

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LENOVO INC.,
Petitioner,

v.

TELEFONAKTIEBOLAGET LM ERICSSON,
Patent Owner

U.S. PATENT NO. 10,425,817

Case IPR2024-TBD

DECLARATION OF FRIEDHELM RODERMUND
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S.
PATENT NO. 10,425,817

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Declaration of Friedhelm Rodermund

I, Friedhelm Rodermund, do hereby declare as follows:

I. INTRODUCTION AND ENGAGEMENT

1. I have been retained in this matter by Lenovo Inc. (“Petitioner” or “Lenovo”) to provide testimony regarding 3GPP’s standard business practices for record keeping and publishing technical specifications, change request proposals, reports, and other documents developed during the course of standards activities carried out by the 3rd Generation Partnership Project (“3GPP”) and the European Telecommunications Standards Institute (“ETSI”), and to provide testimony regarding the availability of a specific document from 5G Ensure.

2. I have been asked to provide my opinions regarding the authenticity and dates of public accessibility of the following documents:

- Version 1.1.0 of technical report 3GPP TR 33.899 (“Technical Specification Group Services and System Aspects; Study on the security aspects of the next generation system (Release 14)”) (hereinafter “TS 33.899 v1.1.0”, Ex. 1007)
- Version 0.4.0 of technical specification 3GPP TS 23.501 (“Technical Specification Group Services and System Aspects; System Architecture for the 5G System; Stage 2 (Release 15)”) (hereinafter “TS 23.501 v0.4.0”, Ex. 1008)

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- 5G Ensure Deliverable D3.1 (“5G-PPP security enablers technical roadmap (early vision)”) (hereinafter “D3.1”, Ex. 1010)

3. As an ETSI Project Manager and Secretary, from June 1998 to December 2004, I have personal knowledge of 3GPP’s standard business and records keeping practices. I continued following 3GPP’s work ever since. Thus, based on my experience, personal knowledge, and review of 3GPP’s business records, I am able to testify regarding the authenticity of certain documents published by 3GPP and the timing of their publication. I’m also aware of various organizations which work in the cellular technology and industry space, such as the 5G Infrastructure Public Privat Partnership (5G PPP).

4. I am being compensated for my time spent on this matter at my usual rate of €500 per hour. My fee is not contingent on the outcome of this or any matter, or on the content of any of the testimony I give in this declaration. I have no financial interest in Petitioner.

5. I have been informed that Ericsson (hereinafter referred to as “Patent Owner”) alleges ownership and is the current assignee of U.S. Patent No. 10,425,817 (“the ’817 Patent”) (Ex. 1001). I have no financial interest in the Patent Owner or the ’817 patent.

II. BACKGROUND AND QUALIFICATIONS

6. I have more than 25 years of experience working with standards development organizations including the Third Generation Partnership Project (“3GPP”), the European Telecommunications Standards Institute (“ETSI”), and the Open Mobile Alliance (“OMA”). I have particular experience with the development of standards related to cellular telecommunications, including the standards for the Universal Mobile Telecommunications System (“UMTS”), Long Term Evolution (“LTE”), and 5G, which are all standards developed by the 3GPP.

7. I attended the University of Technology Aachen in Aachen, Germany, where I performed graduate studies in Electrical Engineering with a focus on telecommunications technologies (“Dipl.-Ing. TH” degree). I also attended the University of Technology Trondheim in Trondheim, Norway, and completed my Diploma thesis, “Design of a dual processor computer for digital signal processing in power electronics,” in 1993.

8. From December 1993 to June 1998, I worked at Mannesmann Mobilfunk as a System Engineer and Project Manager in Quality Assurance and Technical Standards. One of my responsibilities was to ensure by managing and performing related test activities that cellular network equipment was compatible with the Global System for Mobile Communications (“GSM”) standard developed

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by ETSI. During that time, I also started working as a standards delegate. I attended my first ETSI meeting in 1996 (although I was already following ETSI developments from 1992 during my studies).

9. From June 1998 to December 2004, I worked at ETSI as a project manager for various ETSI Special Mobile Group (“SMG”) and 3GPP working groups. First, I served as a secretary of SMG4 “Data Services” and SMG8 “Base Stations Testing.” Then, as a project manager with the ETSI Mobile Competence Center (“MCC”), I supported establishing 3GPP as the new international standards development organization for cellular telecommunications. One of my roles was acting as Secretary for 3GPP’s Technical Specifications Group Terminals, Working Group (“T2”), the group which played a leading role in the creation of standards for Multimedia such as the Multimedia Messaging Service (“MMS”).

10. Later, I was a secretary of the highest-level Technical Specifications Group Terminals which was besides other things responsible for the development of test specifications including tests for the radio interface.

11. I edited all technical specifications produced by my working groups and presented results to the parent body for approval. I attended all meetings (apart from some sub-working group meetings) and was also responsible for compiling meeting reports, for handling all the meeting documents, and managing the work plan. It was

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also my role to guide the groups and to advise the chairmen regarding 3GPP working methods and procedures including document handling, and to make sure delegates were aware of their company's obligations under the 3GPP Intellectual Property Right policy.

12. As part of my responsibilities at ETSI, I acted as a 3GPP custodian of records by personally managing 3GPP's public File Transfer Protocol (ftp) folders, which I used to make publicly accessible various 3GPP documents, including versions of 3GPP specifications, technical reports, liaison statements, change requests, contributions, agendas, meeting reports, and other 3GPP documents from my working groups. I am also knowledgeable about document management practices used in other working groups and within 3GPP in general with regard to making documents publicly accessible through the same, public ftp server of 3GPP.

13. Since I left ETSI as a staff member in 2005, I have been continuously involved in standardization activities, including with Open Mobile Alliance, ETSI, and 3GPP.

14. After I left ETSI, I worked from January 2005 to October 2014 at Vodafone, first as a Project Manager for Mobile Broadcast Standards, and then as Vice Chairman of the Device Management working group of the Open Mobile Alliance, and then as a Senior Standards Strategist, all with responsibilities as

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described on my C.V. At Vodafone, I was deeply involved in standards work with ETSI and 3GPP and other standards setting organizations, including as a delegate to 3GPP SA1 “Services.” As part of my responsibilities, I attended selected 3GPP meetings, submitted documents to 3GPP, used 3GPP resources (including 3GPP’s ftp server) extensively, and remained knowledgeable about 3GPP policies and procedures with regard to document management and public accessibility. I was also involved in the creation of patents, defense activities related to patent litigations, and patent evaluation, mostly in the context of standards development.

15. Since leaving Vodafone in 2014, I have performed consulting work regarding Internet of Things (IoT) and Machine to Machine (M2M) technology and standards, first at Friedhelm Rodermund Consulting and then as the Founder and Director of IOTECC GmbH. In connection with my work, I regularly deal with standards such as OMA’s Lightweight M2M, 3GPP’s LTE, Narrowband IoT (NB-IoT) and 5G standards. And I have extensively used 3GPP resources and have remained knowledgeable about 3GPP policies and procedures with regard to document management and public accessibility.

16. I also provide consulting services related to patents, in particular around 3GPP Standard Essential Patents (“SEPs”), and I have been working as an expert witness on a number of occasions. I continue to closely follow the maintenance of

the ETSI IPR Policy as a delegate to the ETSI IPR Special Committee. Furthermore, I'm conducting a seminar on SEPs and the Internet of Things at the Technical University of Ilmenau, Germany.

17. At the time of writing this declaration, I am following – including attending selected meetings - the following standards committees: ETSI oneM2M, ETSI IPR Special Committee, Open Mobile Alliance, and 3GPP.

18. A copy of my curriculum vitae, which includes a detailed description of my experience and education, is attached as Appendix A. A list of litigation matters on which I have worked over the last five years is also included in my curriculum vitae.

III. SUMMARY OF OPINIONS

19. It is my opinion that TR 33.899 v1.1.0 (Ex. 1007) is a technical specification published by 3GPP and would have been publicly accessible through <ftp.3gpp.org> as of April 13, 2017.

20. It is my opinion that TS 23.501 v0.4.0 (Ex. 1008) is a technical specification published by 3GPP and would have been publicly accessible through <ftp.3gpp.org> as of April 20, 2017.

21. It is my opinion that D3.1 (Ex. 1010) is a document published by 5G Ensure and would have been publicly accessible through <https://5gensure.eu/deliverables> as of March 18, 2016.

IV. PUBLICATION OF 3GPP SPECIFICATIONS AND RELATED DOCUMENTS

A. General Practices

22. Unless otherwise noted, the following is an accurate description of 3GPP general practices from 1998 to the present, regardless of whether I use the present or past tense to describe those practices.

23. 3GPP was established in 1998 by a group of telecommunications standard development organizations from Japan, Korea, China, Europe, and the United States to jointly develop worldwide standards for mobile telecommunications. Today, 3GPP consists of seven partners: Association of Radio Industries and Businesses, Japan (“ARIB”), Alliance for Telecommunications Industry Solutions, USA (“ATIS”), China Communications Standards Association (“CCSA”), European Telecommunications Standards Institute (“ETSI”), Telecommunications Technology Association, Korea (“TTA”), Telecommunication Technology Committee, Japan (“TTC”). In addition to being one of the founding partners, ETSI hosts the Mobile Competence Centre (“MCC”), which provides administrative and technical support to the day-to-day work of 3GPP. Furthermore,

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ETSI manages 3GPP's IT services such as the 3GPP website, ftp server, and email exploders.

24. 3GPP is the world's leading organization for developing and maintaining cellular telecommunications standards, which it has done since its foundation in 1998. As noted above and in my C.V., I began working for 3GPP, as part of my work at ETSI, the European-based organizational partner of 3GPP.

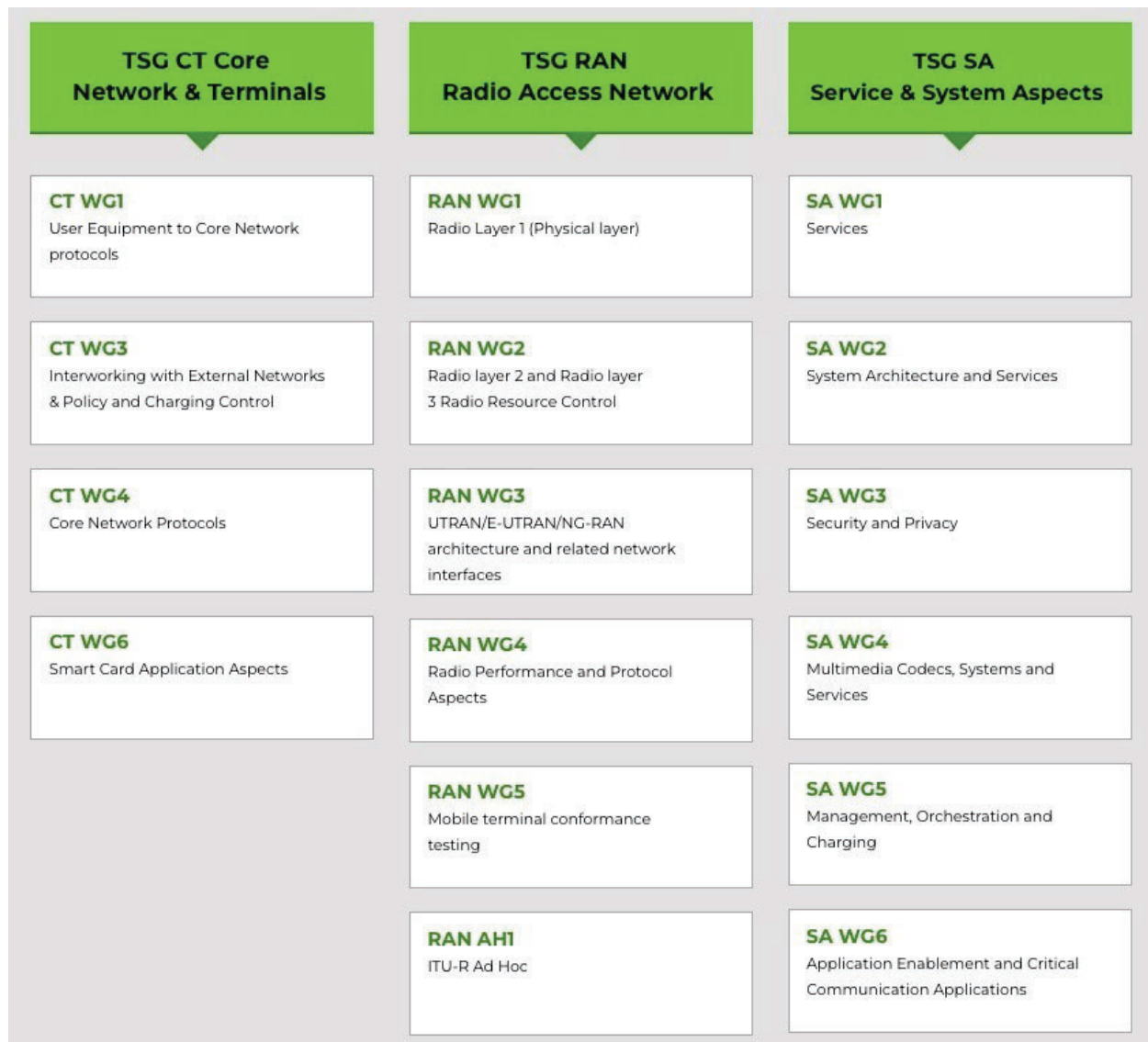
25. In the ordinary course of its regularly conducted business activities, and pursuant to its standard business practices, 3GPP publishes technical specifications, proposals, reports, and other documents related to the development of cellular telecommunications standards. Such documents are published for the purposes of discussion and establishment of industry standards for cellular telecommunications. This has been 3GPP's ordinary course of business since when I began working at ETSI in 1998.

26. In the ordinary course of 3GPP's regularly conducted business activities, and pursuant to its standard business practices, all draft technical specifications, proposals, reports, and other temporary documents to be discussed or considered in relation to 3GPP's telecommunications standards activities were, and continue to be, assigned a temporary document number and made publicly available, including on the ftp server associated with the 3GPP website, currently residing at

ftp.3gpp.org. Such documents are referred to as “T-docs.” Final versions of the technical specifications also were, and continue to be, publicly available from that same ftp server.

27. The names and the structure of 3GPP working groups, as of today, can be found below¹:

¹ <https://www.3gpp.org/3gpp-groups>



28. Each Technical Specification Group (TSG) or Working Group adopts a structured numbering system for the documents associated with their meetings, and those systems typically follow a consistent numbering system as shown in the following example: xminnzzzz. The numbering system normally comprises five logical elements: (1) x: a single letter corresponding to the TSG; where in 2007/2008

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x was one of R (Radio Access Network), C (Core and Terminals), S (Service and System Aspects), or G (GSM/EDGE Radio Access Network); (2) m: A single character corresponding to the Working Group identity (typically 1, 2, 3, etc.) or, in the case of the TSG itself, the letter “P”; (3) i: Normally the hyphen character “-”; (4) nn: the calendar year of the meeting to which the document was submitted; (5) zzzz: a running number.

29. In the ordinary course of 3GPP’s regularly conducted business activities, and pursuant to its standard business practices, from December 1998 onwards, 3GPP published all of its T-docs and all final versions of its technical specifications on its ftp server, which has always been easily and publicly accessible from its website and currently resides at [ftp.3gpp.org](ftp://ftp.3gpp.org).

30. As early as December 1998, 3GPP’s ftp server was freely accessible to the general public with no login, password, or membership requirement.

31. By 1999, at least 100 companies were members of 3GPP (by December 2020: 719 companies), ranging from Bosch to Ericsson to Nokia to Samsung and generally including those interested in the discussion, creation, and adoption of cellular telecommunications standards, including UMTS. Each of these companies typically delegated multiple individuals to regularly participate in 3GPP meetings. Further, pursuant to 3GPP’s standard business practices, 3GPP working groups sent

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emails notifying these individuals as soon as new or additional documents had been uploaded to 3GPP's ftp server. Thus, not only did the general public have access to the documents on the ftp server, but some of the most interested members of the public—those working to develop standards for cellular telecommunication or working to implement the standards—were personally informed of their availability by email. Based on my experience with 3GPP and the telecommunications industry, I would expect any person implementing a cellular network or device, e.g., an LTE network or device, to consult the corresponding specifications on the 3GPP ftp server, as well as other related documents. The whole purpose of 3GPP creating and making these specifications available was so that engineers and other individuals would have ready access to them when developing and implementing cellular networks and devices.

32. By June 1999, 3GPP's ftp server was well-known to persons in the cellular telecommunications industry as a source of public information regarding industry standards and technological advances.

33. 3GPP specifications bear a specification number consisting of four or five digits, e.g., 09.02 or 29.002. The first two digits define the specification series which are defined to group the different aspects of the 3GPP system into e.g. requirements, service aspects, radio aspects codecs, security aspects, and test

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specifications. The series digits are followed by two additional digits for the 01 to 13 series or three further digits for the 21 to 55 series. The subjects of the individual specification series are explained on 3GPP's website at <https://www.3gpp.org/specifications/specification-numbering>, and reproduced below:

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Subject of specification series	3G and beyond / GSM (R99 and later)	GSM only (Rel-4 and later)	GSM only (before Rel-4)
Requirements	21 series	41 series	01 series
Service aspects ("stage 1")	22 series	42 series	02 series
Technical realization ("stage 2")	23 series	43 series	03 series
Signalling protocols ("stage 3") - user equipment to network	24 series	44 series	04 series
Radio aspects	25 series	45 series	05 series
CODECs	26 series	46 series	06 series
Data	27 series	47 series (none exists)	07 series
Signalling protocols ("stage 3") -(RSS-CN) and OAM&P and Charging (overflow from 32- range)	28 series	48 series	08 series
Signalling protocols ("stage 3") - intra-fixed- network	29 series	49 series	09 series
Programme management	30 series	50 series	10 series
Subscriber Identity Module (SIM / USIM), IC Cards. Test specs.	31 series	51 series	11 series
OAM&P and Charging	32 series	52 series	12 series
Access requirements and test specifications		13 series ⁽¹⁾	13 series ⁽¹⁾
Security aspects	33 series	(2)	(2)
UE and (U)SIM test specifications	34 series	(2)	11 series
Security algorithms ⁽³⁾	35 series	55 series	(4)
LTE (Evolved UTRA), LTE-Advanced, LTE- Advanced Pro radio technology	36 series		
Multiple radio access technology aspects	37 series		
Radio technology beyond LTE	38 series		

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34. Following a link for a series (e.g., “23 series” link) leads to a 3GPP web page providing access to all specifications in a series, as shown by the screenshot below:

The screenshot displays the 3GPP Portal interface. At the top, there is a navigation bar with links for 'Home', 'Directory', 'Browse FTP', and 'Help'. Below this is a search bar and a table of specifications. The table has columns for 'Specification Number', 'Type', 'Title', 'Status', 'Primary Responsible Group', and 'Release'. The table lists various specifications, including 23.002, 23.003, 23.007, 23.008, 23.009, 23.010, 23.011, 23.012, 23.014, 23.015, 23.016, 23.018, 23.019, 23.022, 23.021, 23.032, 23.034, 23.035, 23.036, 23.038, 23.040, 23.041, 23.042, 23.043, 23.044, 23.045, 23.046, 23.048, 23.053, 23.054, 23.057, 23.059, 23.070, 23.071, and 23.072. The status of each specification is indicated by a color-coded icon and text, such as 'Under change control', 'Withdrawn under change control', or 'Draft'.

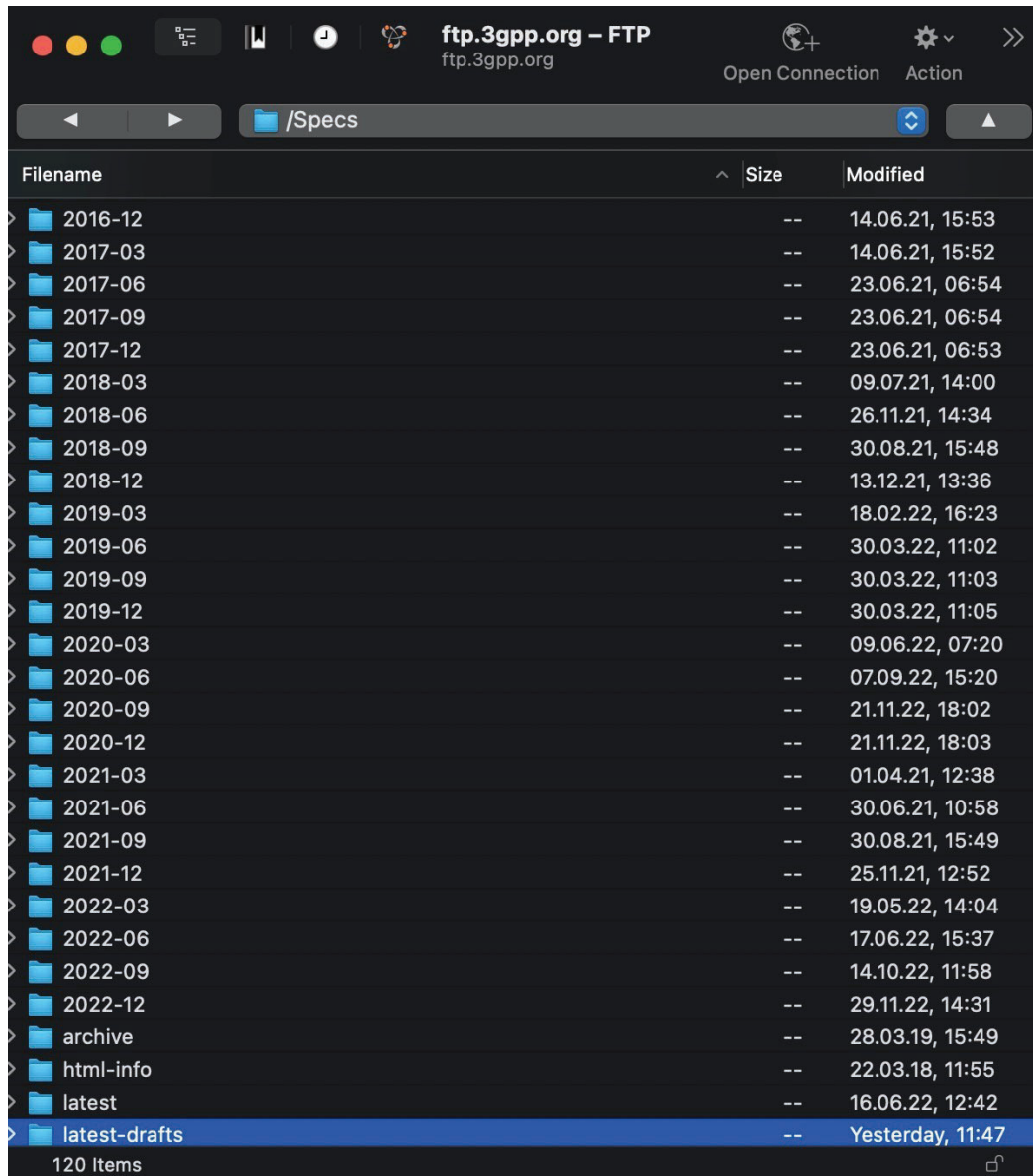
35. For instance, the 5G New Radio (NR) standard is covered in the “38 series” and is further subdivided into separate sections or specifications. As another example of a series, security aspects are covered in the “33 series”. Each specification can span from a few pages to hundreds of pages. One full version of the 5G standard is massive, spanning tens of thousands of pages.

36. In the ordinary course of 3GPP's regularly conducted business activities, and pursuant to its standard business practices, T-docs are usually uploaded to 3GPP's ftp server and website before the meeting where they are to be discussed. Documents created or revised during the course of a meeting are normally uploaded at the latest during the week following the meeting (e.g., the meeting report of the meeting is usually published for review during the week following the meeting).

37. In the ordinary course of 3GPP's regularly conducted business activities, and pursuant to its standard business practices, 3GPP maintains archives that include different versions of the specifications, as well as email communications to its membership, including emails announcing the uploading of new or additional documents to 3GPP's ftp server. These archives are created at the time the emails are initially sent.

38. 3GPP specifications almost always are duplicated in at least two and sometime more locations on the ftp server. One location corresponds to a "snapshot" of the specifications corresponding to a particular plenary meeting cycle—for instance, the 2018–2012 snapshot contains a snapshot of numerous specifications after the December 2018 3GPP plenary meetings. The second location is an

“archive” that contains all versions over time for a given specification. The screenshot below shows an excerpt of the “Spec” folder at ftp.3gpp.org:



Filename	Size	Modified
> 2016-12	--	14.06.21, 15:53
> 2017-03	--	14.06.21, 15:52
> 2017-06	--	23.06.21, 06:54
> 2017-09	--	23.06.21, 06:54
> 2017-12	--	23.06.21, 06:53
> 2018-03	--	09.07.21, 14:00
> 2018-06	--	26.11.21, 14:34
> 2018-09	--	30.08.21, 15:48
> 2018-12	--	13.12.21, 13:36
> 2019-03	--	18.02.22, 16:23
> 2019-06	--	30.03.22, 11:02
> 2019-09	--	30.03.22, 11:03
> 2019-12	--	30.03.22, 11:05
> 2020-03	--	09.06.22, 07:20
> 2020-06	--	07.09.22, 15:20
> 2020-09	--	21.11.22, 18:02
> 2020-12	--	21.11.22, 18:03
> 2021-03	--	01.04.21, 12:38
> 2021-06	--	30.06.21, 10:58
> 2021-09	--	30.08.21, 15:49
> 2021-12	--	25.11.21, 12:52
> 2022-03	--	19.05.22, 14:04
> 2022-06	--	17.06.22, 15:37
> 2022-09	--	14.10.22, 11:58
> 2022-12	--	29.11.22, 14:31
> archive	--	28.03.19, 15:49
> html-info	--	22.03.18, 11:55
> latest	--	16.06.22, 12:42
> latest-drafts	--	Yesterday, 11:47

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39. While 3GPP aims to upload the updated specifications to both locations at the same time, occasionally there may be a small difference in the upload date,

and thus the date stamp, for the same specification uploaded to the two locations. Additionally, specifications which are not yet approved (so called “draft” specifications) are presented as T-docs at working group and at plenary meetings (as soon as the working group decides to submit the specification to the plenary meeting for information or approval). In many cases, the T-docs are also distributed on the email exploder of the working group prior to the meeting, making the T-docs available to all those subscribed to the email distribution list.

40. The timestamp on 3GPP’s ftp server shows the date when the document was uploaded the last time. Thus, the timestamp shows the latest possible date the document became publicly available and accessible on 3GPP’s ftp server. The given document might have been available earlier and the original timestamp might have been overwritten because the document was uploaded again. According to my experience, this is something which happened quite frequently. Thus, the ftp timestamp is reliable as the latest possible upload date but one cannot determine whether it represents the first upload of a document to the ftp server.

41. 3GPP’s working practice to store their documents on their ftp server, as described above, has not changed over time. Starting from the first 3GPP meetings in 1998 until present, all WGs and plenary meetings are represented by dedicated meeting folders on the ftp server. These meeting folders include the documents

discussed at the meetings. Both the folders and the documents are accessible to the public. Almost every week, a new meeting folder with the respective documents is added. In addition to the plenary and WG meeting folders, and some other folders, there is also the “Specs” folder, which holds all 3GPP specifications including the aforementioned “snapshot” and archive folders. Since the early days of 3GPP a new folder is added inside the “Specs” folder after each TSG plenary meeting to hold the latest versions of specifications approved at those TSG plenary meetings. This is still 3GPP’s working practice today; thus, this practice has not changed over time.

42. 3GPP maintains a set of publicly accessible documents² providing further details on its way of working:

- 3GPP Working Procedures
- Vocabulary for 3GPP Specifications 3GPP TR 21.905
- Working Methods 3GPP TR 21.900
- Specification Drafting Rules 3GPP TR 21.801

B. Specific Documents

1. TR 33.899 V1.1.0

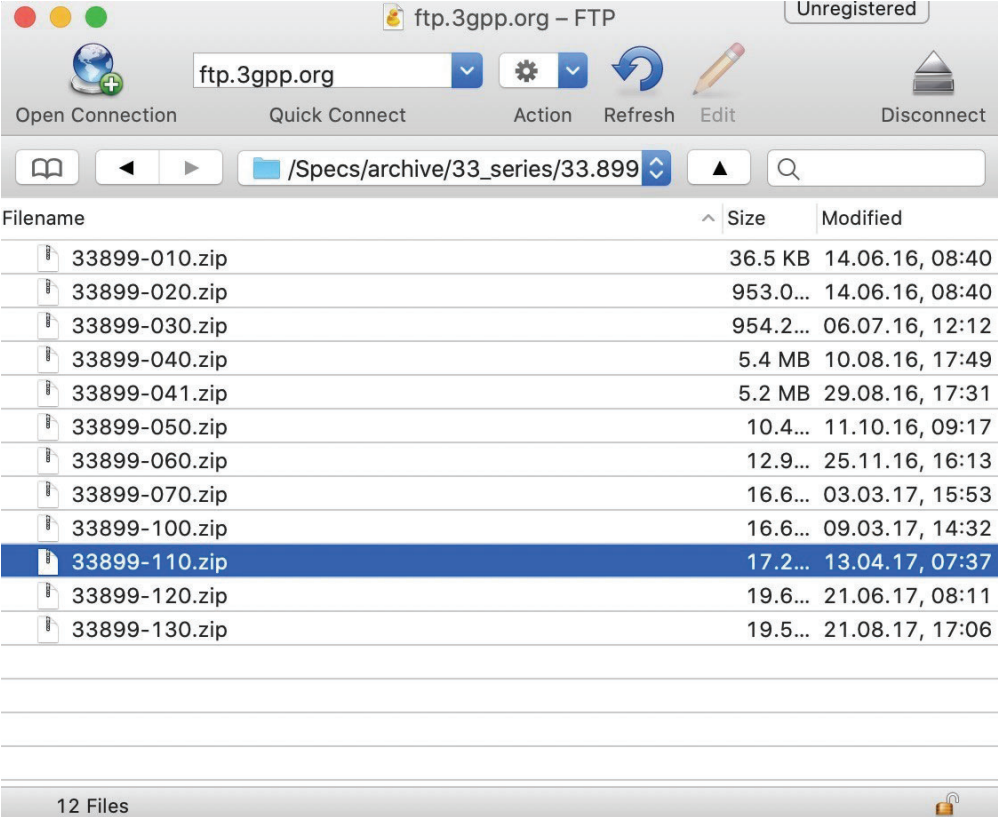
43. Based on my personal knowledge and my review of 3GPP’s business records, I recognize Ex. 1007 as a true and correct copy of version 1.1.0 of technical

² All available from <https://www.3gpp.org/delegates-corner/3gpp-working-procedures>.

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report 3GPP TR 33.899 (“Technical Specification Group Services and System Aspects; Study on the security aspects of the next generation system (Release 14)”), which shows on its cover page “2017-03” as the year (2017) and month (March) during which this document was released by 3GPP. The document was published and freely available on 3GPP’s ftp server by April 13, 2017. This is confirmed by the date stamp shown on the historic 3GPP ftp server for the corresponding downloadable file (“33.899-110.zip”), as maintained by the Internet Archive at https://web.archive.org/web/20170831054628/http://www.3gpp.org/ftp/specs/archive/33_series/33.899. This information is also shown on the date stamp for the present-day listing of the same document on the 3GPP ftp server at https://www.3gpp.org/ftp/Specs/archive/33_series/33.899, as shown by the screen shot below:

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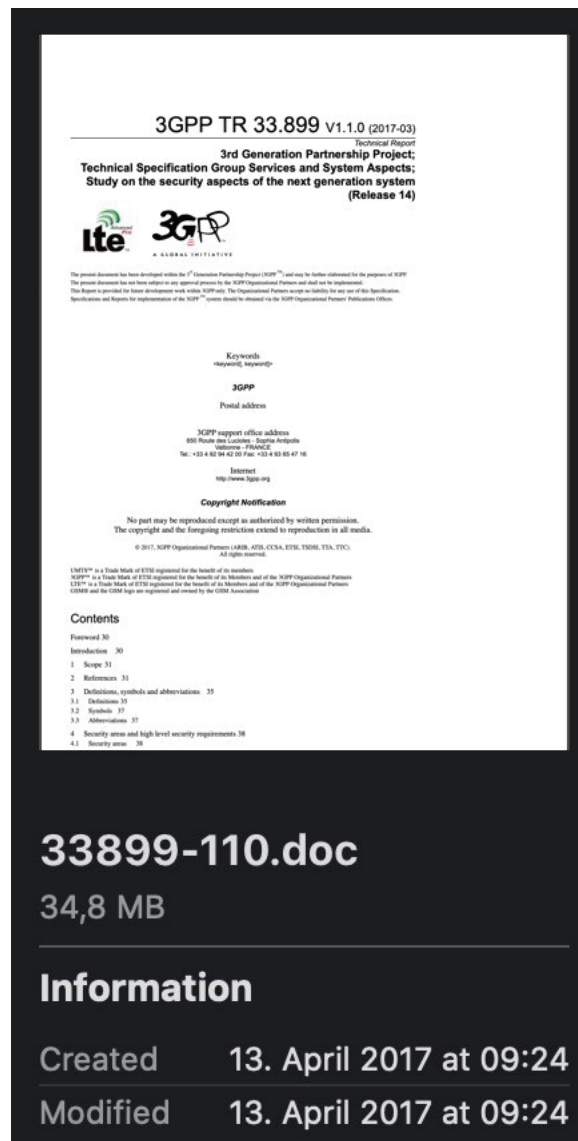


The screenshot shows an FTP client window titled 'ftp.3gpp.org - FTP'. The address bar displays 'ftp.3gpp.org'. The breadcrumb path is '/Specs/archive/33_series/33.899'. A table of files is listed with columns for 'Filename', 'Size', and 'Modified'. The file '33899-110.zip' is selected, highlighting its details.

Filename	Size	Modified
33899-010.zip	36.5 KB	14.06.16, 08:40
33899-020.zip	953.0...	14.06.16, 08:40
33899-030.zip	954.2...	06.07.16, 12:12
33899-040.zip	5.4 MB	10.08.16, 17:49
33899-041.zip	5.2 MB	29.08.16, 17:31
33899-050.zip	10.4...	11.10.16, 09:17
33899-060.zip	12.9...	25.11.16, 16:13
33899-070.zip	16.6...	03.03.17, 15:53
33899-100.zip	16.6...	09.03.17, 14:32
33899-110.zip	17.2...	13.04.17, 07:37
33899-120.zip	19.6...	21.06.17, 08:11
33899-130.zip	19.5...	21.08.17, 17:06

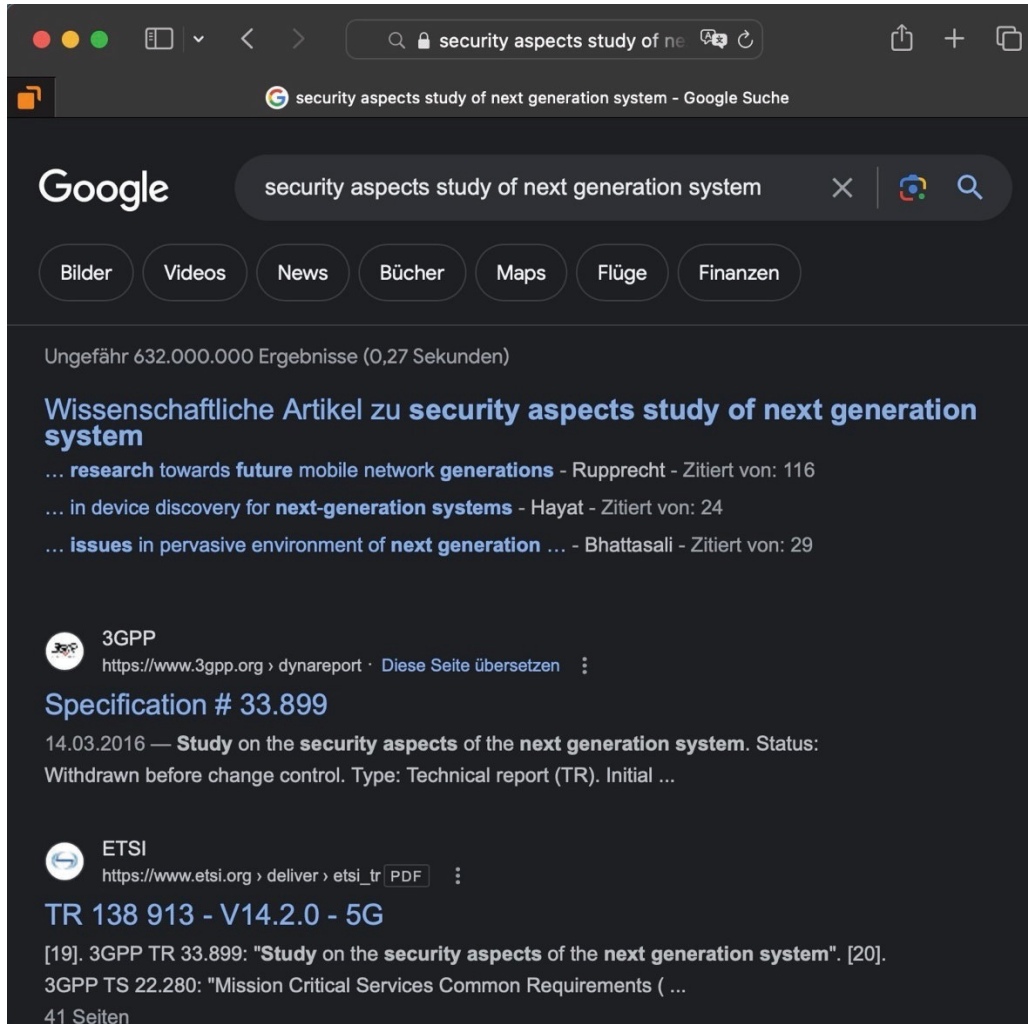
12 Files

44. In addition, metadata information for the downloaded and extracted specification file states a last Modified date of “13. April 2017”, as shown in the screenshot below:



45. I believe that also a person without prior knowledge of 3GPP and/or the technical report (TR) number would have been able to easily find the TR for download via internet search. For instance, a Google search for “security aspects

study of next generation system” provides the TR number “33.899” as the top result as can be seen in the screenshot below:



46. Following the provided search result link “Specification # 33.899” leads to a 3GPP web page offering under the tab “Versions” download links to all versions of TR 33.899 including version 1.1.0, as shown by the screenshot below :

portal.3gpp.org

Specification # 33.899

3GPP A GLOBAL INITIATIVE Portal

General Versions Responsibility Related

Specification #: 33.899

Release 15(Spec is Withdrawn from this Release at SA#77) **Latest Remark:**

Meetings	Version	Upload date	Comment
No related specifications			

Release 14(Spec is Withdrawn from this Release at SA#77) **Latest Remark:**

Meetings	Version	Upload date	Comment
SA3#88	1.3.0	2017-08-21	S3-172095
SA3#87	1.2.0	2017-06-21	S3-171583
SA3#86-Bis (5G ad hoc)	1.1.0	2017-04-13	S3-170692
SA#75	1.0.0	2017-03-09	SP-170096
SA3#86	0.7.0	2017-03-03	S3-170503
SA3#85	0.6.0	2016-11-25	S3-162138
SA3-NextGen	0.5.0	2016-10-11	
SA3#84	0.4.1	2016-08-29	Clean version (previous had r...
SA3#84	0.4.0	2016-08-10	S3-161290
SA3#83	0.3.0	2016-07-06	Implements missing approved t...
SA3#83	0.2.0	2016-06-14	
SA3#83	0.1.0	2016-06-14	

Exit

47. The above example search illustrates that it is very easy for an interested member of the public without prior knowledge of the TR number and

even without prior knowledge of 3GPP to locate any version of TR 33.899, including version 1.1.0, for download.

48. The above search was performed at the time of writing this report. According to my personal experience, similar searches done in 2017 would have similarly provided a path to download version 1.1.0 of TR 33.899.

49. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP members and the general public by April 13, 2017, at the latest.

2. TS 23.501 V0.4.0

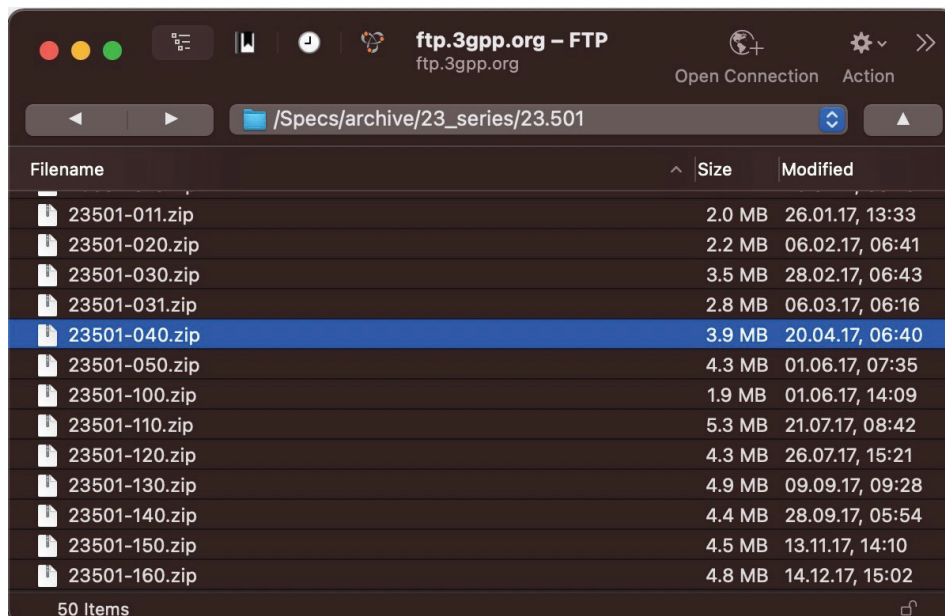
50. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1008 as a true and correct copy of version 0.4.0 of technical specification 3GPP TS 23.501 ("Technical Specification Group Services and System Aspects; System Architecture for the 5G System; Stage 2 (Release 15)"), which shows on its cover page "2017-04" as the year (2017) and month (April) during which this document was released by 3GPP. The document was published and freely available on 3GPP's ftp server by April 20, 2017. This is confirmed by the date stamp shown on the historic 3GPP ftp server for the corresponding downloadable file ("23501-040.zip"), as maintained by the Internet

Declaration of Friedhelm Rodermund

Archive at

https://web.archive.org/web/20170528155820/http://www.3gpp.org/ftp/Specs/archive/23_series/23.501/, as well as the date stamp for the present-day listing of the same document on the 3GPP ftp server at

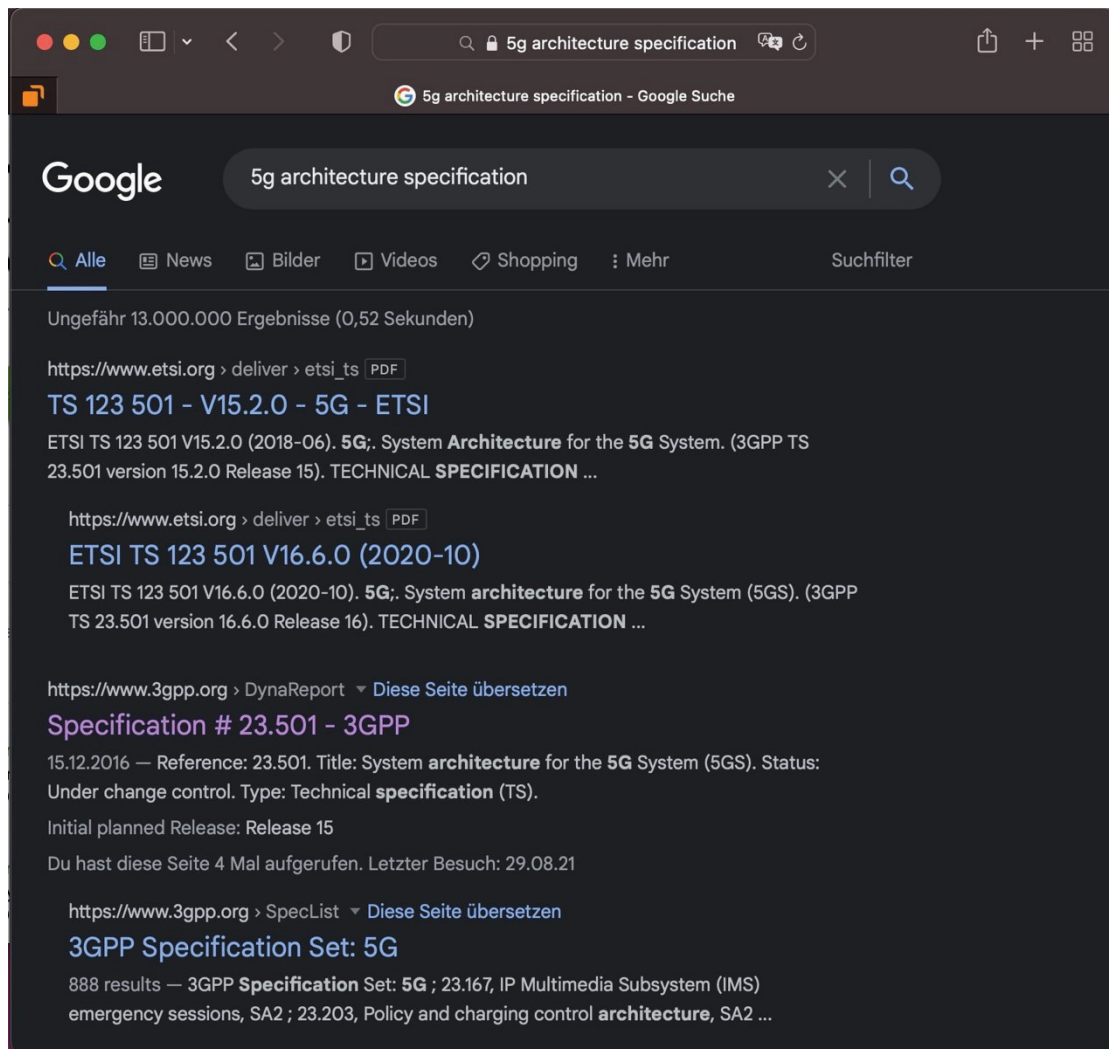
https://www.3gpp.org/ftp/Specs/archive/23_series/23.501 as shown by the screenshot below:



51. In addition, the information for the downloaded and extracted specification file states a last Modified date of “19. April 2017.” Here is a screenshot showing those file details:



53. I believe that a person without prior knowledge of 3GPP and/or the technical specification (TS) number would have been able to easily find the TS for download via internet search. For instance, a Google search for “5g architecture specification” provides the TS number “23.501” as one of the top results as can be seen in the screenshot below:



54. Following the provided search result link “Specification # 23.501 – 3GPP” leads to a 3GPP web page offering under the tab “Versions” download links to all versions of TS 23.501 including version 0.4.0, as shown by the screenshot below:

Declaration of Friedhelm Rodermund

portal.3gpp.org

Specification # 23.501

3GPP Portal

Specification #: 23.501

General	Versions	Responsibility	Related
SA#78	15.0.0	2017-12-22	MCC Editorial update after TS...
SA#78	2.0.1	2017-12-15	SP-170931: Correction of Anne...
SA#78	2.0.0	2017-12-15	
SA2#124	1.6.0	2017-12-14	Updated with approved pCRs af...
SA2#123	1.5.0	2017-11-13	Updated with approved pCRs at...
SA2#122- Electronic: Editorial work on 5G TSs	1.4.0	2017-09-28	Updated with approved pCRs af...
SA#77	1.3.0	2017-09-09	SP-170736: Updated with appro...
SA2#122	1.2.0	2017-07-26	Corrections to pCR implementa...
SA2#122	1.1.0	2017-07-21	Updated with approved pCRs af...
SA#76	1.0.0	2017-06-01	
SA2#121	0.5.0	2017-06-01	Updated with approved pCRs af...
SA2#120	0.4.0	2017-04-20	Updated with approved pCRs af...
-	0.3.1	2017-03-06	Fixing Editorial errors from ...
SA2#119	0.3.0	2017-02-28	Updated with approved pCRs af...
SA2#118-Bis	0.2.0	2017-02-06	Incorporated agreed P-CR - S2...
SA2#118-Bis	0.1.1	2017-01-26	Fixing Editorial errors from ...
SA2#118-Bis	0.1.0	2017-01-25	Updated with approved pCRs at...
SA2#118-Bis	0.0.0	2017-01-23	S2-170625 - TS Skeleton for 5...

Exit

55. The above example search illustrates that it is very easy for an interested member of the public without prior knowledge of the TS number and even without prior knowledge of 3GPP to locate any version of TS 23.501, including version 0.4.0, for download.

56. The above search was performed at the time of writing this report. According to my personal experience, a similar search done in 2017 would have similarly provided the path to download version 0.4.0 of TS 23.501.

57. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP members and the general public by April 20, 2017, at the latest.

V. PUBLICATION OF 5G ENSURE DOCUMENTS

A. General Practices

58. 5G Ensure was an EU funded project which produced various deliverables and resulted by 5/4/2016 in the creation the Security Working Group (WG) of the 5G Infrastructure Public Private Partnership (5G PPP). By the end of 2017 the WG was moved to the 5G Industry Association (5G IA).

59. The 5G PPP is a joint initiative between the European Commission and the European ICT industry (ICT manufactures, operators, service providers,

SMEs and research institutions). In the 5G PPP, the 5G IA represents the private side and the European Commission the public side. The 5G PPP aims to deliver solutions, architectures, technologies and standards for the ubiquitous next generation communication infrastructures of the coming decade, with a focus on 5G as its name shows. One of the goals is to reinforce the European industry to successfully compete on global markets and open new innovation opportunities. The 5G PPP website can be found at <https://5g-ppp.eu>.

60. 5G Ensure was an EU-funded project under the Horizon 2020 program – The European Union program for research and innovation. It started its work by 1/11/2015 and had a planned duration of 24 months. 5G Ensure was driving the 5G security vision for the European 5G Infrastructure Public Private Partnership (5G-PPP) which also included contributing to 3GPP. 5G Ensure published its deliverables at <http://www.5gensure.eu/deliverables>. I was personally never actively involved in the work of 5G Ensure or 5G PPP.

B. Specific Documents

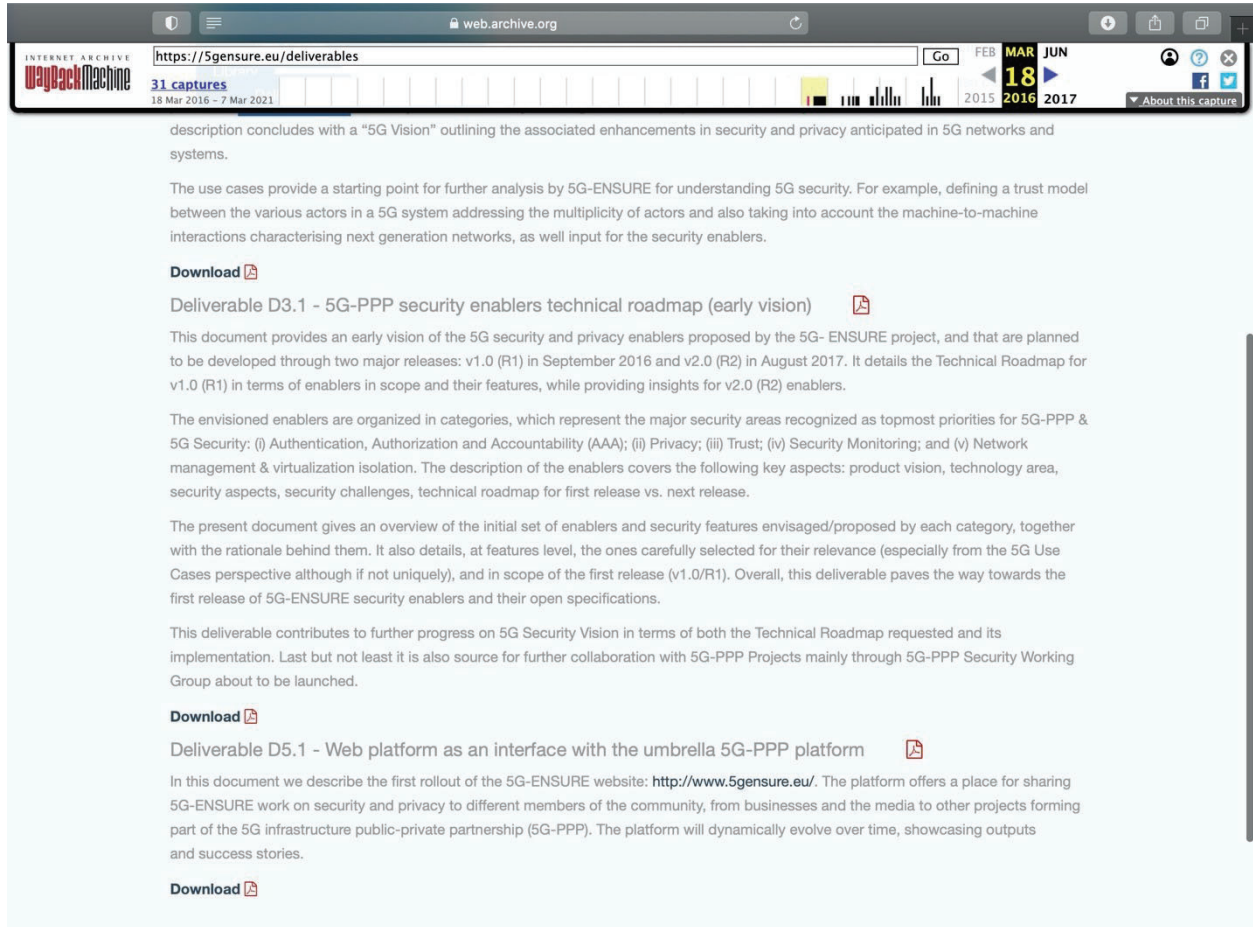
1. 5G Ensure Deliverable D3.1

61. Based on my research and my review of 5G Ensure’s business records, I recognize Ex. 1010 as a true and correct copy of Deliverable D3.1 (“5G-PPP security enablers technical roadmap (early vision)”), which shows on its cover page “11.03.2016” as the “Delivery Date”. Furthermore, the cover page shows “Public”

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as the “Dissemination Level”. Thus, I understand that this document was not only available to all 5G Ensure members but also to the general public. The document was published and freely available on the 5G Ensure website at <https://5gensure.eu/deliverables> by March 18, 2016, at the latest. This is confirmed by an archived version of the above website from that date at <https://web.archive.org/web/20160318120656/https://5gensure.eu/deliverables>, as shown by the screen shot below:

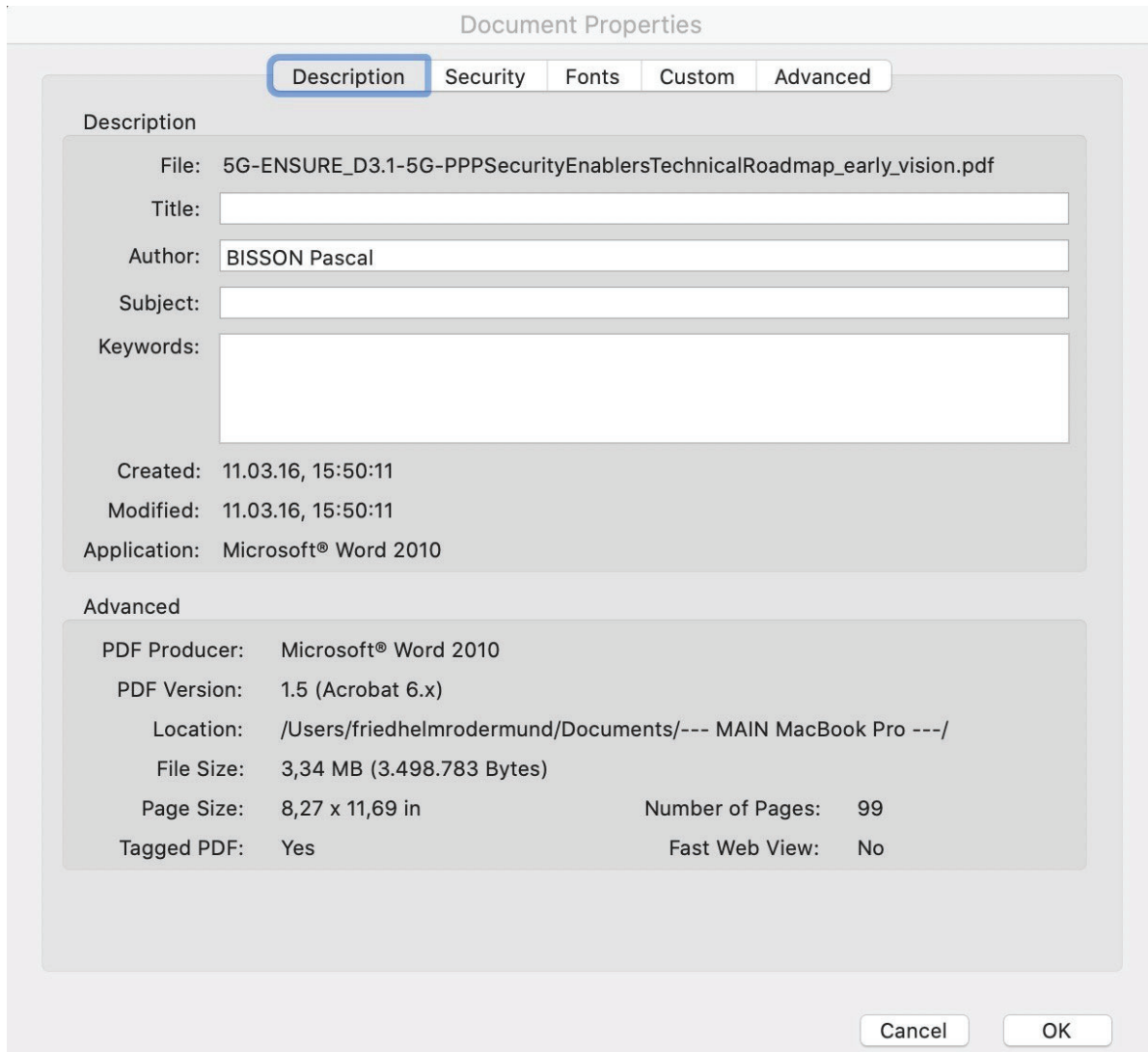
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62. Public download of the document was possible that time. Clicking on the download icon leads to the following archived link https://web.archive.org/web/20160502230835/http://5gensure.eu/sites/default/files/Deliverables/5G-ENSURE_D3.1-5G-PPPSecurityEnablersTechnicalRoadmap_early_vision.pdf which reveals the same document as in Ex. 1010.

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63. In addition, metadata information for the downloaded file from <https://5gensure.eu/deliverables> states a last Modified date of “11. March 2016”, as shown in the screen shot below:



The screenshot shows the 'Document Properties' dialog box with the 'Description' tab selected. The 'Advanced' tab is also visible below it.

Description

File: 5G-ENSURE_D3.1-5G-PPPSecurityEnablersTechnicalRoadmap_early_vision.pdf

Title:

Author: BISSON Pascal

Subject:

Keywords:

Created: 11.03.16, 15:50:11

Modified: 11.03.16, 15:50:11

Application: Microsoft® Word 2010

Advanced

PDF Producer: Microsoft® Word 2010

PDF Version: 1.5 (Acrobat 6.x)

Location: /Users/friedhelmrodermund/Documents/--- MAIN MacBook Pro ---/

File Size: 3,34 MB (3.498.783 Bytes)

Page Size: 8,27 x 11,69 in

Number of Pages: 99

Tagged PDF: Yes

Fast Web View: No

Buttons: Cancel, OK

64. Thus, based on my research, this information tells me that this document was available to all 5G Ensure members and the general public by March 18, 2016, at the latest.

VI. AVAILABILITY FOR CROSS-EXAMINATION

65. In signing this declaration, I recognize that the declaration may be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in the case and that cross examination will take place within the United States. If cross examination is required of me, I will cooperate to the best of my ability to appear for cross examination within the United States during the time allotted for cross examination.

VII. RIGHT TO SUPPLEMENT

66. I reserve the right to supplement my opinions in the future to respond to any arguments that the Patent Owner raises and to take into account new information as it becomes available to me.

VIII. SIGNATURE

67. I 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 willful 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.

68. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Dated: March 13, 2024



Friedhelm Rodermund

Appendix A

CURRICULUM VITAE

I. PERSONAL DATA

Name: **Friedhelm RODERMUND**

Mailing address: Am Steiner Graben 18
56077 Koblenz, Germany

Phone: +49 172 2606489

Email: fred@iotecc.com

II. PROFESSIONAL EXPERIENCE

Summary

Senior expert in telecommunications and Internet of Things (IoT) technology. 25 years of experience within the mobile communications industry, and several years in the IoT domain in various roles such as project management, technology innovation and evolution, standards development, technology strategy, patent creation and patent litigations, and development/introduction of new services.

Recognized standards expert who was actively involved in leading roles in the development of key standards for mobile telephony/data and service enablers across standards development organizations such as 3GPP, ETSI, GSMA, IETF, OMA, and oneM2M. Currently focussing on standards for the Internet of Things.

Founder and director of IOTECC GmbH which provides consulting services around technologies and standards enabling the Internet of Things, and consulting and expert services related to patents for mobile telecommunications and IoT.

01/2015 – present IOTECC GmbH Koblenz, Germany

Founder and CEO

- Mobile telecommunications, Internet of Things (IoT) technology and standards consulting
- Telecommunications and IoT patent consulting
 - Consulting services around telecommunications and IoT patents in particular related to 3GPP, ETSI and OMA standards
 - State of the art/prior art research services related to patent creation e.g. for new 5G patents
 - Prior art research, essentiality assessment, patent infringement analysis related to litigations and validity actions
 - Advising on IP strategy
 - Advising on Standards Development Organisations (SDO) working processes and IPR policy
 - Experienced expert witness (please see section III for a list of supported actions)

11/2014 – 12/2014 Friedhelm Rodermund Consulting Koblenz, Germany

Internet of Things (IoT) Consultant

- IoT standards development and introduction of new IoT services

01/2011 – 10/2014	Vodafone Germany / Vodafone Group R&D	Düsseldorf, Germany
	<u>Senior Standards Strategist</u> - Representing Vodafone in various standardisation bodies - Creating technical standards for the Internet of Things - Work item lead, technical editor and key contributor of Open Mobile Alliance (OMA) "Lightweight M2M (LwM2M)" – the new standard for the Internet of Things - Advising and supporting various IoT/M2M projects related to e.g. automotive, smart metering, health, industry - Advising on the introduction of new IoT/M2M technologies and services - Leading Proof of Concepts of emerging technologies - Involved in innovation projects - Supporting the creation and protection of Intellectual Property	
01/2009 – 12/2010	Vodafone Germany	Düsseldorf, Germany
	<u>Vice Chairman Open Mobile Alliance (OMA) Device Management (DM)</u> - Responsible for Vodafone's Device Management standardisation - As OMA DM Vice Chairman, co-leading the group, chairing committee meetings and web conferences, steering the technical direction, management of the different work items - Editor of several specifications, rapporteur of various work items - Support of projects for the introduction of device management - Delegate to 3GPP SA1 with responsibility for the introduction of MTC (machine type communications) related service/network requirements	
01/2005 – 12/2008	Vodafone Germany	Düsseldorf, Germany
	<u>Project Manager Mobile Broadcast Standards</u> - Responsible for Mobile Broadcast standardisation across different broadcast systems/standards bodies and across all Vodafone local operations - Responsible for Mobile Broadcast standardisation strategy development and implementation - Delegation Lead for the Open Mobile Alliance (OMA) BCAST working group - Initiated and managed the BCAST device profile development in the BMCO Forum - Leading the "Service Protection" (pay-TV) stream of the German DVB-H Consortium - Filed several patents - Supporting patent litigations and patent portfolio evaluation (various technical areas)	
04/2003 – 12/2003	GSM Association	London, United Kingdom
	<u>Member of the MMS Task Force</u> - Verification of the MMS operator interworking framework - Supporting the definition and specification of the MMS functional evolution - Acting as a "link" between 3GPP and GSMA in the area of MMS	
06/1998 – 12/2004	European Telecommunications Standards Institute (ETSI)	Sophia Antipolis, France
01/2002 – 12/2004:	<u>Secretary 3GPP Technical Specifications Group "Terminals" and Terminals Working Group 2 "Terminal Services and Capabilities"</u>	
01/1999 – 12/2001:	<u>Secretary 3GPP Terminals Working Group 2 "Terminal Services and Capabilities" and GERAN 3 "Base Station Testing"</u>	

CURRICULUM VITAE

06/1998 – 03/1999: Secretary ETSI SMG4 "Data Services" and SMG8 "Base Station Testing"

- Supported the establishment of 3GPP (3rd Generation Partnership Project) as the leading standards organization for mobile telecommunications
- Project manager and secretary of TSG "Terminals" responsible for Terminal Conformance Testing, Terminal Services and Capabilities, Universal Subscriber Identity Module (USIM)
- Project manager and secretary of Terminals Working Group 2 "Terminal Services and Capabilities" that was responsible for Terminal Execution Environments, Messaging including Short Message Service (SMS), Cell Broadcast Service (CBS), Enhanced Messaging Service (EMS), Multimedia Messaging Service (MMS), Terminal Interfaces incl. AT-commands, Generic User Profile, Data Synchronization and others
- Establishment and management of the Work Plan and follow-up and report on the progress of the related work items
- Advising the chairmen and the standards groups on technical, procedural and political issues
- Editorship of various GSM and UMTS technical specifications
- Responsible for presenting the technical results of the working groups to the parent body
- Responsible for the communication with other standards bodies inside and outside 3GPP
- PR activities (articles, interviews)

12/1993 – 06/1998 Mannesmann Mobilfunk GmbH

Düsseldorf, Germany

System Engineer and Project Manager in Quality Assurance and Technical Standards

- Leadership and management of acceptance test projects in the area of GSM Base Station Controller (BSC) and GSM Base Station (BTS) hardware and software.
- Leading project teams of around 15 people
- Responsible for the clearance of releasing new software/hardware into the network
- Supported Request for Quotations, supplier evaluation and pre-selection, project manager of System Verification as a central part of the supplier selection process.
- Representation of Mannesmann Mobilfunk to the ETSI standardization group "Standardization Technical Committee SMG3 System Architecture"
- Conduction of product and hardware development quality audits
- Representative of Mannesmann Mobilfunk in A-interface interoperability testing activities
- Member of BSS product planning group which was defining operator requirements for future BSS releases
- Development of process improvements for type acceptance

CURRICULUM VITAE

III. LIST OF SUPPORTED PATENT LITIGATIONS AND VALIDITY ACTIONS

- 2023
Headwater Research LLC v. Samsung Electronics Co., Ltd.
Inter Partes Review matters
On behalf of Samsung
Counsel: Fish&Richardson P.C.
Role: Expert witness and consulting services
- 2023
Pantech Corp. et al. v. LG Electronics Inc. et al.
Inter Partes Review matters
On behalf of LG Electronics
Counsel: Ropes & Gray LLP
Role: Expert witness and consulting services
- 2023
Apple Computer Trading (Shanghai) Co., Ltd, Apple Electronics Products Commerce (Beijing) Co., Ltd. v. Optis Cellular Technology LLC
Shenzhen, China, Intermediate People's Court
On behalf of Apple
Counsel: WilmerHale
Role: Expert witness and consulting services
- 2023
Huawei Technologies Co., Ltd. v. MediaTek Inc.
Inter Partes Review matters
On behalf of MediaTek
Counsel: Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.
Role: Expert witness and consulting service
- 2023
Apex Beam Technologies LLC v. Samsung
Inter Partes Review matters
On behalf of Samsung
Counsel: Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.
Role: Expert witness and consulting services
- 2022
Constellation Designs LLC v. LG Electronics, Inc.
Inter Partes Review matters
On behalf of LG Electronics
Counsel: Fish&Richardson P.C.
Role: Expert witness and consulting services
- 2022
Unified Patents, LLC v. Togail Technologies LTD.
Inter Partes Review matters
On behalf of Unified Patents
Counsel: Duane Morris LLP
Role: Expert witness and consulting services
- 2022
Ericsson v. Apple
Certain Mobile Telephones, Tablet Computers With Cellular Connectivity, And Smart Watches With Cellular Connectivity, Components Thereof, And Products Containing Same, Inv. No. 337-TA-1299 (U.S.I.T.C.)
On behalf of Apple
Counsel: WilmerHale
Role: Expert and consulting services

CURRICULUM VITAE

- 2022
Ericsson v. Apple
Civil Action No. 2:21-cv-376 (E.D. Tex.)
On behalf of Apple
Counsel: WilmerHale
Role: Expert and consulting services
- 2022
Intellectual Ventures II LLC v. Toyota Motor Cooperation.
Inter Partes Review matters
On behalf of Toyota
Counsel: Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.
Role: Expert witness and consulting services
- 2022
Ericsson v. Apple
2nd Business Court, Rio de Janeiro, Brazil
On behalf of Apple
Counsel: WilmerHale
Role: Expert and consulting services
- 2022
Ericsson v. Apple
Civil Court, Bogotá, Columbia
On behalf of Apple
Counsel: WilmerHale
Role: Expert and consulting services
- 2022
Proven Networks LLC. v. NetApp Inc.
Inter Partes Review matters
On behalf of NetApp
Counsel: Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., Ropes & Gray LLP
Role: Expert witness and consulting services
- 2022
Ericsson v. Apple
Inter Partes Review matters
On behalf of Apple
Counsel: Fish&Richardson, Erise IP
Role: Expert witness and consulting services
- 2021
AEGIS 11 LLC v. Hisense Company, Ltd. and Hisense USA Corporation
Inter Partes Review matters
On behalf of Hisense
Counsel: Orrik Herrington & Sutcliffe LLP
Role: Expert witness and consulting services
- 2021
Nokia v. Lenovo
Certain Electronic Devices, Including Computers, Tablet Computers, and Components and Modules Thereof, Inv. No. 337-TA-1208 (U.S.I.T.C.)
On behalf of Lenovo
Counsel: WilmerHale
Role: Expert witness and consulting services
- 2021
Optis Cellular Technology LLC et al. v. Apple
Claim No. HP-2019-000006 (High Court of Justice, Business and Property Courts of England and Wales)

CURRICULUM VITAE

On behalf of Apple
Counsel: WilmerHale
Role: Expert witness and consulting services

2021

Ericsson v. Samsung
Inter Partes Review matters
On behalf of Samsung
Counsel: Kirkland&Ellis LLP, Fish&Richardson
Role: Expert witness and consulting services

2020

Panoptis Patent Management LLC et al. v. Apple Inc.
Civil Action No. 2:19-cv-66 (E.D. Tex.)
On behalf of Apple
Counsel: WilmerHale
Role: Expert witness at bench trial

2020

Sol IP, LLC v. AT&T Mobility, LLC et al.
Civil Action No. 2:18-cv-526 (E.D. Tex.)
On behalf of AT&T, Verizon, Sprint
Counsel: Gibson Dunn
Role: Expert witness and consulting services

2020

Bell Northern Research LLC v. LG Electronics Inc. et al.
Civil Action No. 18-CV-2864-CAB-BLM (S.D. Cal.)
On behalf of LG Electronics Inc.
Counsel: Fish&Richardson
Role: Expert witness and consulting services

2019

Conversant Wireless Licensing S.a.r.l. v. LG Electronics Deutschland GmbH
Civil Action No. 7 O 3277/18 (Landgericht Munich, Germany)
On behalf of LG Electronics Deutschland GmbH
Counsel: Wildanger Kehrwald Graf von Schwerin & Partner mbB
Role: Expert witness and consulting services

2019

Bell Northern Research, LLC v. Huawei Device Co., Ltd. et al.
Civil Action No. 3:18-cv-01784-CAB-BLM
On behalf of Huawei
Counsel: Fish&Richardson
Role: Expert witness and consulting services

2019

Uniloc USA, Inc., et al. v. Samsung Electronics America, Inc. and Samsung Electronics Co. Ltd.
Civil Action Nos. 2:18-cv-00040-JRG, 2:18-cv-00041-JRG, 2:18-cv-00042-JRG and 2:18-cv-00044-JRG (United States District Court for the Eastern District of Texas)
On behalf of Samsung
Counsel: Greenberg Traurig
Role: Expert witness and consulting services

2019

Uniloc USA, Inc., et al. v. Huawei Device USA, Inc. et al.
Civil Action No. 2:18-cv-00072-JRG-RSP (E.D. Tex.)
On behalf of Huawei
Counsel: McGuireWoods
Role: Expert witness and consulting services

CURRICULUM VITAE

2019

Microsoft Corporation v. Uniloc 2017 LLC

Inter Partes Review of U.S. Pat. No. 7,167,487

Inter Partes Review of U.S. Pat. No. 7,075,917

On behalf of Microsoft and on behalf of Apple as joinder petitioner

Counsel: Klarquist Sparkman (Microsoft), Erise IP (Apple)

Role: Expert witness and consulting services

2019

Qualcomm v. KFTC

South Korean Case, Seoul High Court

On behalf of intervenor Apple supporting the KFTC

Counsel: Boies Schiller Flexner

Role: Expert witness

2018/19

Evolved Wireless, LLC v. Apple, Inc.

Civil Action No. 1:15-cv-00542-JFB-SRF

On behalf of Apple

Counsel: DLA Piper

Role: Expert witness and consulting services

2018/19

Cisco Systems Inc. v. Traxcell Technologies

Inter Partes Review of Traxcell Technologies patents

On behalf of Cisco

Counsel: King&Spalding

Role: Expert witness and consulting services

2018/19

Qualcomm Inc. v. Apple Inc.

Civil Action No. 3:17- cv-02398-DMS-MDD (United States District Court for the Southern District of California)

Civil Action No. 3:17-cv-02402-WQH-MDD

Certain Mobile Electronic Devices and Radio Frequency and Processing Components Thereof (II), Inv. No. 337-TA-1093

Inter Partes Review of U.S. PATENT NO. 9,154,356

Cases IPR2019-00047, IPR2019-00048, IPR2019-00049, IPR2019-00128, IPR2019-00129

On behalf of Apple and Intel

Counsel: WilmerHale

Role: Expert witness and consulting services

2018/19

Apple Inc. v. Qualcomm Inc.

Civil Action No. 3:17-CV-00108-GPC-MDD (United States District Court for the Southern District of California)

On behalf of Apple

Counsel: Fish&Richardson, Boies Schiller Flexner

Role: Expert witness and consulting services

2018

3G Licensing, S.A. et al. v. LG Electronics Inc. et al

Inter Partes Review of U.S. Patent No. 7,995,091

On behalf of LG Electronics

Counsel: Fish&Richardson

Role: Expert witness

2017

Huawei Technologies Co. LTD. v. T-Mobile US, Inc. & T-Mobile USA, Inc.

E.D. Tex. Case Nos. 2:16-cv-00052-JRG-RSP; 2:16-cv-00055-JRG-RSP; 2:16-cv-00056-JRG-RSP; and 2:16-cv-00057-JRG-RSP

On behalf of T-Mobile

CURRICULUM VITAE

Counsel: Gibson Dunn
Role: Expert witness and consulting services

2016

Koninklijke KPN N.V. v. Samsung Electronics America, Inc. et al.
Civil Action No. 14-cv-1165
On behalf of Samsung Electronics
Counsel: Baker Botts
Role: Expert witness and consulting services

2016

SSH v. Sony
OLG Düsseldorf, Germany
On behalf of SSH
Counsel: Cohausz&Florack
Role: Technical expert support

2015/16

LG Electronics v. Core Wireless Licensing S.A.R.L.
Inter Partes Review of U.S. Patent No. 8,165,049
On behalf of LG Electronics
Counsel: Greenberg Traurig
Role: Expert witness

2015/16

Core Wireless Licensing S.A.R.L. v. LG Electronics Inc. and LG Electronics MobileComm U.S.A., Inc.
Civil Action No. 2:14-cv-911 (lead case) and Civil Action No. 2:14-cv-912 (consolidated)
On behalf of LG Electronics
Counsel: Greenberg Traurig, Sidley Austin
Role: Expert witness

2015

Intellectual Ventures I LLC v. T-Mobile USA, Inc. & T-Mobile US, Inc.
D. Del. Case No. 1:13-cv-01632
Intellectual Ventures II LLC v. T-Mobile USA, Inc. & T-Mobile US, Inc.
D. Del. Case No. 1:13-cv-01633
On behalf of T-Mobile
Counsel: Gibson Dunn
Role: Technical expert support

IV. EDUCATION

- | | | |
|--------------------------|--|--------------------------|
| 10/1984 – 10/1993 | University of Technology Aachen | Aachen, Germany |
| | <u>Graduate of Electrical Engineering with a focus on telecommunications technologies (Dipl.-Ing. TH)</u> | |
| 10/1992 – 04/1993 | University of Technology Trondheim | Trondheim, Norway |
| | <u>Diploma Thesis "Design of a dual processor computer for digital signal processing in power electronics"</u> | |

V. LANGUAGES

German, English, French

VI. RECENT PUBLICATIONS

CURRICULUM VITAE

- "Unlocking the internet of things and driving the need for interoperability", Global Telecoms Business, December 2013
- "The need for standardisation in the M2M services layer", Global Telecoms Business, February 2014
- Co-authored white paper "Lightweight M2M: Enabling device management and applications for the internet of things", Open Mobile Alliance, March 2014
- "Objects are a new way to create M2M applications", Global Telecoms Business, April 2014
- "The need for standardisation in the M2M services layer", M2M Now, July 2015

Appendix B



3GPP_TSG_SA_WG2@LIST.ETSI.ORG

Options: Use Proportional Font
Show Text Part by Default
Show All Mail Headers

Message: [<< First] [< Prev] [Next >] [Last >>]
Topic: [<< First] [< Prev] [Next >] [Last >>]
Author: [<< First] [< Prev] [Next >] [Last >>]

Subject: TS 23.501 v0.4.0 available
From: "Chandramouli, Devaki (Nokia - US/Irving)" <devaki.chandramouli@NOKIA.COM>
Reply To: Chandramouli, Devaki (Nokia - US/Irving)
Date: Wed, 19 Apr 2017 16:34:41 +0000
Content-Type: multipart/alternative
Parts/Attachments: text/plain (7 kB) , text/html (16 kB)

Hi all,

The next version of TS 23.501 is now available here:
ftp://ftp.3gpp.org/tsg_sa/WG2_Arch/Latest_SA2_Specs/Latest_draft_S2_Specs/23501-040.zip
http://www.3gpp.org/ftp/tsg_sa/WG2_Arch/Latest_SA2_Specs/Latest_draft_S2_Specs/23501-040.zip

Thanks to Maurice for the help with uploading them. I have incorporated all the comments received (so far). In case of further issues, let us fix via P-CRs.

Regards
Devaki.

From: Chandramouli, Devaki (Nokia - US/Irving)
Sent: Monday, April 17, 2017 9:51 AM
To: Chandramouli, Devaki (Nokia - US/Irving) <devaki.chandramouli@nokia.com>; 3GPP_TSG_SA_WG2@LIST.ETSI.ORG
Subject: RE: [SGS_Ph1] draft TS 23.501 v0.4.0 for review

Hi all,

Thanks to everyone who has checked and provided feedback. I have fixed the following based on feedback received:

1. 2831 - implementation error with abbreviations fixed
2. 2717 - implementation error in section 5.3.2.4 fixed.
3. Reference fixed due to updated Section # - correct sec # reflected in bullets under section 5.3.8.
4. 2863 - Implemented
5. 2748 - duplicate EN removed.

I am attaching the updated draft version (draft still). Due to Easter holidays, will wait till tomorrow noon prior to releasing the next version. If you spot implementation errors, I would really appreciate your feedback (directly to me) prior to tomorrow noon CET.

Regards
Devaki.

From: Chandramouli, Devaki (Nokia - US/Irving) [mailto:devaki.chandramouli@NOKIA.COM]
Sent: Tuesday, April 11, 2017 11:10 PM
To: 3GPP_TSG_SA_WG2@LIST.ETSI.ORG
Subject: Re: [SGS_Ph1] draft TS 23.501 v0.4.0 for review

And here is the updated Change history (with the list of incorporated P-CRs):

Incorporated agreed P-CRs for TS 23.501 from SA#120 - S2-172166, S2-172726, S2-172725, S2-172717, S2-172728, S2-172718, S2-172723, S2-172731, S2-172732, S2-172783, S2-172020, S2-172633, S2-172781, S2-172641, S2-172455, S2-172496, S2-172512, S2-172494, S2-172495, S2-172034, S2-172510, S2-171726, S2-172473, S2-172476, S2-172519, S2-172748, S2-172320, S2-172392, S2-172394, S2-172376, S2-172378, S2-172379, S2-172341, S2-172342, S2-172356, S2-172852, S2-172857, S2-172863, S2-172867, S2-172869, S2-172870, S2-172872, S2-172876, S2-172877, S2-172846, S2-172851, S2-172656, S2-172784, S2-172787, S2-172860, S2-172663, S2-172821, S2-172824, S2-172825 plus implementation of "Update '5G Core' to 5GC and use 'Control Plane' throughout 501" as indicated in Chairman's notes and some editorial cleanup by Rapporteur

Regards,
Devaki.

From: Chandramouli, Devaki (Nokia - US/Irving)
Sent: Tuesday, April 11, 2017 11:03 PM
To: Chandramouli, Devaki (Nokia - US/Irving) <devaki.chandramouli@nokia.com>; 3GPP_TSG_SA_WG2@LIST.ETSI.ORG
Subject: RE: [SGS_Ph1] draft TS 23.501 v0.4.0 for review

Hi all,

I realized I missed couple of P-CRs (S2-172846, S2-172831) approved during email approval. Please find attached revised draft version including them.

PS: With 2831, Editor inserted the new definitions in the appropriate spots to retain the alphabetical order.

Regards
Devaki.

From: Chandramouli, Devaki (Nokia - US/Irving) [mailto:devaki.chandramouli@NOKIA.COM]
Sent: Tuesday, April 11, 2017 5:04 PM
To: 3GPP_TSG_SA_WG2@LIST.ETSI.ORG
Subject: [SGS_Ph1] draft TS 23.501 v0.4.0 for review

Hi all,

Please find attached draft TS 23.501 for your review. **As usual, draft version is not for P-CRs yet.**

Please check that your approved P-CR from SA2#120 has been implemented and also ensure that all parts of your P-CR is implemented.

If you spot implementation errors, please send your comments to me directly and will ensure that this is taken care of. Kindly provide your comments by Monday noon CET.

It incorporates the following P-CRs:

Incorporated agreed P-CRs for TS 23.501 from SA#120 - S2-172166, S2-172726, S2-172725, S2-172717, S2-172728, S2-172718, S2-172723, S2-172731, S2-172732, S2-172783, S2-172020, S2-172633, S2-172781, S2-172641, S2-172455, S2-172496, S2-172512, S2-172494, S2-172495, S2-172034, S2-172510, S2-171726, S2-172473, S2-172476, S2-172519, S2-172748, S2-172320, S2-172392, S2-172394, S2-172376, S2-172378, S2-172379, S2-172341, S2-172342, S2-172356, S2-172852, S2-172857, S2-172863, S2-172867, S2-172869, S2-172870, S2-172872, S2-172876, S2-172877 plus implementation of "Update '5G Core' to 5GC and use 'Control Plane' throughout 501" as indicated in Chairman's notes and some editorial cleanup by Rapporteur

Please note some editorial adaptations done as part of implementation:

S2-172824 – Figure titles were missing. Editor gave titles for the figures in section 7.2.1.

S2-172731 - Editorial - Change on change - Second Note was deleted from sec. 5.6.9.2.2 but still the Note # was not updated. Note 1 is simply a Note now as Note 2 does not exist.

S2-172633 - Editor gave the title section 5.6.9.4 for the new section.

S2-172496 – proposes a new roaming arch. figure with SMF-UPF split however it does not show deletion of the old figure (Editor confirmed with originators that the old figure should have been deleted thus deleted it). Overlaps quite much with the content of 2455. For editing, 2455 has been used as the baseline as it precedes the introduction of 2496 (as 2455 is an implementation of CR approved in SA2#119) and 2496 overrides the content of 2455 in case of differences. However Editor noticed that 2496 CR has been written as an independent P-CR thus it is possible that there are some duplication of sections. This might deserve some technical verification and alignment in the upcoming SA2#121.

Updates the roaming arch. figures however it does not show this as a new change! It also does not show the existing arch. figure to be deleted (Editor confirmed with originators that this should have been shown as a new figure with old figure deleted). In the future, it is recommended to use track changes also for figure updates to ensure this is incorporated. Figure A.2.1-3 shows SMF - SMF interface as N4. I assume it should have been SMF to UPF with N4 thus Editor has corrected assuming it is a sheer typo/oversight.

S2-172512 - Updates the same non-roaming arch. figure as in 2496. Editor had to create a new figure in order to incorporate and merge the changes proposed by 2496 and 2512. (Editor verified the new figure with respective SMEs).

S2-172495 - 3rd CR modifying the same set of arch. figures. Would be highly preferred that such CRs are merged to avoid having to create new figures as part of implementation of the P-CRs.

S2-172034 - one change proposed by this (arch. figure update) was already covered also by S2-172663.

S2-171726 - Note: 2728 also covers the first change proposed by this CR.

S2-172473 - Modified 4.7.2.2.2a to 4.8.2.2.3 to align with the ToC based on other P-CRs. I believe we can avoid introducing sections like 2a as we are still working on a draft spec as section renumbering is still acceptable.

S2-172342 – Editor updated reference numbers and updated the corresponding usage. One observation – there are 2 references to TS 23.228 – [15] as part of the main body and [8] as part of MPS annex. Need to avoid duplication of references when text in the annex is being moved over.

S2-172378 – Editor gave sec# 5.16.3.3 for new section.

S2-172870 - Editor (re)numbered the Note #s i.e. the ones with Note X and also one existing Note due to deleted/newly added Note.

Regards
Devaki.

