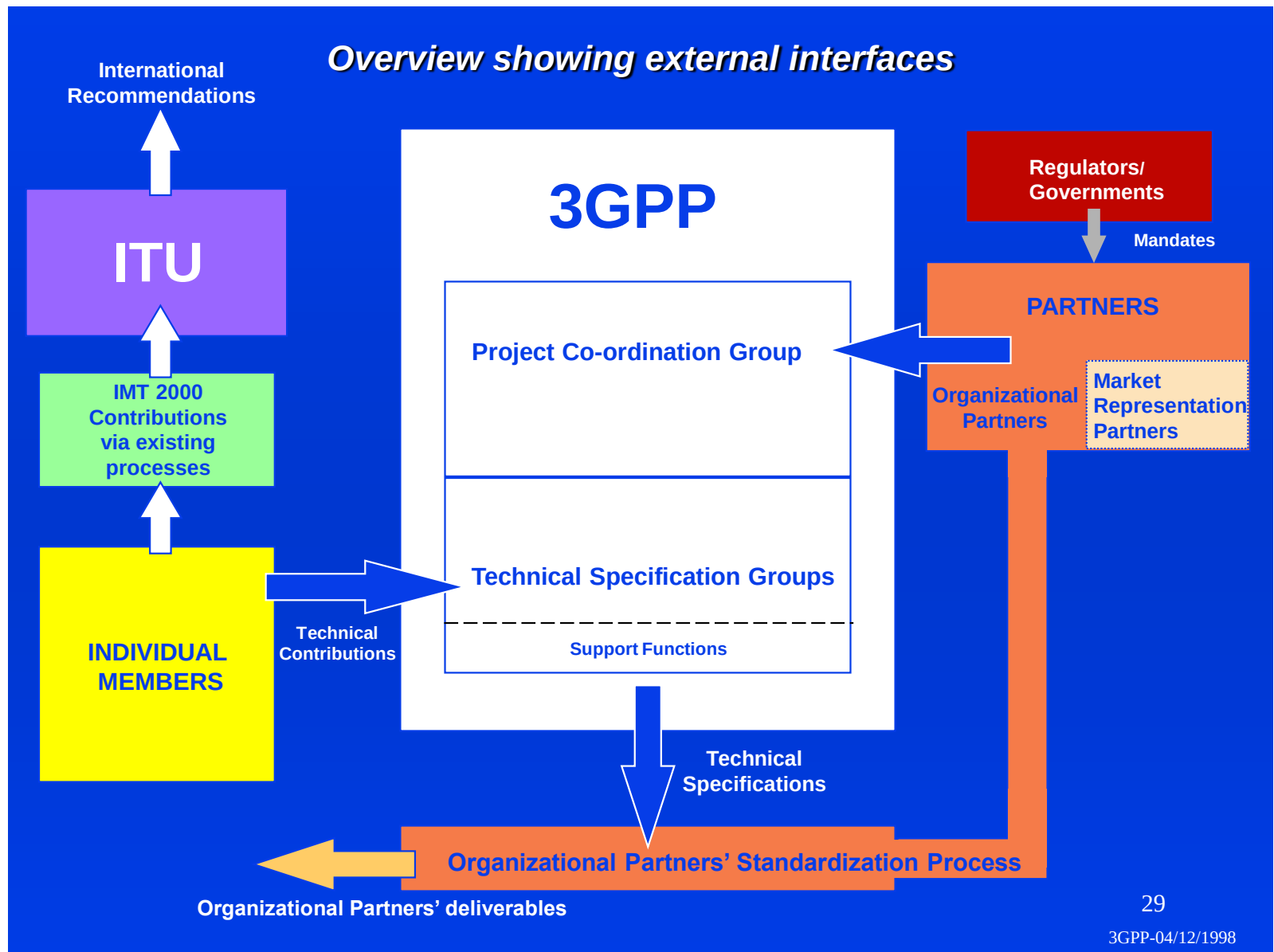
Resource requirements for establishing 3GPP

ETSI will absorb the initial cost of establishing the 3GPP, if required.

Thereafter, the costs will be shared by the Organizational Partners. There will be no direct 3GPP membership fee for Individual Members.

Partners and Individual Members may provide support functions to the extent that they are able (eg hosting of meetings and provision of Secretariat support).

The longer term financial requirements are for further study.

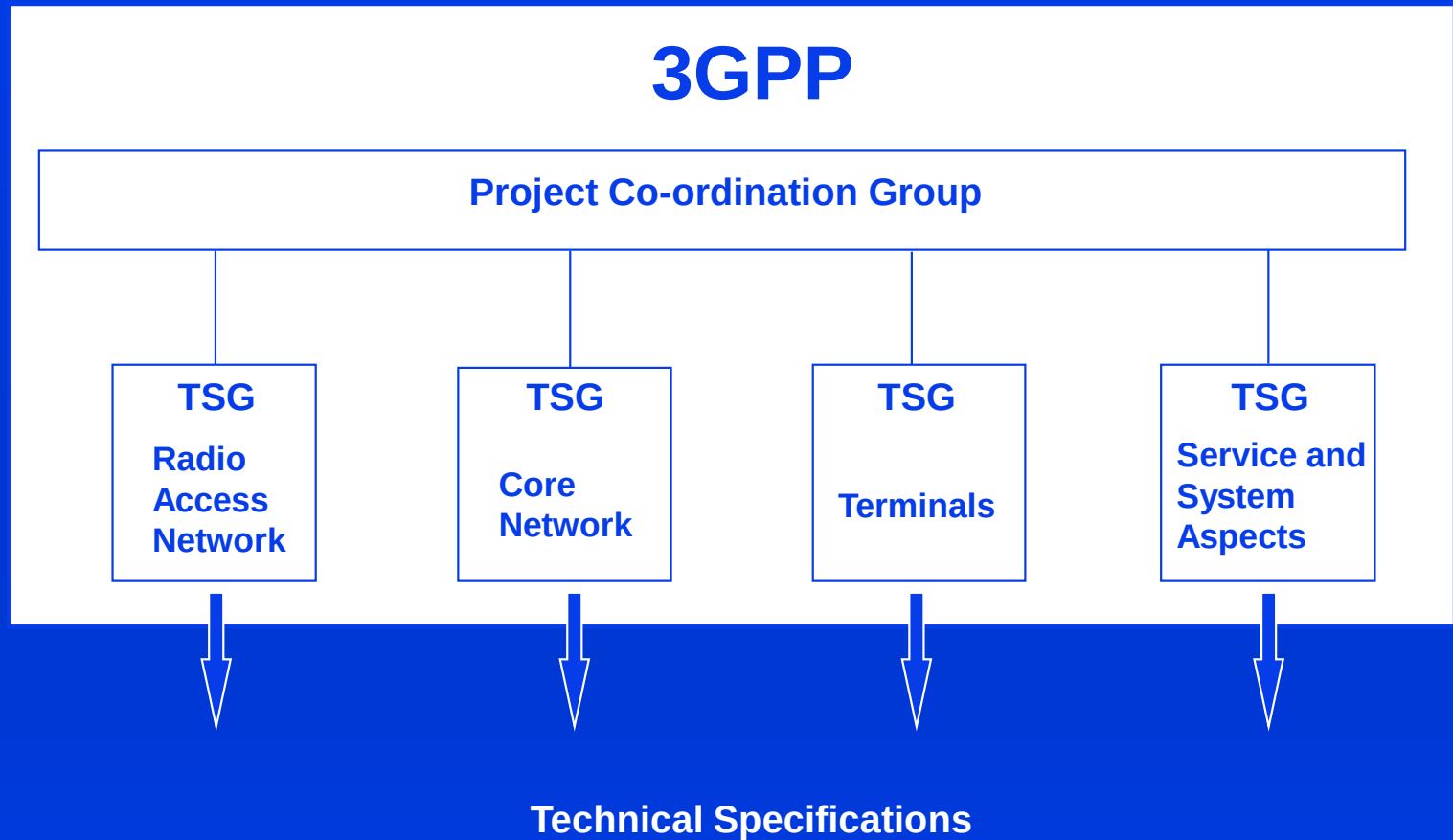


Internal structure of 3GPP (1)

3GPP consists of a Project Co-ordination Group (PCG) and Technical Specification Groups (TSGs).

To assist in the co-ordination of the technical activities, the TSGs are encouraged to meet at the same time and place, as and when appropriate (e.g. twice per year).

Internal structure of 3GPP (2)



Work areas to be covered by the Radio Access Network TSG

- **Radio Layer 1 specification**
- **Radio Layer 2 specification**
- **Radio Layer 3 RR specification**
- **Iub specification**
- **Iur Interface**
- **Iu Interface**
- **UTRAN O&M requirements**
- **Base station radio performance specification**
- **Conformance test specification for testing of radio aspects of base stations**
- **Specifications for radio performance aspects from the system point of view**

Work areas to be covered by the Core Network TSG

- **Mobility management, call connection control signalling between the user equipment and the core network**
- **Core network signalling between the core network nodes. the signalling supports functionality such as user location information, subscription information and control of network services**
- **Definition of interworking functions between the core network and external networks**
- **Packet related questions such as mapping of QoS (e.g. transparency for IP domain applications, general for bearer types, special for optimized applications such as Voice over IP)**
- **Core network aspects of the lu interface**
- **Core network O&M requiremnents**

Work areas to be covered by the Terminal TSG

- **Service capability protocols**
- **Messaging**
- **Services end-to-end interworking**
- **USIM to Mobile Terminal interface**
- **Model/framework for terminal interfaces and services (application) execution**
- **Conformance test specifications of terminals, including radio aspects**

Work areas to be covered by the Service and System Aspects TSG

- **Service capabilities**
 - Definition of services and feature requirements
 - Development of service capabilities and a service architecture for cellular, fixed (and cordless) applications
- **Stage one and two descriptions for:**
 - Charging and accounting
 - Network Management
 - Security Aspects
- **Architecture**
 - Definition, evolution, and maintenance of overall architecture, including assignment of functions to particular sub-systems and identification of key information flows
 - In co-operation with other TSGs, define required services, service capabilities and bearer capabilities offered by the different sub-systems
- **Codec aspects**
 - Principles for definition of end-to-end transmission
 - Definition, evolution and maintenance of relevant specifications
- **Project co-ordination**
 - High level co-ordination of the work performed in other TSGs and monitoring of progress

Primary responsibilities of PCG and TSGs (1)

The primary responsibilities of PCG, TSGs and Organizational Partners are given in the following tables:

	Function	Org Partners collectively	PCG	TSGs
1	Approval of new Partners for 3GPP	X		
2	Approval of Organizational Partner funding requirements and contributions	X		
3	Allocation of human and financial resources provided by Partners to PCG	X		
4	Allocation of resources to TSGs		X	
5	Allocation of resources within TSGs			X

Primary responsibilities of PCG and TSGs (2)

	Function	Org Partners collectively	PCG	TSGs
6	Allocation of voluntary human and financial resources by Market Representation Partners and Individual Members		X	X
7	Handling of appeals from Individual Members on procedural matters	2 nd step	1 st step	
8	Handling of appeals from Individual Members on technical matters		2 nd step	1 st step
9	Determine overall time frame and manage overall work progress		X	

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Primary responsibilities of PCG and TSGs (3)

	Function	Org Partner collectively	PCG	TSGs
10	Detailed time frame and manage detailed work progress			X
11	Approval of Technical Specifications			X
12	Proposal and approval of work items within the agreed scope and terms of reference			X
13	Final adoption of work items within the agreed scope and terms of reference		X	
14	Management of work items			X

Primary responsibilities of PCG and TSGs (4)

	Function	Org Partners collectively	PCG	TSGs
15	Technical Co-ordination (System Aspects TSG will play a role here)			X
16	Appointment of Org Partners meeting Chairman (provided by host on a rotational basis)	X		
17	Appointment of PCG Chairman (for one year term)		X	
18	Election of TSG Chairman and Vice Chairmen			X
19	Creation of TSGs and approval of their terms of reference	X		

Primary responsibilities of PCG and TSGs (5)

	Function	Org Partners collectively	PCG	TSGs
20	Creation of TSG working groups and approval of their terms of reference			X
21	Election of TSG Working Group Chairmen and Vice Chairmen			X
22	Confirmation of individual member participation rights	X		
23	Approval of 3GPP scope and terms of reference	X		
24	Maintain Partnership Project Agreement, Project Description and Working Procedures (consensus agreement by all Partners)	X		

Participation rights in PCG and TSGs

The following have a right to participate in the PCG:

- **Representatives of participating Organizational Partners**
- **Representatives of participating Market Representation Partners**
- **Chairman and Vice Chairmen of the TSGs, as ex-officio members**

The following have a right to participate in the TSGs :

- **Representatives of members of participating Organizational Partners (i.e. Individual Members)**
- **Representatives of participating Organizational and Market Representation Partners**

Principles for decision making within 3GPP

Decision making within PCGs

- **By consensus amongst the Organizational Partners**
- **By vote amongst the Organizational Partners in unavoidable cases**

Decision making within TSGs

- **By consensus amongst the Individual Members**
- **By vote amongst the Individual Members in unavoidable cases**

The Organizational Partners will conduct a fairness review of the decision making process six months after 3GPP start-up, taking into account all concerns raised

(Note: voting will not be permitted on National/Regional regulatory requirements)

Principles for voting within TSGs

The following principles will be applied for voting within the TSGs

- **One “Individual company Member”, one vote**
- **Organizational Partners to interpret “ Individual company Member” according to its own rules of membership**
- **The PCG will maintain a register of eligible voters for the TSGs**
- **Each Individual Member may carry the proxy for up to five other Individual Members**

Working language for 3GPP

The working language for 3GPP shall be English

- **Meetings of the PCG and TSGs shall be conducted in English**
- **3GPP Technical Specifications shall be prepared in English**

Relationship with other groups

3GPP will establish and maintain good relationships with groups working on standards for other IMT-2000 family members.

Intellectual Property Rights (IPR) Principles (1)

The Individual Members of 3GPP are bound by the IPR Policies of their respective Organizational Partner.

Individual Members are encouraged to declare at the earliest opportunity, any IPRs which they may have and believe to be essential, or potentially essential, to any work ongoing within 3GPP.

After comparing their respective IPR policies, ARIB, ETSI, T1, TTA and TTC have agreed that their IPR policies share common principles are quite similar and have agreed on the following additional principles to maximize the success of 3GPP.