

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC.,

Petitioner,

v.

KONINKLIJKE KPN N.V.,

Patent Owner.

Case No. IPR2022-00524

Patent 9,372,098

**DECLARATION OF DR. JAMES OLIVIER
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 9,372,098**

TABLE OF CONTENTS

	Page
LIST OF EXHIBITS AND APPENDICES	iv
I. INTRODUCTION	1
II. SUMMARY OF OPINIONS.....	2
III. QUALIFICATIONS AND EXPERIENCE.....	3
A. Education and Work Experience.....	3
B. Compensation.....	7
C. Documents and Other Materials Relied Upon	8
IV. STATEMENT OF LEGAL PRINCIPLES	8
A. Claim Construction.....	8
B. Anticipation	9
C. Obviousness.....	9
V. LEVEL OF ORDINARY SKILL IN THE ART	11
VI. TECHNOLOGY BACKGROUND OF THE '098 Patent	15
A. A Brief History of Telecommunication Networks.....	15
B. The 3rd Generation Partnership Project.....	20
C. Mobility Management and Connection Management.....	21
1. Mobility Management.....	23
2. Connection Management.	25
VII. OVERVIEW OF THE '098 PATENT.....	26
A. '098 Types of Wireless Signalling Attach Messages.....	29
B. Prosecution History	32
C. The '098 Patent Claims	36
D. Priority Date	41
E. Claim Construction.....	41
VIII. IDENTIFICATION OF THE PRIOR ART AND SUMMARY OF OPINIONS.....	42

TABLE OF CONTENTS
(continued)

	Page
A. Summary of United States Patent 9,191,774 (“ <i>Krco</i> ”)	42
B. Summary of U.S. Patent App. Pub. No. 2008/0153521 A1 to <i>Benaouda</i> (“ <i>Benaouda</i> ”)	46
C. Summary of 3GPP TS 24.008 v8.3.0 (“TS 24.008”).....	49
D. Summary of WO 2008/039973 A1 to Ananthanarayanan (“ <i>Ananthanarayanan</i> ”).....	50
E. A POSITA’s Motivation to Combine <i>Krco</i> with <i>Benaouda</i>	51
F. Reasonable Expectation of Success	56
G. A POSITA’s Motivation to Combine <i>Krco</i> with <i>Benaouda</i> and TS 24.008	58
H. Reasonable Expectation of Success	60
IX. UNPATENTABILITY OF THE ’098 PATENT CLAIMS	62
A. Ground 1: Claims 1-2 and 9-25 are Unpatentable as they are rendered Obvious by <i>Krco</i> in view of <i>Benaouda</i>	62
1. Independent Claim 17	62
2. Claim 20	83
3. Claim 18.....	87
4. Claim 19.....	88
5. Independent Claim 1	88
6. Claim 2.....	90
7. Claim 9.....	92
8. Claim 10.....	94
9. Claim 11	95
10. Claim 12.....	97
11. Claim 13.....	98
12. Claim 14.....	98
13. Claim 15.....	98
14. Claim 16.....	101

TABLE OF CONTENTS
(continued)

	Page
15. Claim 21	101
16. Claim 22. A communication device according to claim 21, wherein the non-signalling application data comprises alarming data.....	104
17. Claim 23. The communication device according to claim 21, wherein the non-signalling application data comprises measurement data.....	104
18. Claim 24. The communication device according to claim 23, further comprising one or more sensors, wherein the measurement data comprises measurement data obtained using the one or more sensors.....	105
19. Claim 25.....	105
B. Ground 2: <i>Krco</i> in view of <i>Benaouda</i> and TS 24.008.	106
1. Claim 2. The method according to claim 1, wherein the wireless signalling message is a network attach request message.	106
2. Claim 3. The method according to claim 2, wherein said network attach request message is a location updating request message with a location updating type information element indicating an IMSI attach.	109
3. Claim 4. The method according to claim 2, wherein said network attach request message is an attach request with an attach type information element indicating a GPRS request or a combined GPRS/IMSI attach.....	112
4. Claim 5.....	112
5. Claim 6. The method according to claim 2, further comprising transmitting an attach reject message to said communication module, said attach reject message comprising data for said communication module.....	115
X. CONCLUSION	117
XI. DECLARATION	117

LIST OF EXHIBITS AND APPENDICES

Exhibit No.¹	Description
1001	U.S. Patent No. 9,549,098 B2 (“the ’098 Patent”)
1002	Prosecution File History for the ’098 Patent
1003	Declaration of Dr. James Olivier
1004	CV of Dr. James Olivier
1008	Jörg Eberspächer, Hans-Jörg Vögel, Christian Bettstetter, Christian Hartmann, GSM Architecture, Protocols and Services (3rd Edition) (“Eberspächer”)
1009	U.S. Patent No. 9,191,774 B2 to <i>Krco</i> (“ <i>Krco</i> ”)
1010	U.S. Patent Pub. No. 2008/0153521 to <i>Benaouda</i> (“ <i>Benaouda</i> ”)
1011	3GPP TS 24.008 v8.3.0 (“TS 24.008”)
1012	WO Publication No. WO 2008/039973 to Ananthanarayanan (“ <i>Ananthanarayanan</i> ”)
1013	Declaration of Craig Bishop
1014	Claim Listing
1015	U.S. Patent No. 7,802,292 B2 to Shaw
1016	Convergence Technologies for 3G Networks
1017	WO Publication No. WO 2006/088947 to Geltner (“Geltner”)
1020	3GPP TS 23.040 v6.9.0 (“TS 23.040”)
1021	U.S. Patent Pub. No. 2006/0217136 A1 to Bantukul
1022	WO Publication No. WO 2009/146740 to <i>Krco</i>

¹ Citations to patents are made by column and line cite; citations to patent publications are made by paragraph number; citations to Exhibit 1002 are made with reference to the Bates-stamped pagination; citations to other exhibits are made to the page number of the document itself.

TABLE OF ABBREVIATIONS AND CONVENTIONS

Abbreviations and Conventions	
3GPP	3rd Generation Partnership Project
BSC	Base Station Controller
BSS	Base Station Subsystem
BTS	Base Station Transceiver
CN	Core Network
EDGE	Enhanced Data rates for GSM Evolution
EMM	Evolved Packet System (“EPS”) Mobility Management
eNodeB	E-UTRAN Node B
EPC	Evolved Packet Core
EPO	European Patent Office
EPS	Evolved Packet System
E-UTRAN	Evolved UMTS Terrestrial RAN (sometimes used interchangeably with “LTE”)
GERAN	GSM EDGE Radio Access Network
GGSN	Gateway GPRS Service Node
GSM	Global System for Mobile Communications
HSS	Home Subscriber Server
HLR	Home Location Register
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
LTE	Long Term Evolution

Abbreviations and Conventions	
MM	Mobility Management
MME	Mobility Management Entity
MS	Mobile Station
NAM	Network Access Mode
Node B	Base Station for UMTS
PGW	Packet Data Network Gateway
RAN	Radio Access Network
RAT	Radio Access Technology
SGW	Serving Gateway
TCH	Traffic Channel
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS Terrestrial RAN

I, James L. Olivier, Ph.D., hereby declare as follows:

I. INTRODUCTION

1. I am currently a Research Professor and Program Lead for Transformational Technology at the Hunt Institute for Engineering and Humanity, which is part of the Lyle School of Engineering at Southern Methodist University (“SMU”) in Dallas, Texas. The mission of SMU’s Hunt Institute is to partner with leaders in business, academia, and government to develop and scale sustainable and affordable technologies and solutions to the challenges facing people locally and globally.

2. I am also currently an Adjunct Professor in the Telecommunications and Network Engineering Program at SMU’s Graduate School of Electrical Engineering. In addition, I am also the owner of Olivier Consulting, where I provide consulting services for advanced network/product design along with Intellectual Property consulting.

3. I have been engaged by Petitioner to investigate and opine on certain issues relating to U.S. Patent No. 9,372,098 to Busropan et al. (EX1001, “the ’098 Patent”).

4. I understand that the ’098 Patent is assigned to Koninklijke KPN N.V. (“KPN”). KPN is also referred to as the “Patent Owner” in this document.

5. In this declaration, I will discuss the technology related to the '098 Patent, including an overview of that technology as it was known at the time of the earliest priority date claimed by the '098 Patent, which I have been informed is October 28, 2009. This overview of the technology provides some of the bases for my opinions with respect to the '098 Patent.

6. This declaration is based on the information currently available to me. To the extent that additional information becomes available, I reserve the right to continue my investigation and study.

7. In forming my opinions, I have relied on information and evidence identified in this declaration, including, without limitation, the '098 Patent, the prosecution history of the '098 Patent, and prior art including the references and other materials mentioned throughout my declaration below. I have also relied on my own experience and expertise in the technologies and systems that were already in use prior to October 28, 2009.

II. SUMMARY OF OPINIONS

8. The '098 patent generally relates to “the field of data transfer over a telecommunications network.” *See* EX1001, 1:17-18. As I will discuss below in more detail, challenged claims 1-6, and 9-25 of the '098 Patent were not patentable as of the claimed priority date.

9. It is my opinion that challenged claim 1 is both anticipated and obvious, and challenged claims 1-6 and 9-25 are obvious in light of the prior art discussed below.

10. My declaration is organized as follows: First, in Section III, I discuss my qualifications and background experience. In Section IV, I provide statements regarding the relevant legal principles, as I understand them, that I then apply in later sections. In Section V, I provide an overview of the level of ordinary skill in the art at the time of the alleged invention and then subsequently turn to the relevant technological background at the time of the alleged invention in Section VI. In Section VII, I introduce the '098 Patent, its prosecution history, and its priority date. In Section VIII, I introduce the prior art references which I use for my opinions in this Declaration, and I explain why a POSITA would have been motivated to combine these references and would have had a reasonable expectation of success in doing so. Finally, in Section IX, I walk through Grounds 1 and 2 showing how all the challenged claims of the '098 Patent are invalid as being obvious in view of the combinations identified.

III. QUALIFICATIONS AND EXPERIENCE

A. Education and Work Experience

11. I have a Ph.D. from The Ohio State University in Electrical Engineering with minors in Discrete Mathematics, Computer Science, and

Microelectronics. I have published papers in the areas of coding theory and multiprocessor computer systems. My CV is attached hereto as Exhibit 1004, which shows my education and experience in more detail.

12. I have extensive experience in the design and development of telecommunication systems and have specialized experience in cellular product development.

13. I have developed and designed equipment for cellular/data networks since I first joined AT&T Bell Laboratories in 1990. From 1990 to 2005 I also designed and implemented a variety of telecommunication systems, including Asynchronous Transfer Mode (“ATM”) based systems for use in cellular networks. ATM is a broadband, packet-switched telecommunications standard defined by the American National Standards Institute (“ANSI”) and the International Telecommunication Union (“ITU”). I also participated in the design and development of AT&T Autoplex Series base stations. I also participated in the design and development of AT&T’s Network Control Points (“NCPs”) which were massive network databases containing subscription information for customers. During this time, I first began my work with telecommunication standards bodies as a contributing member of the ATM Forum.

14. In 1995, I transitioned to the Digital Switch Corporation (“DSC”) Switch Products Division and was the Senior Manager of the ATM systems

engineering group developing ATM packet switches for a new generation base station for use by Motorola in their Centralized Base Station Controller, a core part of the second generation cellular network. I also served as DSC's representative to the ATM Forum. I was one of the first contributors to the wireless standards for the ATM Forum.

15. I next worked at Samsung Telecommunications America from 1996 to 1999 as a Principal Engineer for Samsung's next generation wireless broadband switching system over the Universal Mobile Telecommunications System ("UMTS"). UMTS is a third-generation ("3G") broadband standard developed by the 3rd Generation Partnership Project ("3GPP"). My work at Samsung included designing their next generation UMTS cellular switch, which provided both packet and voice services, such as telephony services, wireless services, broadband services, and Internet services. While at Samsung, I also served as Samsung's North American corporate representative to the ITU, which is the agency of the United Nations responsible for facilitating interconnectivity of information and communication technologies worldwide. The ITU participated in the 3GPP under the ITU's International Mobile Telecommunications 2000 effort. It was there that I participated in the development of standards for advanced wireless networks.

16. After that, I worked for Marconi Communications from 1999 to 2002, where I was responsible for design and development of a number of systems for

the access market, including Digital Subscriber Line (“DSL”) modems, along with the design of point-to-point wireless systems. I was also responsible for the servers for the Network Management System for the North American Access product division, which provide service provisioning for DSL customers.

17. I joined Navini Networks in 2002 as a Senior Manager. The Navini system was an entirely packet-based cellular system. I was responsible for layer 2 and layer 3 network protocols for Navini’s Wideband Code Division Multiple Access (“WCDMA”) wireless base stations and broadband modems. These layers were responsible for packet transmissions for various services over the WCDMA air interface. I also developed servers and databases for network authentication, network services, service provisioning and subscriber management for the Navini’s Worldwide Interoperability for Microwave Access ‘WiMAX’ Network.

18. I have also been the owner of Olivier Consulting since 2003 and have provided consulting services to various companies to develop networking systems and on intellectual property matters, including many such matters relating to cellular technologies specifically.

19. I am currently a Research Professor at the Hunt Institute for Engineering and Humanity, which is part of the Lyle School of Engineering at SMU in Dallas, Texas. Here, I serve as the Program Lead for Transformational Technology. Among the transformational technologies I investigate at the Hunt

Institute are Artificial Intelligence, the Internet of Things (“IoT”), and Blockchains.

20. I am also currently an Adjunct Professor in the Telecommunications and Network Engineering Program at SMU’s Graduate School of Electrical Engineering, where I teach Multiprotocol Label Switching (“MPLS”) networked enabled applications. MPLS is a telecommunications routing technique, and one of the MPLS applications I teach is the use of MPLS in advanced cellular networks.

21. Because of my background, training, and experience, I am qualified as an expert to explain the background of the technology encompassed by the ‘098 Patent as well as to opine on the validity of the claims of the ‘098 Patent in view of the prior art references discussed herein.

22. More details on my education, work experience and technical consulting experience, as well as a list of publications that I have authored or co-authored, are contained in my CV, attached to this Declaration as Exhibit 1004.

B. Compensation

23. I am being compensated for the services I am providing in connection with this petition for *inter partes* review of the ‘098 Patent at the rate of \$650 per hour. The compensation is not contingent upon my performance, the outcome of

these *inter partes* review proceeding, or any other proceeding, or any issues involved in or related to the *inter partes* review.

C. Documents and Other Materials Relied Upon

24. The documents on which I rely for the opinions expressed in this declaration are referenced in LIST OF EXHIBITS AND APPENDICES above. I also rely on any other references specifically identified in this declaration, in their entirety, even if only portions of these documents are discussed here in an exemplary fashion.

IV. STATEMENT OF LEGAL PRINCIPLES

A. Claim Construction

25. I have been informed that in an IPR proceeding, the challenged claims are generally given their ordinary and customary meaning in view of the specification and the prosecution history as it would have been understood by one of ordinary skill in the art at the time of the alleged invention.

26. I also understand that the claims should be construed consistent with the patent's intrinsic record, which includes the patent itself as well as the patent's prosecution history.

27. Moreover, I understand that extrinsic evidence (including, for example, technical dictionaries and treatises) may shed light on the meaning claim terms would have to one of ordinary skill in the art. I also understand that, where

extrinsic evidence conflicts with the intrinsic record, the intrinsic record governs the meaning of claim terms.

28. Further, I understand that conditional language in an apparatus claim does not render the claim indefinite because the structural elements that carry out conditional steps remain present regardless of whether or not the conditions for carrying out the step(s) is (are) met.

B. Anticipation

29. I have been informed that a patent claim is invalid if it is anticipated by prior art. I have been informed that anticipation requires a finding that a single prior art reference discloses each limitation of a claim as the limitations are arranged in the claim. I have been informed that a prior art reference's disclosures may be express or inherent. I have been informed that a limitation is inherently disclosed by a prior art reference if the reference necessarily includes the limitation in question.

C. Obviousness

30. I have also been informed that obviousness is a basis for invalidity of a patent. Specifically, I understand that where a prior art reference discloses less than all of the limitations of a given patent claim, that patent claim is invalid if the differences between the claimed subject matter and the prior art reference are such that the claimed subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the relevant art.

Obviousness can be based on a single prior art reference or a combination of references that teach all limitations of the claimed invention.

31. I have been informed that a claim is not obvious merely because each limitation was independently known in the prior art. I also have been informed that hindsight reasoning is not an appropriate basis for combining references to form an obviousness combination.

32. I understand that obviousness is not driven by a rigid formula, but is instead a flexible inquiry that reflects the fact that a person of ordinary skill in the art exercising ordinary creativity may find a variety of reasons to combine the teachings of different references. I understand that a non-exclusive list of possible factors that may give a person of ordinary skill in the art a reason to combine references includes any one or more of the following:

- Whether combining elements according to known methods yields predictable results;
- Whether simple substitution of known elements obtains predictable results;
- How use of known techniques improves similar methods in the same way;

- Whether applying known techniques to known methods ready for improvement yields predictable results;
- Whether one can choose from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- How known work in one field of endeavor prompts variations for use in the same field; and
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to combine prior art reference teachings to arrive at the claimed invention.

33. I have been informed that obviousness also requires that the combination could have been made with a reasonable expectation of success. I have been informed that absolute predictability is not required; however, at least some degree of predictability is required. I have been informed that predictability is determined at the time the invention was made.

V. LEVEL OF ORDINARY SKILL IN THE ART

34. I understand that the claims and specification of a patent must be read and construed through the eyes of a person of ordinary skill in the art (“POSITA”) at the time of the priority date of the claims.

35. I have also been advised that to determine the appropriate level of a person having ordinary skill in the art, the following factors may be considered:

(a) the types of problems encountered by those working in the field and prior art solutions thereto; (b) the sophistication of the technology in question, and the rapidity with which innovations occur in the field; (c) the educational level of active workers in the field; and (d) the educational level of the inventors.

36. Based on my education and experience, I am familiar with the level of knowledge that a person of ordinary skill would have possessed during the relevant time period.

37. **First**, turning to the types of problems and prior art solutions in the art, the “Field of Invention” to the specification of the ’098 Patent states that the patent “the invention relates to the field of data transfer over a telecommunications network.” EX1001, 1:16-18. The “Field of Invention” section further explains that the patent pertains to transferring data in a machine to machine setting. *Id.*, 1:19-23 (“the invention relates to a telecommunications network and a method of transferring user data from a communication module to a data processing centre in a machine-to-machine communications setting.”).

38. **Second**, turning to the sophistication of the technology and the rapidity with which innovations occur in the field, the technical specifications that governed the functionality of data/cellular networks at the time of the alleged invention required education and experience in cellular communications technology to understand. A person skilled in the art would have been monitoring

these developments. *See, e.g.*, EX1001, (“These specific instances of network attach request messages typically occur when a communication device is powered on and allow for efficient implementation within the standard 3GPP TS 24.008, Version 8.3.0.”).

39. **Third**, with respect to the educational level of active workers in the field, I personally observed that the individuals that participated in development and implementation of cellular systems typically had at least a bachelor’s degree in electrical engineering or a related discipline and at least several years of experience working in the cellular communications industry or in academic research in the field of cellular communications.

40. **Fourth**, turning to the educational level of the named inventors, the ‘098 Patent names two inventors: Bryan Busropan and Johannes Maria van Loon. I am not personally acquainted with these individuals, but here is a summary of the information I located from a LinkedIn profile that I reasonably believe to be associated with Bryan Busropan:

- Bryan Busropan’s profile indicates that he has been a consultant in Mobile Networks since 1991, by 2009 he had over 18 years’ experience in mobile networks. He also appears to have some degree from Delft University of Technology.

<https://www.linkedin.com/in/bryan-busropan-4087496/>

- I was unable to find a LinkedIn page for Johannes Maria van Loon.

41. In my opinion, a person of ordinary skill in the art at the time of the alleged invention of the '098 Patent (October 28, 2009) would have had a degree in electrical engineering or a similar discipline, with at least three years of relevant industry or research experience, including designing or implementing network systems. A POSITA would also have familiarity with the wireless standards and protocols relating to data transmission and subscriber management. This definition is approximate, and more education may substitute for industry experience or vice versa.

42. In addition, in my opinion, while a person of ordinary skill in the art would have some familiarity with such underlying technologies, that familiarity would need only be sufficient to utilize the technology in connection with a broader system and method. For example, a person of ordinary skill in the art would be aware of signaling messages used in telecommunications systems and the type of data included in those signaling messages.

43. Based on my educational and employment background, I am qualified to provide opinions concerning what a POSITA would have known and understood by October 28, 2009. Indeed, as reflected in my qualifications above, I am more

than qualified as a person of ordinary skill in the art as of the relevant date of the '098 Patent.

VI. TECHNOLOGY BACKGROUND OF THE '098 PATENT

44. I have been asked to provide some context to the technology related to the '098 Patent and the prior art. I understand that the relevant timeframe is July October 28, 2009, and below I provide background on how the various technologies were developed and operating up to that time frame.²

A. A Brief History of Telecommunication Networks

45. The first generation of mobile telecommunications networks, which was retroactively dubbed "1G," dates back to Nippon Telegraph and Telephone's 1979 launch in Tokyo. The United States approved 1G networks for use in or around 1983. This early analog cellular technology was expensive and suffered from a number of drawbacks, including a lack of compatibility between systems, no roaming support between operators, and no encryption. Adoption of this 1G technology began slowly. Many people likely recall the "brick"-sized cell phones

² This technology background is intended to provide an introduction to this technology. My shortened explanations to introduce these concepts for purposes of understanding the claims of the '098 Patent and the prior art discussed in this Declaration are not intended to, and do not, provide a complete explanation of this technology.

that someone that they knew kept in their cars in the late 1980s. Such brick phones, which were something of a novelty item, generally operated on 1G networks.

46. To overcome these issues, the European Telecommunication Standards Institute (“ETSI”) began developing the Global System for Mobile Communications (“GSM”) standard for second generation mobile networks (“2G”), which first launched in Finland in or around 1991. GSM was standardized in Europe to create an interoperable telecommunications network.

47. GSM used a digital circuit-switched architecture for voice calls, which means that voice channels were established between the “calling” user equipment and the “called” user equipment every time a call was placed. This circuit-switched architecture is described as creating a dedicated digital connection, known as a traffic channel, “TCH,” connecting the two mobile devices during a call. A traffic channel is a designated channel used to carry user data such as voice. EX1016, p. 56 (“Although this is a designated traffic channel consisting of 26 frames, at most only 24 of these are used for TCH user data such as voice.”). 2G GSM also offered standardized traffic channels which carried user data. Digitally encoded voice channels up to 13 Kbit/s and data channels of up to 9.6 kbit/s were offered. Packet data transmission was sent over the data traffic channels, and made use of the Packet Switched Public Data Network, ‘PSPDN’.

48. The 2G GSM Architecture is shown below.

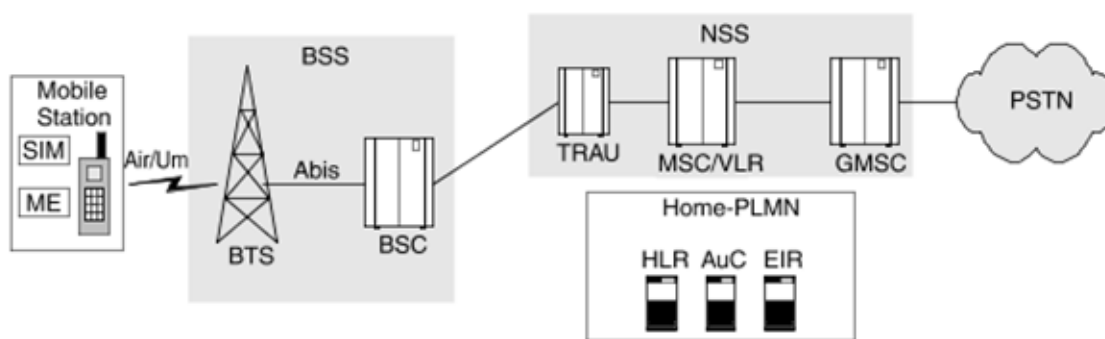


Figure 3.1 GSM general architecture

Id., p. 44.

49. The network entities described in the 2G GSM architecture include the user equipment, known as the Mobile Station (MS), the Base Station Transceivers (BTSs), Base Station Controller (BSC), which make up the radio access network, known as the base station subsystem (BSS). In the core network there is a Transcoder and Rate Adaptation Unit, (TRAU), a Mobile Switching Center (MSC) and Visitor Location Register (VLR), a Home Location Register (HLR), an Authentication Center (AuC) and Equipment Identity Register (EIR). The Home Public Land Mobile Network (PLMN) provide authentication data for the MSC/VLR, so that a visiting MS could register with the visited network.

50. From this starting point a planned migration from this second generation to a third generation was planned. The standards groups then specified a migration from the 2G GSM standard to Universal Mobile Telecommunications System (UMTS) via the general packet radio service (GPRS) and enhanced data rates for global evolution (EDGE), as shown in Figure 1.1. *Id.*, p. 4.

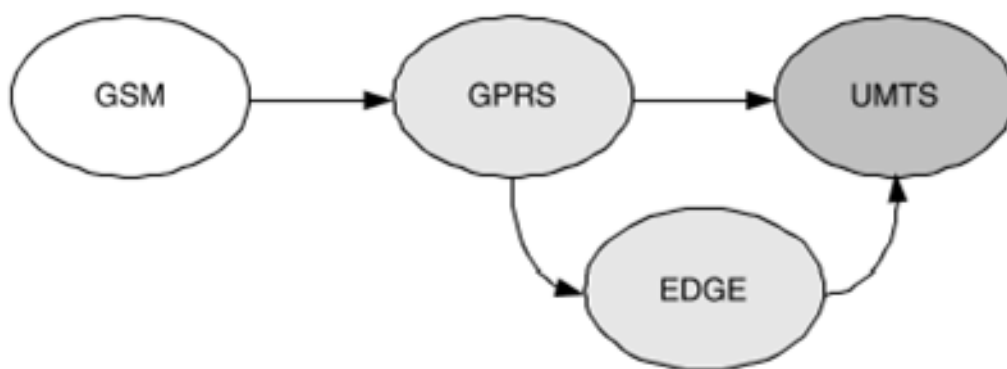


Figure 1.1 GSM evolution to UMTS

51. The GSM standard evolved into the General Packet Radio Packet Service (“GPRS”) standard developed by ETSI, sometimes known as 2.5G, and the Universal Mobile Telecommunications System (“UMTS”) technical specifications developed by the 3rd Generation Partnership Project (“3GPP”). The GPRS extension was an overlay on the existing 2G GSM Architecture and is shown below. *Id.*, p. 266.

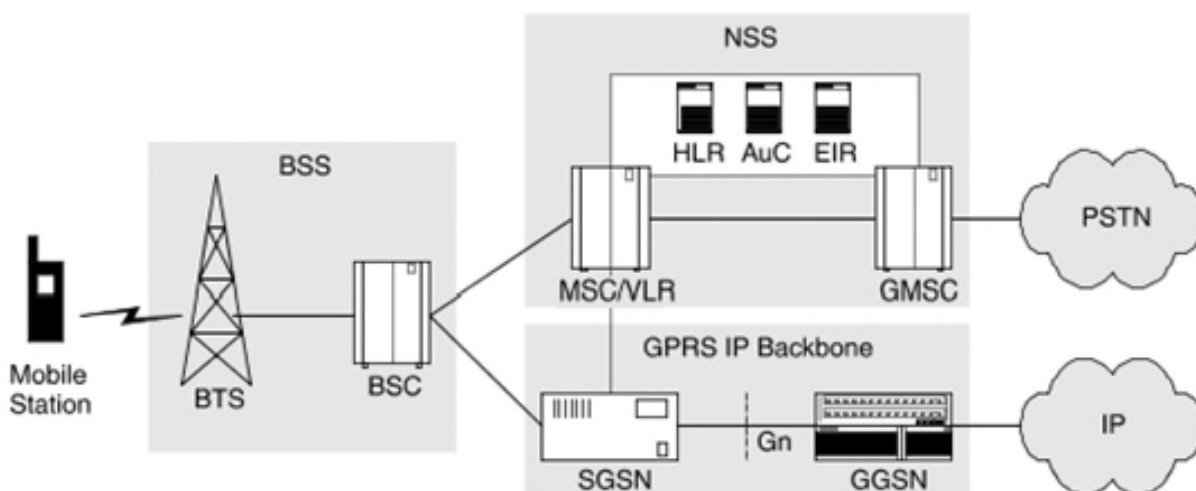


Figure 6.1 GPRS general architecture. Note that there are connections from the MSC and SGSN to the home location, visitor location and equipment identity registers (HLR/VLR/EIR)

52. GPRS introduced a packet-based core network but still uses much of the GSM functionality, including the home location register (HLR), equipment identity register (EIR) and authentication center (AuC) (3G systems also use this GSM functionality). GPRS extension to GSM added new network elements Serving GPRS Support Node (SGSN) and Gateway GPRS Support Node (GGSN). The SGSN was the connection point between the BSS and the Core Network, and at a high level it provided a similar role for the packet switched network as the MSC/VLR provides to the circuit switched network. *Id.*, pp. 81-82. GPRS data capabilities allowed for Machine to machine (M2M) communications over the packet network.

53. GPRS was standardized by 1998, 11 years before the October 28, 2009, filing date of the '098 Patent. The evolution of GSM continued with the addition of Enhanced data rates for global evolution (EDGE). Like GPRS, EDGE uses much of the underlying GSM system, including the existing frequency band that an operator has been allocated but provides higher data rates for the subscriber. EDGE introduces nine new modulation and coding schemes over the air interface. *Id.*, pp. 152-153. A GSM/EDGE Radio Access Network is known as a GERAN. The GERAN extension was another overlay on the existing 2G GSM Architecture allowed for the further integration of UMTS and is shown below. *Id.*, p. 164.

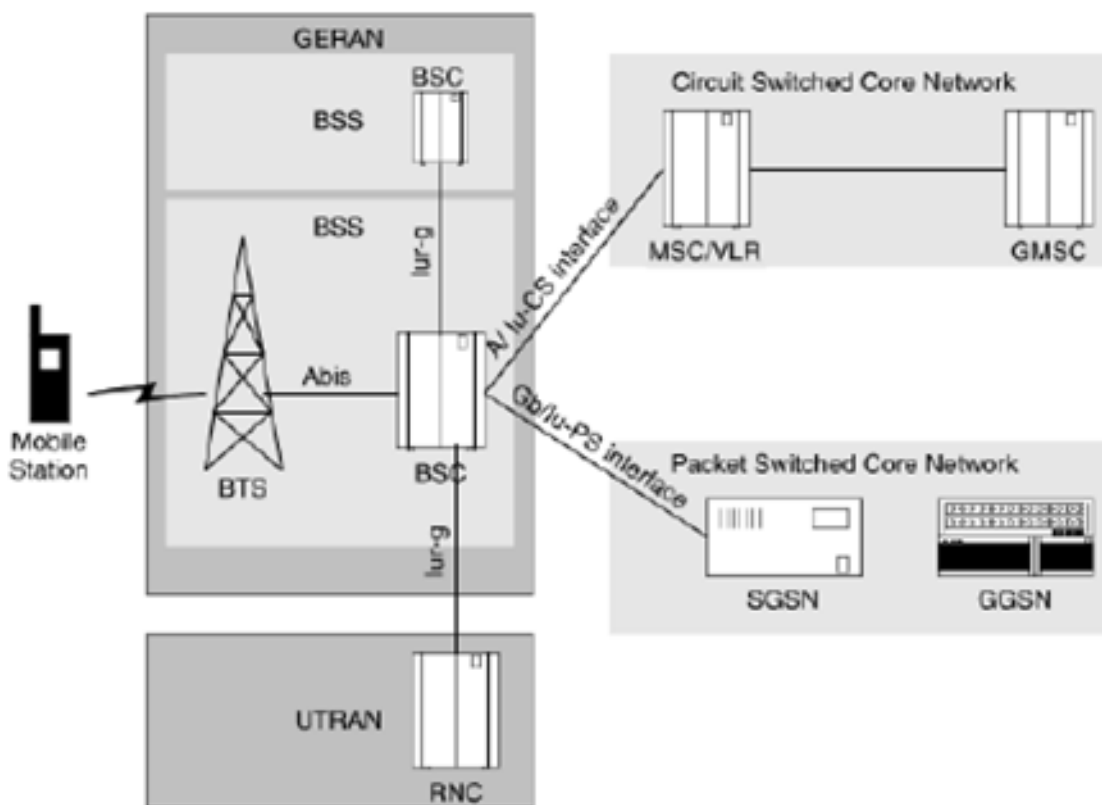


Figure 4.63 Generalized GERAN architecture

B. The 3rd Generation Partnership Project

54. In the late 1990s, the various standards joined to form the 3rd Generation Partnership Project (3GPP). The 3GPP was formed in 1998 with an initial objective of producing technical specifications for a 3G cellular communication system called UMTS. UMTS is a 3G standard that was derived from the 2G GSM standard. For reference, GSM is a 2G standard, UMTS is 3G, and LTE is (generally considered) 4G.

55. The evolution of GSM standardization is summarized in the Figure below. This figure is helpful to understand the role that the radio access technology plays in a user equipment connecting to a network. *Id.*, p. 3.

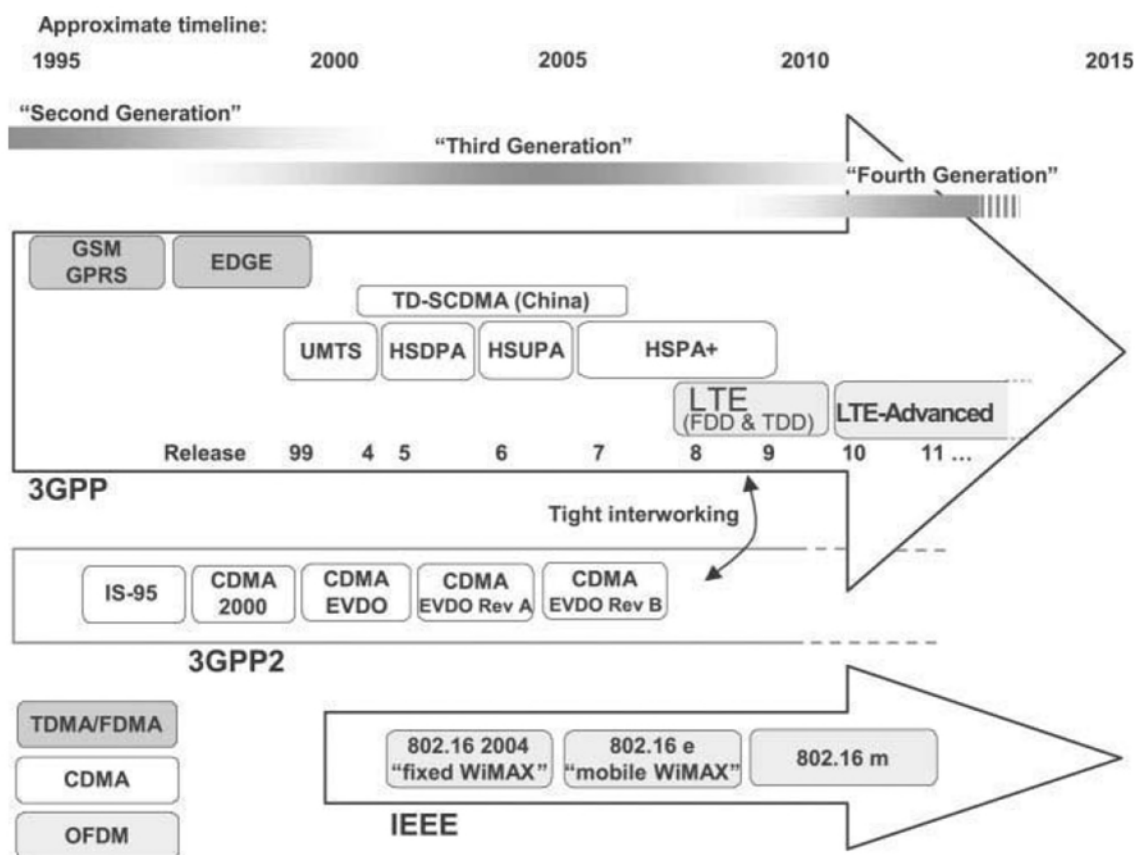


Figure 1.1: Approximate timeline of the mobile communications standards landscape.

C. Mobility Management and Connection Management

56. Mobility Management and Connection Management are two basic functionalities specified for standardized telecommunications networks. Mobility Management starts with the mobile attaching to the network. After the network knows where the mobile is, circuit switched and packet switched connections can

be made with the mobile. The process of setting up these connections is known as connection management. Examples of Mobility Management signaling messages in a GSM network include IMSI Detach, Location Updating request and Location Updating Accept. Examples of connection management signaling messages include Alerting, (of an incoming call), connection and release (call). These signaling messages can be seen in Figs. 3.22 and 3.23 from EX1016, copied and annotated below.

Type	Messages	
Registration	IMSI DETACH INDICATION	
	LOCATION UPDATING REQUEST	LOCATION UPDATING ACCEPT
Security	AUTHENTICATION REQUEST	AUTHENTICATION RESPONSE
	IDENTITY REQUEST	IDENTITY RESPONSE
Connection	CM SERVICE REQUEST	CM SERVICE ACCEPT
management	CM RE-ESTABLISHMENT REQUEST	

Figure 3.22 Example MM messages

Type	Messages	
Call establishment	ALERTING	
	SETUP	
	PROGRESS	
	AUTHENTICATION REQUEST	AUTHENTICATION RESPONSE
	CONNECT	CONNECT ACKNOWLEDGE
Call clearing	RELEASE	RELEASE COMPLETE
	DISCONNECT	
Supplementary service control	HOLD	HOLD ACKNOWLEDGE
	RETRIEVE	RETRIEVE ACKNOWLEDGE

Figure 3.23 Example CM messages

Id., p. 67.

1. Mobility Management

57. The mobility management (MM) function is required in networks, such as cellular networks, which allow for device mobility. EX1016, p. 49 (“To make and receive calls, the location of the mobile device has to be known by the network.”), *see also id.* (“Mobility management is the mechanism that the network

uses for keeping a dynamic record of the location of all of the mobile devices currently active in the network.”); *see also* EX1011, p. 35 (“The main function of the Mobility Management sublayer is to support the mobility of user terminals, such as informing the network of its present location and providing user identity confidentiality.”)

58. In order for user equipment to connect to any wireless network, whether packet-switched or circuit-switched, it must first “attach” to the network. GSM, GPRS, UMTS, and LTE have an attach procedures for their networks which results in the network trying to authenticate the device.

59. To make and receive calls, the location of the mobile device has to be known by the network. EX1016, p. 49. When a mobile device enters a new area, the mobile device may wish to connect to this network and if so informs the MSC of its arrival. Once the MSC checks are complete, the MSC will update the VLR. A message is sent to the HLR informing it of the VLR which contains the location of the mobile. If the mobile device is making or has recently made a call, then the VLR will know the location of the mobile device down to a single cell. If the mobile device has requested and been granted attachment to a mobile network, but not made any calls recently, then the location of the mobile device will be known by the VLR to a location area, *i.e.* a group of cells and not a single cell.

60. In a GPRS network an “Attach request” message is sent by the MS to the telecommunications network in order to perform a GPRS or combined GPRS/IMSI attach. EX1011, 295 (Section 9.4.1). A combined attach means that the MS is attaching to both the packet core and the voice core networks at the same time.

2. Connection Management.

61. In order to establish a circuit switched or packet switched connection to a telecommunication network, connection management is required. For GSM, this includes establishment of normal calls (MS-originating and MS-terminating) and the termination of calls. For GPRS, this includes the establishment of a packet connection. *Id.*, p. 135 (“Once the mobile device has registered with the mobile network, **it cannot start to send and receive data over the packet core until it has established a session**, which is known as having a packet data protocol context (PDP context).”³). Figure 6.138 of EX1016, copied and annotated below, provides more detail of establishing a packet connection:

³ All emphasis added unless noted otherwise.

1. Once again, the signalling connection is established (Figure 6.138).
2. The initial message from the UE is the **GPRS attach request**.
3. Once the authentication and security procedures have successfully completed, the SGSN will reply with a **GPRS attach accept**.
4. The *common ID update* is performed.
5. To transfer data, the UE must establish a PDP context. This is done through the **activate PDP context request**. There will also be a **create PDP context/create PDP context response** between the SGSN and the GGSN, during which the UE is allocated an IP address which is then bound to its IMSI.

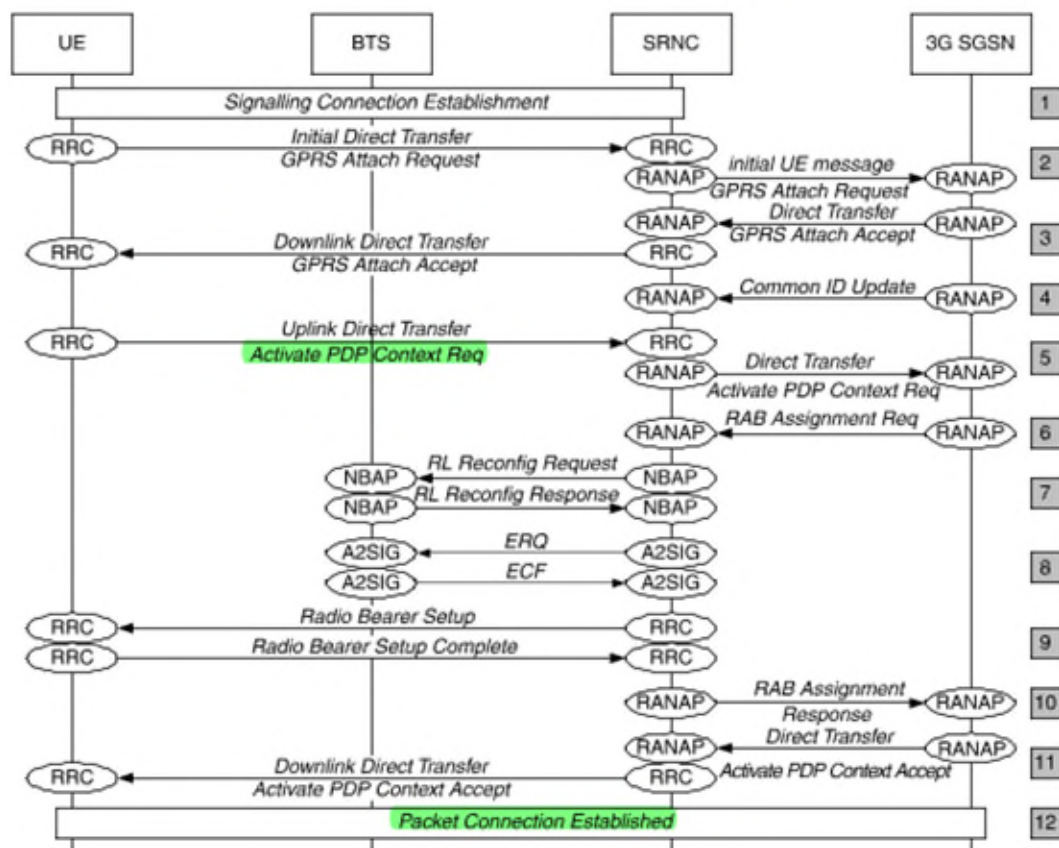


Figure 6.138 Packet connection establishment

Id., p. 413.

VII. OVERVIEW OF THE '098 PATENT

62. The '098 Patent is titled "Telecommunications network and method of transferring user data in signaling messages from a communication unit to a data

processing centre.” EX1001, cover. The ’098 patent claims priority to a PCT application that was filed on Oct. 28, 2009. The ’098 patent has 4 independent claims and 21 dependent claims.

63. The ’098 Patent is directed to a telecommunications network and a method of transferring user data from a communication module to a data processing centre in a machine-to-machine communications setting. *Id.*, 1:19-22. An object of the ’098 Patent is to provide a method and telecommunications network that allow for efficient and fast communications of limited amounts of data in a machine-to-machine environment. *Id.*, 1:53-56.

64. The ’098 Patent states that the claimed “*wireless signalling message*” received from a communication module “can be a network attach request message,” which the ’098 Patent acknowledges as being well-known and standardized by the 3GPP at the time of the ’098 Patent’s filing. *Id.*, 5:30-40, 5:64-66 (“the communication module 2 may send a location updating request to request IMSI attach as specified in subclause 9.2.15 of 3GPP TS 24.008 V8.3.0”); *see also id.*, 7:57-61 (“identifying other well-known examples of a “*signalling message*”). The ’098 Patent explains that “[t]he attach message is typically one of the first messages received from the communication module in the telecommunications network.” *Id.*, 2:38-41. Thus, by transmitting “*non-signalling application data*”

via a “*signalling message*” such as the network attach request message, “it is possible to rapidly transmit data to the telecommunications network.” *Id.*, 2:8-11.

65. The '098 patent teaches by inserting user data in wireless signalling messages, network resources are saved since the network is not required to establish a complete circuit-switched or packet-switched connection between the communication module and the telecommunications network. EX1001, 2:8-13 (“**By inserting the user data in the signalling message(s)**, it is possible to rapidly transmit data to the telecommunications network, **while resources can be saved since it is not required to establish a complete circuit-switched or packet-switched connection between the communication module and the telecommunications network.**”)

66. The '098 patent also teaches that in some embodiments, after the telecommunication network accepts the attach request, a connection **can be** established. *Id.*, 2:55-57 (“In an embodiment of the invention, the telecommunications network may accept the network attach request message after which a **connection can be established.**”). However, the '098 Patent **does not** disclose actually establishing such a connection, because it does not disclose the additional connection signaling messages that, as described above, are required to establish a complete circuit-switched or packet-switched connection. *See above*, Section VI.C.2.

67. In other embodiments, the '098 patent teaches that the attach request may be rejected, excluding the establishment of a circuit switched or packet switched connection. *Id.*, 3:3-6 (“the attach request message from the communication module is rejected by the network, thereby **excluding** that a **circuit switched or a packet switched connection can be established.**”).

68. Regardless of whether the attach request is accepted or rejected, the '098 Patent avoids establishing a complete circuit switched or packet switched connection because it does not teach performing the connection establishment procedure. *See above*, Section VI.C.2.

A. **'098 Types of Wireless Signalling Attach Messages.**

69. The '098 patent teaches that wireless signaling messages can be network attach requests. EX1001, 5:30-32 (“The **signalling message S** can be a network attach request message in order to provide rapid transfer of the user data.”).

70. The '098 patent goes on to explain that there are different types of network attach messages. For example, the network attach request may be a location updating request. *Id.*, 2:38-44 (“The attach message is typically one of the first messages received from the communication module in the telecommunications network and, therefore, provides an appropriate instance for rapidly receiving the user data. For circuit switched applications, **the network**

attach request message may be a location updating request message with a location updating type information element indicating an IMSI attach.”). For packet switched networks, the network attach request may have an attach type that indicates an a GPRS attach or a combined GPRS/IMSI attach. *Id.*, 2:45-48 (“For packet-switched applications, the **network attach request message may be an attach request with an attach type information element indicating a GPRS request or a combined GPRS/IMSI attach.”).** The ’098 Patent recognizes that a location updating request is an example of “a network attach request message,” which the ’098 Patent characterizes as a “signalling message”:

In the first step, the communication module 2 initiates the attach procedure to inform the telecommunications network it wants to access CS Services and uses the capability to insert user data by the transmission of an Attach Request [IMSI, User data] message. The communication module 2 sends an IMSI Attach Request [IMSI, User data] message to RAN. The RAN conveys this message transparently to the MSC.

*In particular, the **communication module 2 may send a location updating request to request IMSI attach as specified in subclause 9.2.15 of 3GPP TS 24.008 V8.3.0, indicating that the communication module 2 has become active for the telecommunications network.***

EX1001, 5:57-6:1.

71. The network attach request message may be accepted or rejected. *Id.*, 5:52-7:8 (describing “an embodiment for circuit switched (CS) data wherein the

attach request is accepted.”); 7:9-7:44 (describing “an embodiment for circuit switched data (now denying the attach request).”). In both cases, the “*non-signalling application data*” is “encapsulated” in the network attach request message, sent to a network node (*e.g.*, an MSC (Mobile Switching Center) or an SGSN (serving GPRS support node)), retrieved at the network node, and transferred further to an “M2M server.” See, *e.g.*, EX1001, 4:40-43, 5:23-49, 7:14-17. Figure 2A of the ’098 Patent, copied and annotated below, is an example of the ’098 Patent’s method for transferring the “*non-signalling application data*”:

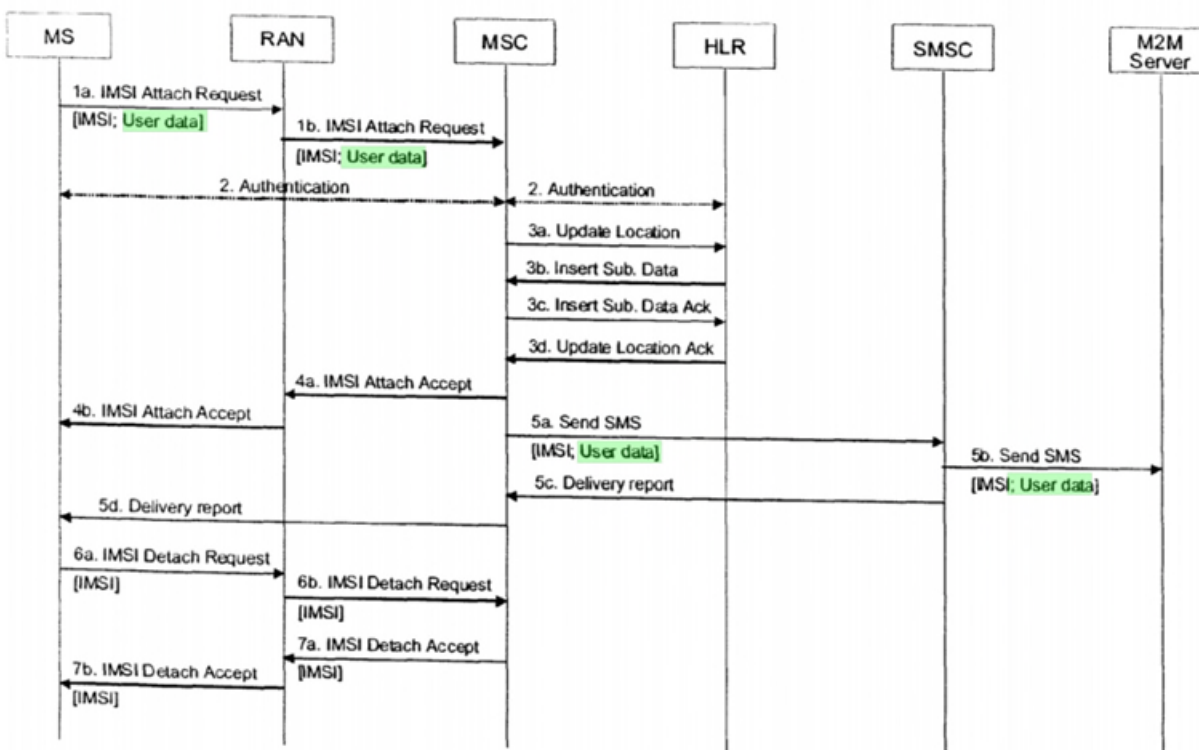


FIG. 2A

B. Prosecution History

72. The PCT application that led to the '098 Patent was filed in the U.S. on April 28, 2011. EX1002, 333 (transmittal of application). The Patent Office issued a first Office Action on June 20, 2013, in which the Examiner rejected then-pending claims 1-24. *Id.*, 229. The Examiner rejected Claims 1-13, 15, and 17-24 over US 2007/0232306 to Johannesson in view of US 2006/0262742 to Dommaraju (referred to by the Examiner and applicant as “Domm”), rejected claim 14 over Johannesson in view of Dommaraju and US 2010/0203898 to Noldus, and rejected claim 16 over Johannesson. *Id.*, 236-250. In response to the Office Action, applicant filed an amendment to the claims on September 5, 2013, and in the remarks accompanying this amendment, applicant argued that the cited references did not disclose a “signalling message containing application data of a program run by the communication module”:

As understood by a person of ordinary skill in the art, the well-known Open Systems Interconnection (OSI) model partitions functions of a communication system into multiple abstraction layers. Among these layers are a network layer and an application layer. The network layer provides switching and routing functionality (i.e., connectivity between two nodes in the same network), while the conceptually higher-level application layer supports software applications and end-user processes. As described in Domm, the IMSI, PTMSI, TLLI, and RAI parameters are used for setting up, maintaining or ending connections between nodes in the same network. Accordingly, at best the parameters disclosed in Domm amount to network data, but certainly not to application data as recited in claim 1. *Id.*, 222.

73. While these remarks acknowledged that Dommaraju taught the transmission of “network data,” such as “IMSI, PTMSI, TLLI, and RAI parameters,” such data was “certainly not application data as recited in claim 1.” *See id.*

74. The Examiner did not find these remarks convincing, and issued a second Office Action on December 4, 2013, rejecting then-pending claims 1-10, 12-14, 16-22, and 24-28, again asserting Johannesson and Dommaraju.⁴ In its February 4, 2014, response to this Office Action, applicant did not amend the claims, and instead re-asserted its earlier argument and argued that the Examiner improperly analyzed an earlier version of the claims. *Id.*, 170-171. The Examiner

⁴ Applicant canceled claims 11, 15, and 23 in its September 5, 2013 response. *Id.*, 215, 217.

issued another Office Action on March 24, 2014, again asserting that Dommaraju teaches the claimed “application data” (*id.*, 120-121); again, applicant argued otherwise in its August 25, 2014, response (*id.*, 104-105).

75. On December 15, 2014, the Examiner issued another Office Action again asserting that Dommaraju teaches the claimed “application data.” *Id.*, 75-76. On May 21, 2015, applicant amended the independent claims to specify that the “application data” was “non-signalling application data generated for a machine-to-machine function”:

1. (Currently amended) A method of transferring data from a communication module to a machine-to-machine server over a telecommunications network, the method comprising:

~~wirelessly-receiving a wireless signalling message from said communication module at a signalling termination node of the telecommunications network, said received wireless signalling message containing having inserted in it non-signalling application data of a program run generated for a machine-to-machine function by the communication module, wherein wireless signalling messages of the telecommunications network are configured for carrying signalling data for managing connections in the telecommunications network; and~~

~~retrieving said non-signalling application data from the received wireless signalling message; and~~

~~terminating further transmission of the received wireless signalling message and transferring said retrieved non-signalling application data of said program run by the communication module to said machine-to-machine server.~~

Id., 54.

76. In the remarks accompanying this amendment, applicant argued that the data extracted from an attach request message in Dommaraju—*i.e.*, the IMSI, PTMSI, TLLI, and RAI—“are ‘parameters that may be associated with a particular subscriber’s connection’” and therefore not “non-signalling application data generated for a machine-to-machine function.” *Id.*, 64. The Examiner found these remarks convincing and issued a notice of allowance on February 25, 2016. *Id.*, 7. The Examiner also suggested an additional amendment, which applicant authorized:

1. (Currently amended) A method of transferring data from a communication module to a machine-to-machine server over a telecommunications network, the method comprising:

receiving a wireless signalling message from said communication module at a signalling termination node of the telecommunications network, said received wireless signalling message having inserted in it non-signalling application data generated for a machine-to-machine function by the communication module, wherein wireless signalling messages of the telecommunications network are ~~configured~~ of a message type specified for carrying signalling data for managing connections in the telecommunications network;

retrieving said non-signalling application data from the received wireless signalling message; and

terminating further transmission of the received wireless signalling message and transferring said retrieved non-signalling application data to said machine-to-machine server.

Id., 12-13.

C. The '098 Patent Claims

77. The '098 Patent includes twenty-five claims: four independent claims and twenty-one dependent claims. Independent claim 1 is directed to a method performed in transferring data from a communication module to a machine-to-machine server over a telecommunications network, and independent claims 15, 17, 21 and 10 are very similar but directed to apparatus, either in a telecommunications network (claim 15), a node in a telecommunications network (claim 17), or a communication device (claim 21).

78. I understand that Petitioner is challenging claims 1-6 and 9-25 in their petition. Here is a table listing the claims challenged in the petition on a limitation-by-limitation basis.

Claim Element	Claim Language
Independent Claim 1	
[1p]	A method of transferring data from a communication module to a machine-to-machine server over a telecommunications network, the method comprising:
[1a]	receiving a wireless signalling message from said communication module at a signalling termination node of the telecommunications network,
[1b]	said received wireless signalling message having inserted in it non-signalling application data generated for a machine-to-machine function by the communication module,
[1c]	wherein wireless signalling messages of the telecommunications network are of a message type specified for carrying signalling data for managing connections in the telecommunications network;

[1d]	retrieving said non-signalling application data from the received wireless signalling message; and
[1e]	terminating further transmission of the received wireless signalling message and transferring said retrieved non-signalling application data to said machine-to-machine server
2	The method according to claim 1, wherein the wireless signalling message is a network attach request message.
3	The method according to claim 2, wherein said network attach request message is a location updating request message with a location updating type information element indicating an IMSI attach.
4	The method according to claim 2, wherein said network attach request message is an attach request with an attach type information element indicating a GPRS request or a combined GPRS/IMSI attach.
5[a]	The method according to claim 2, further comprising: transmitting a network attach accept message to the communication module;
5[b]	transmitting further data to and/or receiving further data from the communication module; and
5[c]	receiving a network detach message from the communication module.
6	The method according to claim 2, further comprising transmitting an attach reject message to said communication module, said attach reject message comprising data for said communication module.
9	The method according to claim 1, wherein said received wireless signalling message contains address information indicative of said machine-to-machine server.
10	The method according to claim 1, wherein the non-signalling application data comprises alarming data.
11	The method according to claim 1, wherein the non-signalling application data comprises measurement data
12	The method according to claim 11, wherein the communication module comprises one or more sensors, and wherein the measurement data comprises measurement data obtained using the one or more sensors.

[13a]	The method of claim 1, wherein said method is a method of transferring non-signalling data from the communication module to the machine-to-machine server over the telecommunications network in a machine-to-machine communications setting; and
[13b]	wherein transferring said non-signalling application generated for a machine-to-machine function by the communication module to said machine-to-machine server comprises transferring said non-signalling application data to said machine-to-machine server while avoiding to establish a complete circuit-switched or packet-switched connection between said communication module and said telecommunications network.
14	The method of claim 1, wherein said received wireless signalling message comprises data derived from a sensor of the communication module.
Independent Claim 15	
[15p]	A telecommunications network for transferring data from a communication apparatus to a machine-to-machine server, said telecommunications network comprising:
[15a]	a signalling termination node; and
[15b]	one or more processors for carrying out operations including:
[15c]	receiving a wireless signalling message from said communication apparatus at the signalling termination node,
[15d]	said received wireless signalling message having inserted in it non-signalling application data generated for a machine-to-machine function by the communication apparatus,
[15e]	wherein wireless signalling messages of the telecommunications network are of a message type specified for carrying signalling data for managing connections in the telecommunications network;
[15f]	retrieving said non-signalling application data from the received wireless signalling message; and
[15g]	terminating further transmission of the received wireless signalling message and transferring said retrieved

	non-signalling application data to said machine-to-machine server.
[16a]	The telecommunications network of claim 15, wherein said telecommunications network is configured for transferring non-signalling data from the communication apparatus to the machine-to-machine server in a machine-to-machine communications setting; and
[16b]	wherein transferring said non-signalling application data to said machine-to-machine server comprises transferring said non-signalling application data to said machine-to-machine server while avoiding to establish a complete circuit-switched or packet-switched connection between said communication apparatus and said telecommunications network.
Independent Claim 17	
[17p]	A node in a telecommunications network, said telecommunications network being configured for transferring data from a communication apparatus to a machine-to-machine server, said node being comprising:
[17a]	one or more processors for carrying out operations including:
[17b]	receiving a wireless signalling message from said communication apparatus,
[17c]	said received wireless signalling message having inserted in it non-signalling application data generated for a machine-to-machine function by the communication apparatus,
[17d]	wherein wireless signalling messages of the telecommunications network are of a message type specified for carrying signalling data for managing connections in the telecommunications network;
[17e]	retrieving said non-signalling application data from the received wireless signalling message; and
[17f]	terminating further transmission of the received wireless signalling message and transferring said retrieved non-signalling application data to said machine-to-machine server.

18	A node according to claim 17, wherein the node is a serving GPRS support node.
19	A node according to claim 17, wherein the node is a signalling monitor.
[20a]	The node of claim 17, wherein the telecommunications network is configured for transferring non-signalling application data from the communication apparatus to the machine-to-machine server in a machine-to-machine communications setting; and
[20b]	wherein transferring said non-signalling application data to said machine-to-machine server comprises transferring said non-signalling application data to said machine-to-machine server, while avoiding to establish a complete circuit-switched or packet-switched connection between said communication apparatus and said telecommunications network.
Independent Claim 21	
[21p]	A communication device comprising:
[21a]	a transmitter; and
[21b]	a processor for causing the communication device to carry out operations including:
[21c]	(i)generating non-signalling application data for a machine-to-machine function,
[21d]	(ii)encapsulating said non-signalling application data in one or more signalling messages from said communication device over a telecommunications network to a machine-to-machine server, wherein wireless signalling messages of the telecommunications network are of a message type specified for carrying signalling data for managing connections in the telecommunications network, and
[21e]	(iii) transmitting, via the transmitter, said signalling messages containing said non-signalling application data to a signalling termination node of said telecommunications network for termination of said signalling messages and transfer of said non-signalling application data to the machine-to-machine server.

22	A communication device according to claim 21, wherein the non-signalling application data comprises alarming data
23	The communication device according to claim 21, wherein the non-signalling application data comprises measurement data
24	The communication device according to claim 23, further comprising one or more sensors, wherein the measurement data comprises measurement data obtained using the one or more sensors
[25p]	The communication device of claim 21, wherein the processor is configured for generating non-signalling application data in a machine-to-machine communications setting run by the communication device; and
[25a]	wherein the transmitter is configured for transmitting said signalling messages containing said non-signalling application data to said telecommunications network, while avoiding to establish a complete circuit-switched or packet-switched connection between said communication device and said telecommunications network.

D. **Priority Date**

79. I understand that the Petitioner assumes without conceding that under pre-AIA § 102(b) the date of the first priority application filed “in the United States” was October 28, 2009.

E. **Claim Construction**

80. In my opinion, all of the claim terms in the '098 Patent should be given their plain and ordinary meaning, as a POSITA would understand them in light of the specification and file history of the '098 Patent at the priority date which I understand to be October 28, 2009. Except as otherwise noted, I have

applied such a plain and ordinary meaning in my analysis of the claims. I reserve the right to offer additional opinions on claim construction in response to arguments that may be made by Patent Owner.

VIII. IDENTIFICATION OF THE PRIOR ART AND SUMMARY OF OPINIONS

81. As explained below, it is my opinion that the following prior art references, at least in the combinations outlined below, disclose all technical features of challenged claims 1-6 and 9-25 of the '098 Patent, thus rendering them unpatentable.

A. Summary of United States Patent 9,191,774 (“*Krco*”)

82. United States Patent 9,191,774 to *Krco* et al. is titled “Method for distribution of information of networks or entities using UE as gateway.” *Krco* was filed as a PCT application of June 4, 2008. I understand that *Krco* qualifies as prior art under at least 35 U.S.C. §§ 102(a), 102(b), and 102(e).

83. *Krco* describes a mobile communications system and method “for distribution of information in a primary cellular network.” EX1009, Abstract. *Krco* discloses a system wherein a UE is connected to one or more “second entities” (*e.g.*, sensors) or “second networks” (*e.g.*, network of sensors), which may relate to, for example, “habitat monitoring, health monitoring, burglar alarms, automatic meter reading, home automation and other types of Machine to Machine

(M2M) type of services.” *Id.*, 1:29-52, 3:52-59, 4:3-9. The UE forwards data from the M2M sensors to an M2M service provider. *Id.*, 3:60-62, 4:10-16 (“The service provider 17 is an entity offering services like environment **and habitat monitoring, health monitoring, burglar alarms, automatic meter reading, home automation and other types of Machine to Machine (M2M) type of services.**”). In order for the service provider to be aware of the M2M sensors’ “existence, location, and availability,” the UE sends “secondary data”—information about the M2M sensors’ properties—to the M2M service provider. *Id.*, 1:59-2:24. The UE does so by including the M2M sensor data in a “first message,” such as “a Location Update Request or a Routing Area Update request message,” which are examples of well-known signaling messages. *Id.*, 4:24-26, 4:44-47; see Section IX.A.1.b below. Similarly, the ’098 Patent also uses a “location updating request” message to transmit its application data to an M2M server. See EX1001, 5:64-66 (describing a “location updating request to request IMSI attach” as an example of a “signalling message” carrying application data).

84. In transmitting the M2M sensor data to the M2M service provider, the UE first sends a Location Update Request containing the M2M sensor data to a “third entity” (*e.g.*, an MSC (Mobile Switching Center), see EX1009, 4:53-55) that is located in a “third network” (*e.g.*, a cellular network). *Id.*, 4:17-21, 4:24-26. The MSC then extracts the M2M sensor data and sends it to a “fourth entity” (*e.g.*,

an “availability server”) in the cellular network, where the availability server stores the M2M sensor data and forwards it to one or more M2M service providers that are authorized to access the data. *Id.*, 6:45-62. Figure 2 of *Krco*, copied and annotated below, illustrates this process:

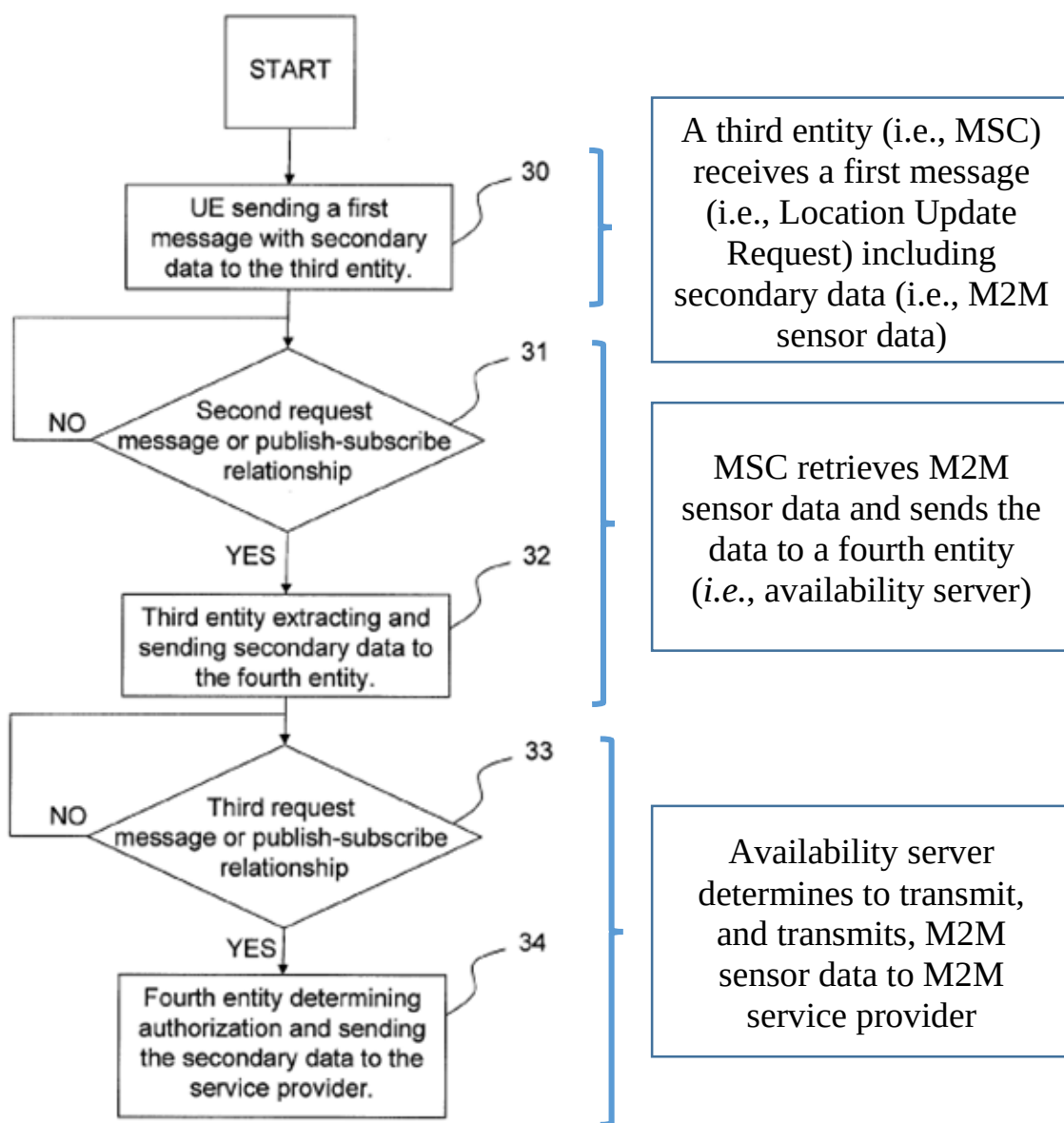


FIG 2

85. *Krco's* secondary data (*i.e.*, M2M sensor data) comprises information about the “second entities” (*i.e.*, M2M sensors) and “second networks” (*i.e.*, networks of M2M sensors), for example: “the number of second networks or second entities included in the information element, identity of the second network or entity together with the local validity, the type of second network or entity, location of the second network or entity relative to the UE position.” *Id.*, 5:45-53. This information is included in an information element (*e.g.*, called “ExtDeviceInfo”) that is separate from the signaling data found in the Location Update Request. *Id.*, 4:64-5:63. The signaling data may relate to a protocol discriminator, skip indicator, message type, location area identification, and P-TMSI, for example. *Id.*

86. Unlike that signaling data and the data identified in the prior art during prosecution (*e.g.*, the “IMSI, PTMSI, TLLI and RAI within the attach request message,” EX1002, p. 238), *Krco's* M2M sensor data is not related to a location update or registration procedure. Instead, this data is application data of the M2M sensor from which it originated. Accordingly, *Krco's* secondary data corresponds to the claimed “*non-signaling application data generated for a machine-to-machine function.*” *Id.*, 4:48-52.

87. *Krco* also teaches that the fourth entity will send secondary data to the service provider providing they have authorization. *Id.*, 7:55-62 (“When the fourth

entity 18 receives the third request message or **when there is a publish and subscribe relationship 33, the fourth entity performs the steps of 34:** determining if the service provider has an authorization to receive the secondary data, and **sending the secondary data to the service provider 17 if the service provider has the authorization.**”). Since *Krco* teaches that the fourth entity provides for multiple service providers and that it sends secondary data to these different service providers, there must be information indicative of the M2M service provider in the secondary data or the fourth entity would not know where to send the secondary data when it receives the secondary data. A POSITA would understand that this information was address information indicative of said machine-to-machine server.

B. **Summary of U.S. Patent App. Pub. No. 2008/0153521 A1 to *Benaouda* (“*Benaouda*”)**

88. United States Patent App. Pub. No. 2008/0153521 A1 to *Benaouda*, titled “MDN-less SMS messaging (network solution) for wireless M2M application,” was filed on December 22, 2006 as Appl. No. 11/643,709, and was published on June 26, 2008. I understand that *Benaouda* qualifies as prior art under at least §§ 102(a), 102(b), and 102(e)

89. *Benaouda* discloses a machine-to-machine (M2M) system for efficient transmission of M2M data via SMS (Short Message Service) text

messages, which are messages that can be used for user data or signaling.

EX1010, [0001], [0006]; *see also* EX1021, [0019] (“Further, it will be appreciated by those of ordinary skill in the art that SMS service can involve the exchange of signaling information between SMS entities in a wireless communication network (*e.g.*, person-to-person messaging, person-to-machine messaging, and machine-to-machine messaging).”); *see also* EX1010, [0005] (“In a typical implementation, SMS communications to/from a **mobile station use a signaling channel** over the airlink and use out-of-band **signaling resources** of the mobile phone network for transport to/from a server platform referred to as a SMSC.”). *Benaouda* uses SMS text messages to communicate M2M measurement data, such as utility meter readings, between M2M devices and their corresponding M2M applications. *Id.*, [0006], [0023], [0063].

90. *Benaouda*’s communication system involves an M2M device transmitting the SMS message to an access network. *Id.*, [0067]. TS 23.040 (EX1020) describes how SMS communications work in a GSM network. EX1020, 9. TS 23.040 explains that SMS messages follow different formats which may be based the device that sends the message. *Id.*, 14, 42-43. For example, an SMS message that is sent from a mobile station to the network takes the “SMS-SUBMIT” format. *Id.* A POSITA would have understood that when *Benaouda*’s system is implemented in a GSM network, *Benaouda*’s SMS messages would take

an “SMS-SUBMIT” format, because these message are sent from an M2M device (i.e., a mobile station), to the network. See EX1020, 14, 42-43. EX1020 discloses the various elements included in an SMS message of the SMS-SUBMIT type:

Abbr.	Reference	p1)	p2)	Description
TP-MTI	TP-Message-Type-Indicator	M	2b	Parameter describing the message type.
TP-RD	TP-Reject-Duplicates	M	b	Parameter indicating whether or not the SC shall accept an SMS-SUBMIT for an SM still held in the SC which has the same TP-MR and the same TP-DA as a previously submitted SM from the same OA
TP-VPF	TP-Validity-Period-Format	M	2b	Parameter indicating whether or not the TP-VP field is present.
TP-RP	TP-Reply-Path	M	b	Parameter indicating the request for Reply Path.
TP-UDHI	TP-User-Data-Header-Indicator	O	b	Parameter indicating that the TP-UD field contains a Header.
TP-SRR	TP-Status-Report-Request	O	b	Parameter indicating if the MS is requesting a status report.
TP-MR	TP-Message-Reference	M	l	Parameter identifying the SMS-SUBMIT.
TP-DA	TP-Destination-Address	M	2-12o	Address of the destination SME.
TP-PID	TP-Protocol-Identifier	M	o	Parameter identifying the above layer protocol, if any.
TP-DCS	TP-Data-Coding-Scheme	M	o	Parameter identifying the coding scheme within the TP-User-Data.
TP-VP	TP-Validity-Period	O	o/7o	Parameter identifying the time from where the message is no longer valid.
TP-UDL	TP-User-Data-Length	M	l	Parameter indicating the length of the TP-User-Data field to follow.
TP-UD	TP-User-Data	O	3)	

EX1020, 47; see also EX1010, [0046] (“An SMS message includes source and destination address fields.”).

91. As shown, an SMS-SUBMIT type SMS message includes a number of elements that a POSITA would considering “signaling data.” For example, the “TP-Message-Type-Indicator” element describes the SMS message type, the “TP-Destination-Address” element identifies the address of the destination SME (short message entity), and the TP-Reply-Path element indicates whether the transmitting

mobile station (*e.g.*, the M2M device sending the SMS message) is requesting the network to commit to deliver a reply to the mobile station. EX1020, 47, 21 (describing “Reply Path”). A POSITA would have understood that at least each of these elements affects the connection between the mobile station transmitting the SMS message and the short message entity receiving the SMS message, and would thus be considered “signaling data.”

C. Summary of 3GPP TS 24.008 v8.3.0 (“TS 24.008”)

92. 3GPP TS 24.008 v8.3.0 was published by 3GPP on September 24, 2008. EX1013, ¶¶ 42-47. I understand that TS 24.008 qualifies as prior art under at least 35 U.S.C. §§ 102(a) and 102(b).

93. TS 24.008 is a 3GPP technical specification that “specifies the procedures used at the radio interface core network protocols within the 3rd generation mobile telecommunications system and the digital cellular telecommunications system.” EX1011, 24. For example, TS 24.008 describes the procedures and signaling messages used for third-generation mobility management, which generally “support[s] the mobility of user terminals” and “provide[s] connection management services” to the network components. *Id.*, 35.

**D. Summary of WO 2008/039973 A1 to Ananthanarayanan
 (“Ananthanarayanan”)**

94. WO 2008/039973 A1 (“Ananthanarayanan”) was filed on September 28, 2007, designated the United States, and was filed and published in English.

Ananthanarayanan has an international publication date of April 3, 2008. I understand that *Ananthanarayanan* qualifies as prior art under at least 35 U.S.C. §§ 102(a), 102(b) and 102(e).

95. Like the '098 Patent, *Ananthanarayanan* describes bundling application data into a signaling message to increase communication efficiency in a wireless communications network. EX1012, [0007]-[0010]. *Ananthanarayanan* discloses a system and method for “bundling a connection request and a reservation for QoS resources into an access message at an access terminal; and transmitting the access message to an access network.” *Id.*, [0009]. “Additionally, application layer data (*e.g.* a DataoverSignaling (DOS) message) may also be bundled in the access channel message to expedite communication with an end application (*e.g.*, the group server, application resident another AT, etc.).” EX1012, [0032].

96. As acknowledged by applicant during prosecution, the application layer “supports software applications and end-user processes,” while the “network

layer provides switching and routing functionality (*i.e.*, connectivity between two nodes in the same network).” EX1002, 222.

E. A POSITA’s Motivation to Combine *Krco* with *Benaouda*

97. As I explain below, in my opinion the challenged claims 1-2 and 9-25 of the ‘098 Patent are unpatentable as they are rendered obvious by the combination of *Krco* and *Benaouda*. I understand, however, that a POSITA would need to have had a reason to combine these pieces of prior art for obviousness to apply. It is my opinion that there are a number of reasons why a POSITA would have been motivated to combine *Krco* with *Benaouda* at the time of the alleged invention and would have had a reasonable expectation of success in doing so.

98. *Krco* describes a cellular network in which a UE sends non-signalling M2M data to a termination point, such an MSC or SGSN. See EX1009, 4:41-47, 4:53-60, *see also below*, Section IX.A.1.c. *Krco* describes the inserted non-signaling M2M data, referred to as “secondary data”, as data about the properties of a network or entity to which the UE is connected. EX1009, 5:37-53. The network or entity may be, for example, an M2M sensor or a network of M2M sensors. *Id.*, 1:43-52, 3:60-4:2. *Krco* inserts the M2M data into an information element of a Location Update Request or Routing Area Update message; *Krco* refers to this information element as “ExtDeviceInfo.” *Id.*, 5:41-43. *Krco* describes using the Location Update Request (or Routing Area Update) message to

transmit the M2M data from the UE to the termination point (*e.g.*, an MSC), which then forwards the M2M data to an M2M service provider. *See id.*, 4:41-47, 4:53-60, 6:45-50, 7:54-62.

99. *Benaouda* teaches a similar system. *Benaouda* describes transmitting M2M measurement data, such as utility meter reading data, collected by M2M devices. Instead of using a Location Update Request message to transmit this data (as described in *Krco*), *Benaouda* uses SMS messages. As I discussed above, a POSITA would have understood *Benaouda*'s SMS messages to be "signalling messages" at least because they contain signaling data and because they use signaling resources. *See above*, Section VIII.B.

100. A POSITA would have been motivated to combine *Krco* with *Benaouda* to modify *Krco*'s teachings such that its Location Update Request message included *Benaouda*'s M2M measurement data. This modification would have involved a simple substitution of one known element for another to obtain predictable results. *Krco* teaches bundling data about M2M sensors, such as the sensor's identity, type, or location, into an "ExtDeviceInfo" information element of a Location Update Request (or Routing Area Update) message. EX1009, 2:11-24, 4:24-40, 5:37-63. A POSITA would have understood that the data sent in this manner was not restricted, and that nearly any data, including the machine-to-machine measurement data discussed in *Benaouda*, could be included in the

ExtDeviceInfo information element. Indeed, the name of this information element indicates that it could be extended to include any sort of device information. Such a modification would have involved a simply substituting, or supplementing, *Krco*'s secondary data with *Benaouda*'s M2M measurement data, which would have been obvious in light of the knowledge of a POSITA. *See, e.g.*, EX1009 ("The secondary data preferably consists in an information element in the first message, which may be called ExtDeviceInfo.")).

101. As an example of why it would be obvious to include *Benaouda*'s M2M measurement data in *Krco*'s Location Update Request signaling message, *Ananthanarayanan* discloses a system that suggests the proposed modification. *Ananthanarayanan* discloses that a terminal bundles application-layer data (*e.g.*, in a DataoverSignaling (DOS) message) into an access channel message that is sent by the terminal to request traffic channel resources for a communication session to expedite communication with an end application. EX1012, [0032] ("Additionally, application layer data (*e.g.* a **DataOverSignaling** (DOS) message) may also be **bundled in the access channel message to expedite communication with an end application** (*e.g.*, the group server, application resident on another AT, etc.)").

The access channel message is a "ConnectionRequest" message that includes signaling information for establishing a traffic channel, such as "route update information (RouteUpdate), provisioning for any QoS services used for the

communication (ReservationOnRequest), etc.” *Id.*, [0032]-[0033]. Thus, a POSITA would have understood *Ananthanarayanan*’s access channel message to be a signaling message because it contains signaling data that facilitates traffic channel establishment and connection between the terminal and the access network. *Ananthanarayanan*’s disclosure of bundling application-layer data in the access channel signaling message to expedite communication with an end application therefore suggests to a POSITA why it would be obvious to include data like *Benaouda*’s M2M measurement data in *Krco*’s Location Update Request signaling message.

102. A POSITA would have recognized that applying such a basic technique, bundling M2M measurement data into a signaling message from a UE, would have yielded predictable results and an improved system, such as a UE that can more efficiently transfer or expedite M2M data to an M2M service provider by bundling this data in a Location Update Request message.

103. Further, a POSITA implementing *Krco*’s teachings would have been motivated to look to similar references like *Benaouda* for implementation details. *Krco* discloses a “service provider” that provides machine-to-machine services, like habitat and health monitoring, burglar alarms, and automatic metering, and home automation. EX1009, 4:10-16. A POSITA would have been motivated to look to similar references, such as *Benaouda*, for implementation details of the

service provider. *Benaouda* discloses an “M2M application” that, like *Krco*’s service provider, “provides [] M2M capability and function” such as “remote control of customer premises equipment, alarm reporting, medical telemetry,” and utility meter reading. EX1010, [0025]. And *Benaouda*’s M2M application “is an application hosted on a server or host computer.” *Id.* A POSITA would have been motivated to look to similar references, such as *Benaouda*, for the implementation details of an M2M service provider, and would have turned to *Benaouda*’s teachings that such a service provider could be implemented on a server or host computer.

104. *Krco* also discloses transmitting “secondary data” to an M2M service provider that offers M2M services like burglar alarms, health monitoring, and utility meter reading. EX1009, 1:60-62, 4:24-26, 7:54-62. Similarly, *Benaouda* transmits M2M measurement data from an M2M device to an M2M application offering similar M2M services via an SMS message, which also includes a short code that identifies the M2M application to which the M2M measurement data is to be sent. EX1010, [0013], [0025], [0062]. A POSITA would have been motivated to look to similar references, such as *Benaouda*, for the implementation details of delivering M2M device data to the proper M2M service provider, and would have turned to *Benaouda*’s teachings about identifying a destination application via an address of the destination application.

F. Reasonable Expectation of Success

105. A POSITA would have had a reasonable expectation of success when combining *Krco* with *Benaouda*. A POSITA would have reasonably expected success in substituting or supplementing *Krco*'s secondary data with any other type of data, including the M2M data discussed in *Benaouda*. *Krco* does not require its secondary data to comprise a unique formatting or data type, nor does *Krco* suggest that data other than its "secondary data" cannot be included in its Location Update Request/Routing Area Update message. And the name of the information element in which *Krco*'s secondary data is included—ExtDeviceInfo—indicates that it could be extended to include any sort of device information.

106. And as discussed above with reference to Section VIII.D, *Ananthanarayanan* discloses a system wherein application-layer data is bundled into a signaling message and transmitted to an access network for further processing. A POSITA would thus have had a reasonable expectation of success in inserting M2M application-layer data, like *Benaouda*'s M2M measurement data, into *Krco*'s Location Update Request message, as the Location Update Request message was itself a well-known signaling message. Similarly, a POSITA would reasonably expect success in modifying *Krco* to transmit M2M data as disclosed in *Benaouda*, because *Benaouda* discloses transmitting M2M data in an SMS message, which was well-known to be a signaling message. *See above*, Section

VIII.B. This modification would involve a simple substitution of elements that would not have involved undue experimentation and instead only would have required basic network design ability.

107. Further, a POSITA would have reasonably expected success in implementing *Krco*'s service provider such that it is, or such that it includes, a server (*i.e.*, as taught by *Benaouda*). *Krco* teaches a service provider that offers machine-to-machine services like habitat and health monitoring, burglar alarms, and automatic metering, and home automation. EX1009, 4:10-16. *Benaouda* teaches an M2M application that "provides [] M2M capability and function" such as remote control of customer premises equipment, alarm reporting, medical telemetry," and utility meter reading. EX1010, [0025]. Given the similar functions of *Krco*'s M2M service provider and *Benaouda*'s M2M application, a POSITA would have understood these two entities to be equivalent. And because *Benaouda* explains that its M2M application "is an application hosted on a server or host computer" (*id.*), a POSITA would have reasonably expected success when implementing *Krco*'s service provider as, or including, a server.

108. A POSITA also would have reasonably expected success in implementing *Krco*'s Location Update Request message such that it includes the address of a service provider to which embedded M2M device data is to be sent, as taught by *Benaouda*. *Krco* teaches transmitting M2M device data to an M2M

service provider. EX1009, 7:54-62. *Benaouda* transmits M2M measurement data via an SMS message, which also includes a short code that identifies the M2M application to which the M2M measurement data is to be sent. EX1010, [0013]. As discussed above, a POSITA would have understood *Krco*'s Location Update Request message and *Benaouda*'s SMS message to both be signaling messages. Further, a POSITA would have understood that *Krco*'s "ExtDeviceInfo" information element could be extended in a number of ways such as including the address of a service provider to which M2M device data is to be sent. Thus, a POSITA would have reasonably expected success in adding information identifying the address of a destination service provider to *Krco*'s Location Update Request message, as *Benaouda* teaches that this data is already found in a similar signaling message (*i.e.*, an SMS message).

G. A POSITA's Motivation to Combine *Krco* with *Benaouda* and TS 24.008

109. As I discuss above, a POSITA would have been motivated to combine *Krco* with *Benaouda*. A POSITA would have been motivated to further combine these references with TS 24.008.

110. *Krco* generally relates to the use of a Location Update Request message or a Routing Area Update message to transmit "secondary data" through a telecommunications network. EX1009, 4:24-47. A POSITA would have searched

for other references or standards to understand details about these messages and how they are implemented in a telecommunications system. One such reference is TS 24.008, which is a 3GPP specification that provides details about the various signaling messages utilized in telecommunications networks, such as the “location updating request” message, which a POSITA would have understood to be the same as *Krco*’s “Location Update Request” message. *See, e.g.*, EX1011, 256. A POSITA therefore would have been motivated to seek out more detailed descriptions of the messages used in *Krco*, such as those described by TS 24.008, when implementing the teachings of *Krco*.

111. Further, *Krco* acknowledges that its teachings may be applied in a variety of wireless communications settings. *See* EX1009, 8:14-19 (“A person skilled in the art would realize that any technique for wireless communication and any type of access network can be used together with the present invention.”). A POSITA would have searched for other references or standards to understand details of other wireless communications technologies that are not described in *Krco*. One such reference is TS 24.008. TS 24.008 is a 3GPP specification that “specifies the procedures used at the radio interface core network protocols within the 3rd generation mobile telecommunications system and the digital cellular telecommunications system.” EX1011, 24. A POSITA therefore would have been motivated to seek out more detailed descriptions of other wireless communications

technologies, such as those described by TS 24.008, when implementing the teachings of *Krco* within the context of those wireless communications technologies.

H. Reasonable Expectation of Success

112. As discussed above, a POSITA would have had a reasonable expectation of success in combining *Krco* with *Benaouda*. A POSITA would have had a reasonable expectation of success when combining these references with TS 24.008. First, TS 24.008 provides more details about the “Location Update Request” message used in *Krco*, so a POSITA would have reasonable expected success in utilizing those details when implementing *Krco*’s Location Update Request message. *See, e.g.*, EX1011, 256.

113. Second, *Krco* itself states that “[a] person skilled in the art would realize that any technique for wireless communication and any type of access network can be used together with the present invention.” EX1009, 8:14-19. So a POSITA would have reasonably expected success in implementing the techniques taught in *Krco* within the context of the wireless communication protocols described in TS 24.008. Implementing *Krco*’s concepts in the context of user equipment to network layer 3 signalling protocols (*e.g.*, GPRS and LTE signaling protocols) disclosed by TS 24.008 would have involved basic network design skill that was well within the capabilities of a POSITA. The concepts relied upon in

Krco involve basic network signaling between a UE and a cellular network, and a POSITA would have had a reasonable expectation of success in applying those concepts within the context of user equipment to network layer 3 signalling protocols as disclosed in TS 24.008. This is particularly true when user equipment to network layer 3 signalling protocols were well-known at the time just before the alleged invention of the '098 Patent in 2008.

114. For example, a POSITA would have modified the *Krco-Benaouda* system so that, when operating in a 3GPP system, *Krco*'s UE would bundle machine-to-machine data into a ExtDeviceInfo element and place this element in an attach request message as disclosed by TS 24.008. A POSITA would have had a reasonable expectation of success in making that combination, because this combined system merely substitutes *Krco*'s Location Update Request message with a similar message in a GPRS network (*e.g.*, the GPRS "attach request" messages). As a result, implementing the *Krco-Benaouda* combination's method—inserting M2M data into a signaling message—in the context of TS 24.008's GPRS signaling messages would not have involved undue experimentation and instead only would have required basic network design ability.

IX. UNPATENTABILITY OF THE '098 PATENT CLAIMS

A. **Ground 1: Claims 1-2 and 9-25 are Unpatentable as they are rendered Obvious by *Krco* in view of *Benaouda*.**

115. In my opinion, claims 1-2 and 9-25 are rendered obvious by *Krco* in view of *Benaouda*. I have been informed by counsel that only Claims 17 and 20 have been asserted in district court litigation, and I have been asked to analyze these two claims first. So in Ground 1 below, I first analyze Claims 17 and 20, followed by Claims 18-19, 1-2, 9-16, and 21-25, in that order.

1. **Independent Claim 17**

- a. **[17p]: A node in a telecommunications network, said telecommunications network being configured for transferring data from a communication apparatus to a machine-to-machine server, said node being comprising**

116. In my opinion, if the preamble of claim 1 is limiting, then the *Krco-Benaouda* combination discloses the preamble. *Krco* discloses transferring data from a communication apparatus a machine-to-machine server via a telecommunications network. EX1009, 3:60-4:16. *Krco* teaches that UE 10 acts as a communication apparatus for transferring data to a machine-to-machine server, service provider 17. *Id.* 3:60-64 (“The UE 10 could be a mobile phone or any other **device** whose intention is to **forward information between** the second network 15 or **entity 16 and the service provider 17. Such a device** is for

instance an **M2M device for AMR or a security application such as a burglar alarm.**”). Further, *Krco* explains that its UE may be connected with a sensor (or network of sensors) “through a wireless or wired connection,” which a POSITA would have understood to mean that the UE and the sensor(s) could be considered to be a single, integrated device. EX1009, 3:57-59; *see also* EX1017, [0023] (describing a “remote station” with integrated sensors, such as a “temperature sensor, a water sensor, a smoke detector, a carbon-monoxide detector, and/or any other suitable sensor or combination of sensors.”)). This is consistent with the ’098 Patent’s description of a “communication module” (which a POSITA would understand to be the same as a “*communication apparatus*”), which “comprises or is communicatively connected to a sensor 10.” EX1001, 4:34-35.

117. *Krco* discloses that the communications module, UE 10, transfers data to a machine-to-machine server over a third network, which is a “*telecommunications network being configured for transferring data from a communication apparatus to a machine-to-machine server.*” *Id.*, 4:7-9 (“The third network 12 could be a core network of some kind, such as a Wireless Code Division Multiple Access (WCDMA) network.”), 4:15-16 (“The UE 10 and the third network 12 are part of the primary cellular network 20.”). *See* annotated Fig. 1 below.

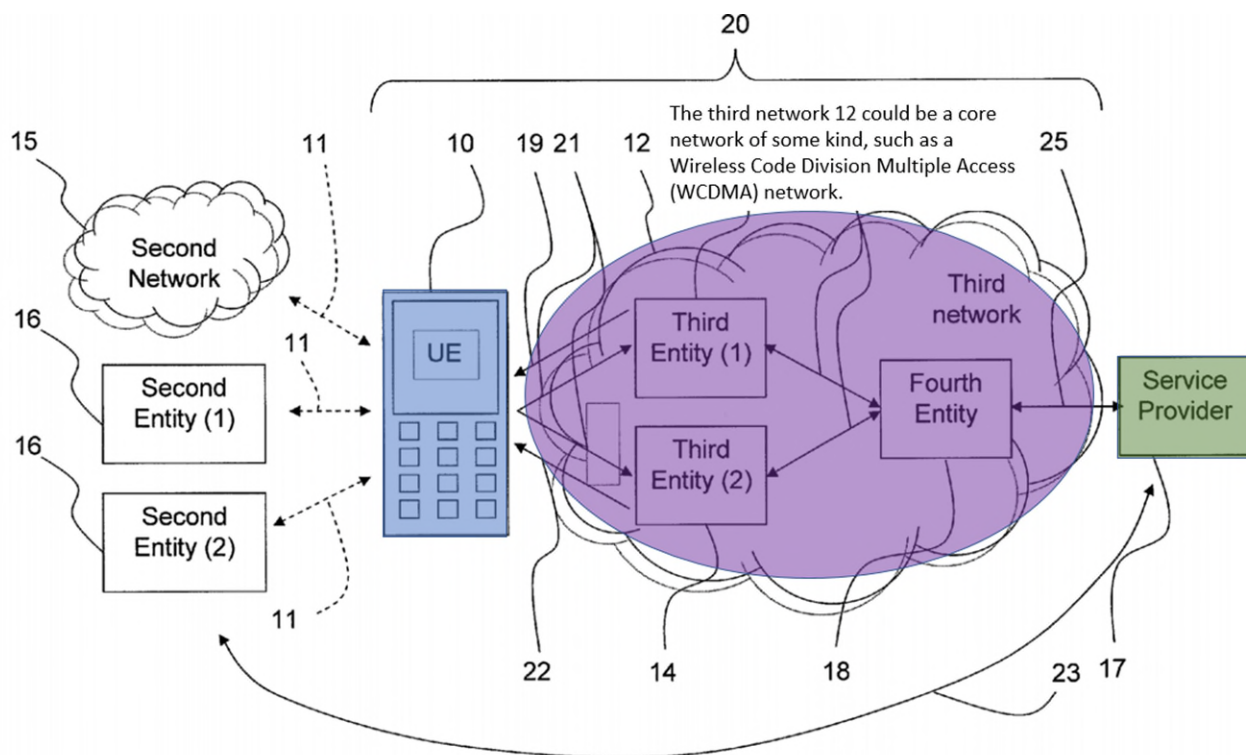


FIG 1

118. *Krco* describes that this third network 12 includes “third entity 13, 14,” which may be a Mobile Switching Center (MSC) or a Serving Generic Packet Radio Services (GPRS) Support Node, which are well-known network nodes implemented in telecommunications networks and therefore disclose “[a] node in a telecommunications network.” *Id.*, 4:53-60.

119. *Krco* discloses “a telecommunications network configured for transferring data from a communication apparatus to a machine-to-machine server ,” at least through its disclosure of cellular network (i.e., “a telecommunications network”) that facilitates the transfer of “secondary data” from the UE (i.e., “a communications module”) to the service provider (i.e., “a

machine-to-machine server, as explained below”) through a cellular network (i.e., “a telecommunications network”). For example, *Krco* discloses:

The object of the present invention is finally solved by means of a method for distribution of information in a primary cellular network. At least one second network or at least one second entity is using a User Equipment (UE) for forwarding information between the second network or entity and a service provider, wherein the second network or entity provides the UE with information about its properties. The method comprises the steps of: (1) the UE sending a first message to a third entity in a third network to inform about the location and properties of the UE, (2) the first message being such that it triggers the third entity to send system information to the UE. What particularly characterizes the method is that the UE sends secondary data in the first message to the third entity, said secondary data comprising information about the properties of the second network or entity.

Id., 2:60-3:4 (emphasis added).

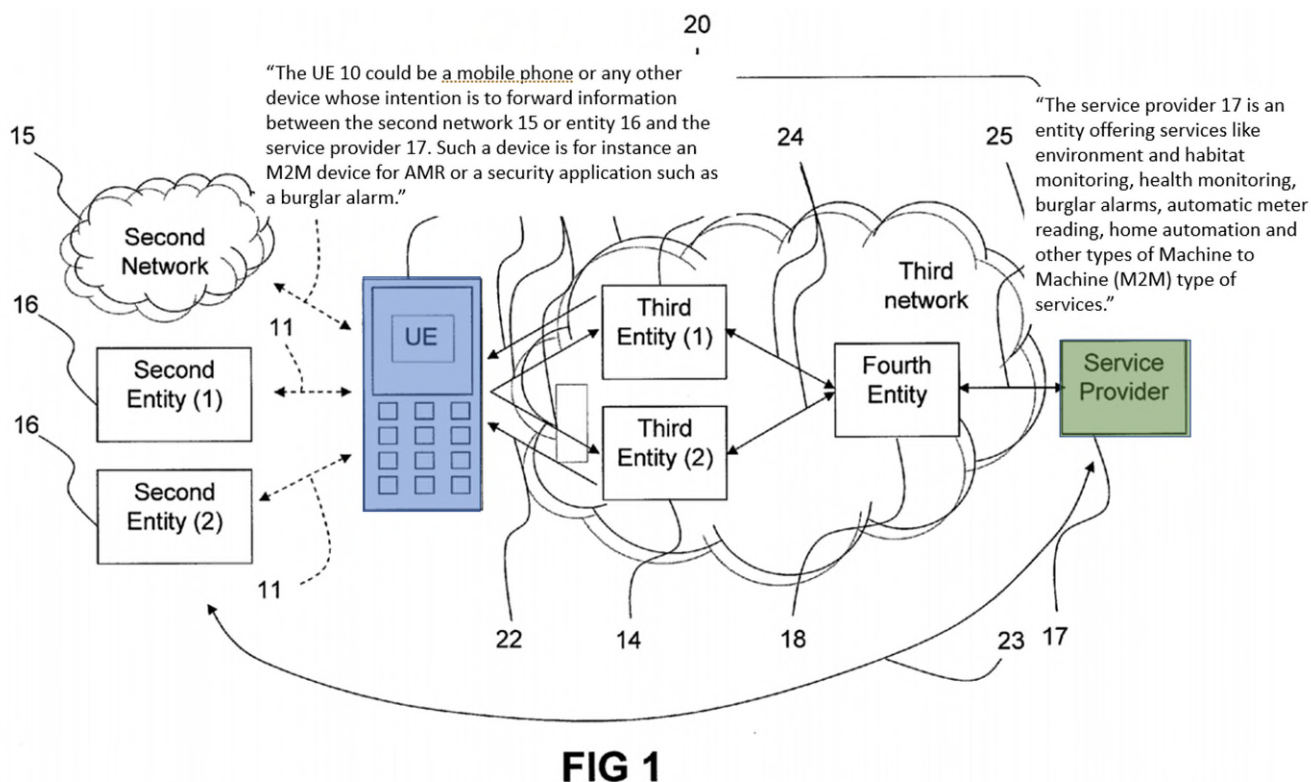
The third entity (i.e., MSC) then forwards the secondary data (i.e., M2M device data) to a “fourth entity” in the core network, where the “fourth entity” acts as an “availability server” whose role “is to enable the service provider as an external entity to reach the secondary data.” EX1009, 6:57-67, 7:54-62. Thus, *Krco*’s cellular network is “configured for transferring data from a communication apparatus to a machine-to-machine server.”

120. *Krco* teaches that the service provider 17 is, or includes, a “machine-to-machine server.” *Krco* explains that “**service provider 17 is an entity** offering services like environment and habitat monitoring, health monitoring, burglar

alarms, automatic meter reading, home automation and **other types of Machine to Machine (M2M) type of services.**” *Id.*, 4:10-13. This machine-to-machine functionality is facilitated by M2M sensors that send data to the service provider 17. *Id.*, 1:43-52, 3:60-62. A POSITA would have understood that such an entity would be implemented via a server that receives and processes the machine-to-machine data in fulfillment of its services.

121. If Patent Owner contends that *Krco*’s service provider 17 is not, or does not render obvious, a “*machine-to-machine server*,” then a POSITA would have found it obvious that an entity providing such machine-to-machine services would be implemented as a server in light of *Benaouda*. *Benaouda* discloses an “M2M application” that is “implemented on a server or host computer, which provides the M2M capabilities and function of an M2M customer, *e.g.* meter reading for a utility customer.” EX1010, [0025]. A POSITA would have recognized *Krco*’s M2M service provider to be equivalent to *Benaouda*’s M2M application because both of these entities provide similar M2M services. And because *Benaouda*’s M2M application is “implemented on a server or host computer,” a POSITA would have found it obvious that *Krco*’s M2M service provider is also implemented on a server and thereby discloses an “M2M server.” *Id.*

122. Annotated Fig. 1 below, highlights *Krco*'s UE 10 and service provider 17 within *Krco*'s disclosed system.



b. [17a] one or more processors for carrying out operations including;

123. *Krco* discloses this claim element. *Krco* discloses a cellular network that includes an MSC or SGSN (see Limitation [17p]), and it was well-known to a POSITA that an MSC or SGSN would have required a processor that would have allowed the MSC or SGSN to carry out the software for operations. A POSITA would understand that MSCs and SGSNs made use of software which required processor to execute. *See also* EX1015, 12:21-32 (“The MSC 116 may also receive communications from one or more other network elements 702 and/or service

providers 160, via input 716 and/or other inputs. A processor 714 and logic 712 may operate cooperatively.”), Fig.7 (illustrating an MSC with a processor and logic, copied and annotated below).

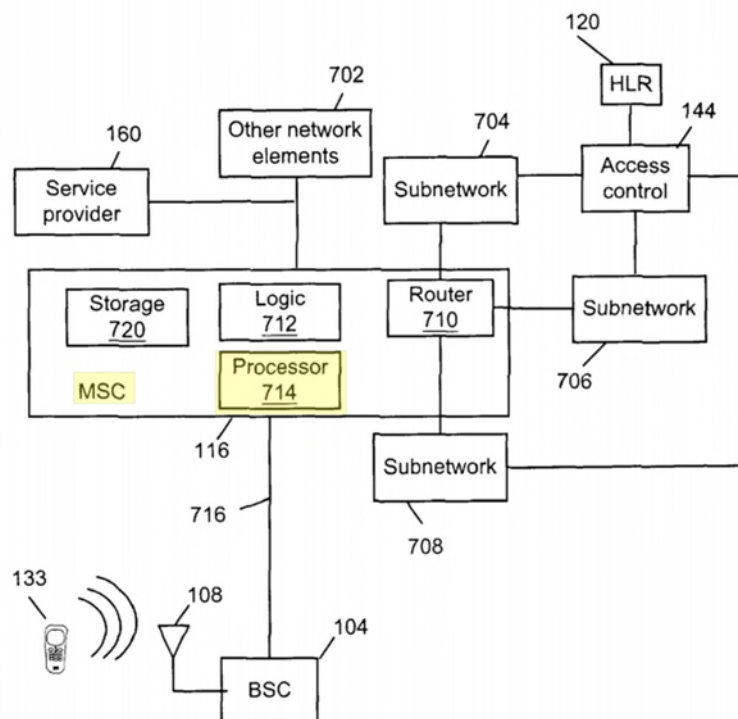


FIG. 7

EX1015, 12:21-32.

c. [17b] receiving a wireless signalling message from said communication apparatus,

124. In my opinion, *Krco-Benaouda* discloses this limitation. *Krco* discloses receiving a wireless signalling message from UE 10 (the “communication module”) at an MSC (or SGSN) in the third network (i.e., the “telecommunications network”).

125. *Krco* teaches the use of wireless signaling messages which are sent by the UE 10, (“the communication module”). EX1009, 3:9-13 (“**By embedding** Wireless Sensor Network (WSN) **properties** (such as the availability) **in the already existing signalling** in a cellular network, efficiency will be enhanced both in terms of network usage and development complexity for the individual service developer.”). *Krco* teaches several examples of existing signaling messages that can be extended to carry additional data, such as Location Update messages or Routing Area Update messages. *Id.*, 4:24-40 (“The **first message 21** is for instance a **Location Update Request or a Routing Area Update request message** (will be described later).”). These messages are well-known signaling messages used in mobility management signaling. *Krco* teaches the use of embedding secondary data into these first messages (the “*signaling messages*”). *Id.*, 5:37-38 (“The **secondary data** is in the present invention **embedded into the existing first messages.**”). And *Krco* discloses that the UE wirelessly communicates with a third network comprising “third entities” (*e.g.*, MSCs and/or SGSNs), so a POSITA would have understood the Location Update Request and Routing Area Update messages to be a “*wireless signaling message.*” As described above in Section VII.A above, the ’098 patent also identifies the “location updating request message” as an example of a wireless signalling message. *See also* EX1001, 2:38-44.

126. *Krco* teaches that these wireless signaling messages are received by entities in the third network. EX1009, 4:41-46 (“In order to enable the provisions for distributing information about the second network 15 or the second entity 16 in the primary cellular network, the method according to the present invention comprises a further step, see FIG. 2. In this step the **UE10 sends secondary data in the first message to the third entity 13.14.**”). *Krco* teaches that these third entities can be either a Mobile Switching Center (“MSC”) or a Serving Generic Packet Radio Services (GPRS) Support Node (“SGSN”). *Id.*, 4:53-60 (“If the method is used in a circuit switched third network 12, the **third entity 13 consists in a Mobile Switching Center (MSC).** The first message then consists in a Location Area Update Request message. If the method is used in a packet switched third network 12, the **third entity 14 consists in a Serving Generic Packet Radio Services (GPRS) Support Node** and the first message consists in a Routing Area Update Request message.”). A POSITA would have understood the MSC and SGSN to be well-known network components that receive and process wireless signaling messages.

d. [17c] said received wireless signalling message having inserted in it non-signalling application data generated for a machine-to-machine function by the communication apparatus,

127. In my opinion, the *Krco-Benaouda* combination discloses, or at least renders obvious this limitation. As discussed above with reference to Claim Element [17p], *Krco* discloses a method for transferring “secondary data” from a UE via a Location Update Request (or Routing Area Update) message (*i.e.*, a “wireless signalling message”). EX1009, 2:60-3:4. *Krco* discloses that the “secondary data comprises information about the properties of the second network or entity,” which may be an M2M sensor or network of M2M sensors that “for instance monitor[s] temperature, pressure, sounds, moving objects and pollutant.” *Id.*, 1:43-52, 4:3-9, 4:46-47. This data is “embedded” (*i.e.*, “inserted”) into the Location Update Request (or Routing Area Update Request) message by the UE. Specifically, the UE embeds the data within an information element of the Location Update Request (or Routing Area Update Request) whose data comprises, for example, “the number of second networks or second entities included in the information element, identity of the second network or entity together with the local validity, the type of second network or entity, location of the second network or entity relative to the UE position.” *Id.*, 5:37-53. The secondary data is provided to the UE from the sensor or network of sensors to

which the UE is connected. *Id.*, 3:57-59. A POSITA would have found it obvious that *Krco*'s sensors would comprise a program module that processes and facilitates the sensors' data collection and communication to the UE.

128. A POSITA would have understood *Krco*'s "secondary data" to be "*non-signalling application data generated for a machine-to-machine function by the communication module.*" *Krco* describes that the secondary data generally "relates to availability information" that "indicates" if the UE and its connected M2M sensor(s) are "present" for use. *Id.*, 4:48-52. As such, a POSITA would have understood that the secondary data, which indicates the identities, types, and locations of the M2M sensors connected to the UE, is "*application data*" at least because it identifies the M2M sensors' device type, which indicates the application in which the M2M sensor is implemented. Further, a POSITA would have understood that the "secondary data" is "*generated for a machine-to-machine function*" because this data is intended to support monitoring service of the M2M devices.

129. Further, a POSITA would have understood that *Krco*'s secondary data is "*non-signalling*" data because it is data about the M2M sensors, not signals. As discussed above in Section VII.B, applicant's amendment narrowing the claimed "application data" to be "*non-signalling application data,*" and applicant's accompanying remarks, led to the '098 Patent's allowance. *See above*, Section

VII.B; *see also* EX1002, 7, 64. And the efficiencies that accompany this technique for inserting “non-signalling application data” in a “signalling message,” met the objectives of the ’098 Patent, which is to “allow for efficient and fast communications of limited amounts of data in a machine-to-machine environment.” EX1001, 1:53-56. *Krco*, too, touts the that “efficiency will be enhanced both in terms of network usage and development complexity, by embedding the secondary data (*i.e.*, M2M sensor data) “in the already-existing signalling in a cellular network.” EX1009, 3:9-14.

130. As discussed above with reference to Claim Element [17p], a POSITA would have understood that the UE and the sensors to which the UE is connected could be implemented as a single device. Thus, because the sensors (*i.e.*, the “second entities”) generate and provide the secondary data, a POSITA would have understood that the combined UE-sensor device (*i.e.*, the “*communication module*”) would have generated the secondary data. This is consistent with the ’098 Patent’s description of a “*communication module*,” which “comprises or is communicatively connected to a sensor 10” that generates M2M data. EX1001, 4:34-49.

131. *Krco* also describes that the “[t]he secondary data is in the present invention embedded into the existing first messages” (*i.e.*, the Location Update Request or Routing Area Update Request message). EX1009, 5:37-38. Because

Krco discloses that it is the UE (*i.e.*, the communication module) that transmits the Location Update Request (or Routing Area Update Request) message, a POSITA would have understood that it is the UE that embeds (*i.e.*, “*insert[s]*”) the secondary data into the Location Update Request (or Routing Area Update Request) message.

132. Therefore, for the reasons above, *Krco* discloses this limitation.

133. If the Patent Owner contends that the “secondary data” in *Krco* is not “*non-signalling application data generated for a machine-to-machine function*,” then a POSITA would have found it obvious to include the machine-to-machine measurement or alarming data from *Benaouda* in *Krco*’s Location Updating Request (or Routing Area Update Request) message. *Benaouda* discloses a method for transferring data from an M2M device to a server hosting an M2M application through a mobile network. *See, e.g.*, EX1010, [0013]. *Benaouda* discloses that this data is generated by the M2M device in accordance with its M2M functionality. For example, *Benaouda* discloses that its M2M system can be implemented as a meter reading service “which provides the M2M capability and function of an M2M customer”:

In a utility meter reading example, the M2M device 11 would be the actual meter reader. There would be similar M2M devices 11 at many premises of customers of the utility company, and the application 13 would enable the utility company to obtain and process meter reading data

from the many devices 11, e.g. for purposes of billing the customers for their respective utility usage. The M2M devices 11 and the M2M application 13 communicate data via an Internet Protocol (IP) data network, such as the exemplary Internet 15, and a public mobile/wireless communication network shown as a public cellular telephone network 17 in the example.

EX1010, [0025]-[0026].

134. As disclosed in *Benaouda*, M2M devices can operate as utility readers, for example, and, in accordance with that M2M function, generate and transmit meter reading data. *Id.* Under a system implementing *Krco*'s method for data transmission via a Location Update Request (or Routing Area Update Request) message, a POSITA would have understood that the M2M data as disclosed in *Benaouda* could be inserted into *Krco*'s Location Update Request (or Routing Area Update Request) message such that the Location Update Request (or Routing Area Update Request) message would transmit this data to the M2M service provider instead of the secondary data described in *Krco*.

135. As discussed above in Sections VIII.E-F, a POSITA would have been motivated to combine *Krco* with *Benaouda*. In particular, a POSITA seeking to implement *Krco*'s method for transmitting device data, secondary data, via a Location Update Request message would have found it obvious to transmit M2M data via the Location Update Request (or Routing Area Update Request) message, at least because a POSITA would have been aware of similar techniques, such as

those disclosed by *Ananthanarayanan*, wherein application-layer data is bundled in a signaling message. *See above*, Section VIII.E-F. Accordingly, implementing *Krco*'s method of transmitting device data to transmit M2M data like that disclosed in *Benaouda* would have involved the implementation of a known technique for its ordinary purposes in the same way as have been previously disclosed, in order to achieve a predictable result.

136. Therefore, for the reasons above, the *Krco-Benaouda* combination renders obvious this limitation.

- e. **[17d] wherein wireless signalling messages of the telecommunications network are of a message type specified for carrying signalling data for managing connections in the telecommunications network;**

137. In my opinion, the *Krco-Benaouda* combination discloses this limitation. *Krco* teaches that the wireless signalling messages are a message type specified for carrying signalling data for managing connections in the telecommunications network.

138. *Krco* discloses that the Location Update Request and Routing Area Update Request messages are involved in the registration of a device in the telecommunications network. EX1009, 4:24-40 ("As a part of the **registration procedure of the UE** in the third network 12, the location update procedure (circuit switched domain) or the routing area update procedure (packet switched

domain) is triggered **and the UE is registered in the third network.**"). A POSITA would have understood "registration" to be a well-known procedure in which the UE connects with the access network to allow user can make a call or use some other network services. *Id.*, 1:14-19 ("In 3G (third generation mobile phone standard) and L0TE (Long Term Evolution) networks today, each **UE (User 15 Equipment)** when activated **goes through a set of registration and attach procedures with the core network before the end user can make a call or use some other network services.**"). Therefore, these messages are a type specified for carrying signalling data for managing connections in the telecommunications network.

139. Further, the Location Update Request and Routing Area Update messages include a number of information elements that relate to, for example, protocol discriminator and update request message identity information (EX1009, 4:64-5:34), which a POSITA would have understood to be signaling data that is needed in this registration procedure (*i.e.*, the connection management). Thus, the *Krco* teaching of Location Update Request/Routing Area Update messages "*are of a message type specified for carrying signalling data for managing connections in the telecommunications network.*"

140. As described above in Section VII.A above, the '098 patent also identifies Location Update messages or Routing Are Update messages as wireless

signalling messages specified for carrying signalling data for managing connections in the telecommunications network.

141. Therefore, for the reasons above, the *Krco-Benaouda* combination discloses this limitation.

f. **[17e] retrieving said non-signalling application data from the received wireless signalling message; and**

142. In my opinion, the *Krco-Benaouda* combination discloses this limitation. As discussed above, *Krco* discloses that when a UE transmits a Location Update Request (or Routing Area Update Request) message containing “secondary data,” it first transfers the message to an MSC/SGSN (*i.e.*, a “signalling termination node”), which then “extract[s] the secondary data from the” Location Update Request (or Routing Area Update Request) message and sends this data to another entity. EX1009, 6:45-50 (“When the third entity 13.14 receives the second request message or when there is a publish and subscribe relationship 31 (periodically or ‘event-triggered’) 31, the **third entity performs the steps 32 of: extracting the secondary data from the first message**, and sending the secondary data to the fourth entity 18.”). A POSITA would have understood that by “extracting” the secondary data (*i.e.*, the “*non-signalling application data*”) from the Location Update request or Routing Area Update request messages (*i.e.*,

the “*wireless signalling message*”), *Krco* discloses “*retrieving said non-signalling application data from the received wireless signalling message.*”

143. If Patent Owner somehow contends that the “secondary data” in *Krco* is not “*non-signalling application data generated for a machine-to-machine function,*” a POSITA would have found it obvious to modify *Krco* to include M2M measurement data as taught by *Benaouda* in the Location Update Request (or Routing Area Update Request) message. *See above*, Section IX.A.1.c. In such a case, a POSITA would have found it obvious to extract the M2M measurement data from the modified Location Update Request (or Routing Area Update Request) message configured according to the *Krco-Benaouda* combination. A POSITA would have found it obvious to perform this extraction to further transmit the data to a service provider that is authorized to access the data as taught by *Krco*. Thus, the *Krco-Benaouda* combination also renders obvious this claim element.

- g. [17f] terminating further transmission of the received wireless signalling message and transferring said retrieved non-signalling application data to said machine-to-machine server.**

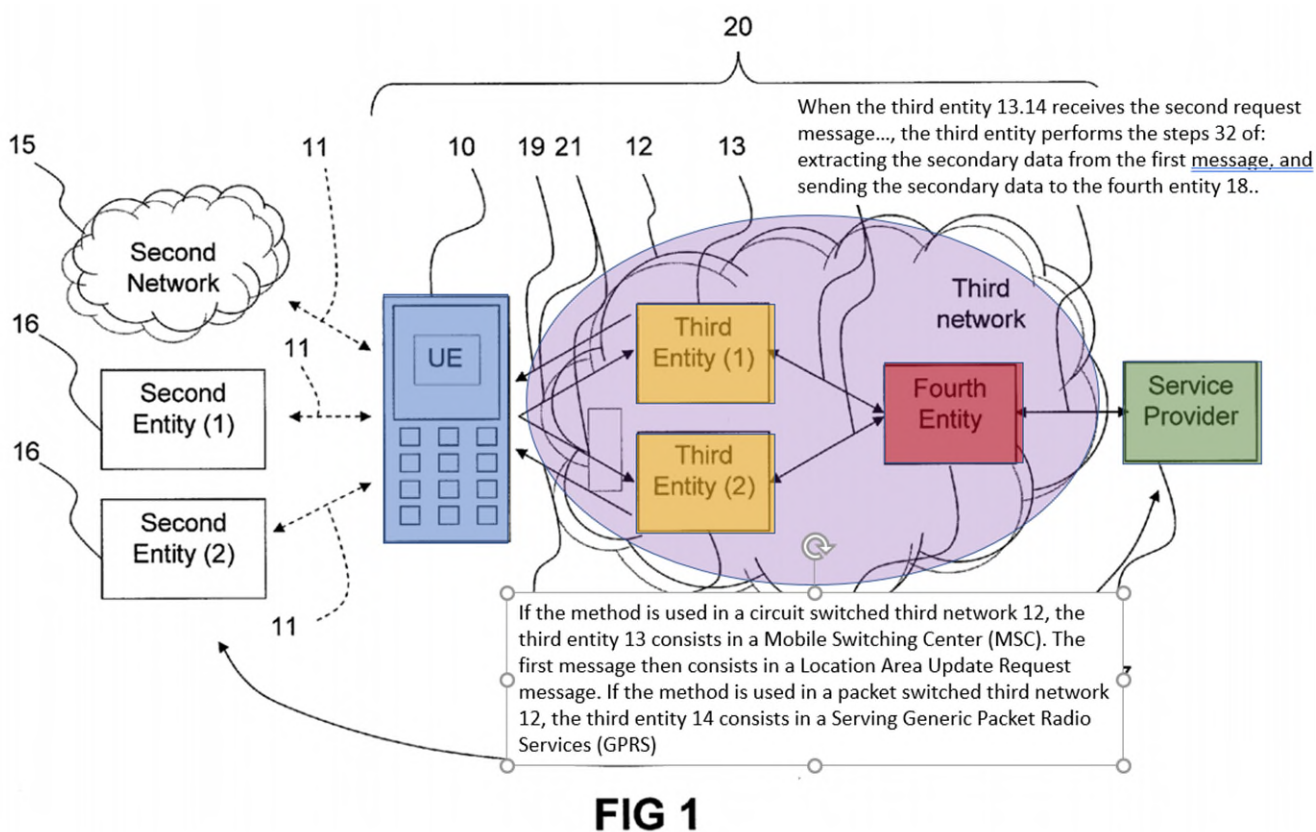
144. The *Krco-Benaouda* combination discloses, or at least renders obvious, this limitation.

145. First, *Krco-Benaouda* teaches that the Location Update Request is terminated at the MSC or SGSN. *Krco-Benaouda* teaches that message 21, is sent from UE 10 to the third entities, 13, 14. EX10079, 4:17-21. (“The method for distributing information in the primary cellular network 20 comprises a first step in which the **UE 10 sends a first message 21 to the third entity 13,14** in the third network 12, to inform about the location and properties of the UE 10.”). These third entities can be a Mobile Switching Center or a SGSN, depending on the message type. *Id.*, 4:53-60. (“If the method is used in a circuit switched third network 12, the **third entity 13 consists in a Mobile Switching Center (MSC)**. The first message then consists in a Location Area Update Request message. If the method is used in a packet switched third network 12, the **third entity 14 consists in a Serving Generic Packet Radio Services (GPRS) Support Node** and the first message consists in a Routing Area Update Request message.”).

146. *Krco* teaches that its third entities extract secondary data and send it to a fourth entity. *Id.*, 6:45-50 (“When the **third entity 13,14 receives the second request message** or when there is a publish and subscribe relationship 31 (periodically or “event-triggered”) 31, the **third entity performs the steps 32 of: extracting the secondary data from the first message, and sending the secondary data to the fourth entity 18.**”). A POSITA would understand that these third entities are extracting the secondary data from the first message (*i.e.*,

the “*signalling message*”), and sending the secondary data to another entity.

However, the third entities are not passing the first message (“*signaling message*”) along to the other entity, which a POSITA would understand to mean that the third entities are terminating the “*signalling message*.” See Fig. 1 annotated below.



147. If the Patent Owner contends that are not passing the first message along and extracting data does not teach terminating a message. It would have been obvious to a POSITA, based on his/her common sense and ordinary ingenuity, to terminate further transmission of the Location Update Request message (i.e., the

“received wireless signalling message”) after the secondary data is extracted.

The '098 Patent acknowledges this understanding, explaining that “the signalling messages terminate at [] nodes” such as the MSC and SGSN. EX1001, 2:21-25.

148. *Krco* also discloses that once the secondary data is extracted from the Request messages by the MSC/SGSN, the secondary data is transferred to the service provider (*i.e.*, the “machine-to-machine server”). *Krco* discloses that upon the extracting the secondary data, the MSC/SGSN sends the secondary data to a fourth entity. EX1009, 6:45-50 (“When the third entity 13.14 receives the second request message or when there is a publish and subscribe relationship 31 (periodically or “event-triggered”) 31, the third entity performs the steps 32 of: extracting the secondary data from the first message, and **sending the secondary data to the fourth entity 18.**”). The fourth entity is another entity in the core network that acts as an “availability server.” EX1009, 6:45-50, 6:57-64. This availability server “control[s] the distribution of the secondary data,” and “send[s] the secondary data to the service provider 17 if the service provider has the authorization” to receive the secondary data. *Id.*, 7:54-62 (“When the fourth entity 18 receives the third request message or when there is a publish and subscribe relationship 33, **the fourth entity performs the steps of 34: determining if the service provider has an authorization** to receive the secondary data, and **sending**

the secondary data to the service provider 17 if the service provider has the authorization.”). Therefore, for the reasons above, *Krco* discloses this limitation.

149. If Patent Owner somehow contends that the “secondary data” in *Krco* is not “*non-signalling application data generated for a machine-to-machine function*,” a POSITA would have found it obvious to modify *Krco* to include M2M measurement data as taught by *Benaouda* in the Location Update Request (or Routing Area Update Request) message. *See above*, Section IX.A.1.c. In such a case, a POSITA would have found it obvious to extract the M2M measurement data from the modified Location Update Request (or Routing Area Update Request) message configured according to the *Krco-Benaouda* combination and transfer this data to the M2M service provider. A POSITA would have found it obvious to perform this this data to a service provider that is authorized to access the data as taught by *Krco*. Thus, the *Krco-Benaouda* combination also renders obvious this claim element

150. As *Krco-Benaouda* discloses all of the claim limitations of Claim 1, *Krco-Benaouda* render obvious Claim 1.

2. Claim 20

i. [20a] The node of claim 17, wherein the telecommunications network is configured for transferring non-signalling application data from the communication apparatus to the machine-to-machine server in a machine-to-machine communications setting; and

151. In my opinion, the *Krco-Benaouda* combination discloses this claim element. As discussed above with reference to Claim Element [17p], *Krco* and the *Krco-Benaouda* combination discloses a telecommunications system wherein a UE transmits M2M sensor data to a M2M service provider. A POSITA would have understood this process for transferring M2M sensor data to occur in a “*machine-to-machine communications setting*.” Thus, for at least the same reasons discussed above in Section IX.A.1.a, the *Krco-Benaouda* combination discloses this claim element.

[20b] wherein transferring said non-signalling application data to said machine-to-machine server comprises transferring said non-signalling application data to said machine-to-machine server, while avoiding to establish a complete circuit-switched or packet-switched connection between said communication apparatus and said telecommunications network.

152. The *Krco-Benaouda* combination renders obvious this claim element. *Krco* discloses that “[a]s part of the registration procedure of the UE in the third network 12, the location update procedure (circuit switched domain) or the routing area update procedure (packet switched domain) is triggered and the UE is

registered in the third network.” EX1009, 4:24-40. A POSITA would have understood that such registration does not result in a “*complete circuit-switched connection or packet-switched connection*” between the UE and the telecommunications network. Establishing a complete circuit-switched or packet-switched connection requires a separate procedure for establishing a communication session. *See above*, Section VI.C.2. For example, in a GRPS system, once a mobile station has attached to a network (*i.e.*, the mobile is registered with the network), the mobile station cannot send or receive data (*i.e.*, complete a packet-switched connection between said the mobile station and the network) until a particular communication session, called a packet data protocol (PDP) context, has been established. EX1016, 135 (“Once the mobile device has registered with the mobile network, **it cannot start to send and receive data over the packet core until it has established a session**, which is known as having a packet data protocol context (PDP context).”), 131 (“A PDP context is required to transfer data over the GPRS network; however **data transmission and reception are not possible until the mobile device moves to the ready state**. The mobile device can be paged in the standby state and asked to move to the ready state. This state is very similar to the GSM idle state.”). Figure 6.138 of EX1016, copied and annotated below, shows an example of the “Packet connection establishment” procedure whereby a PDP context is established.

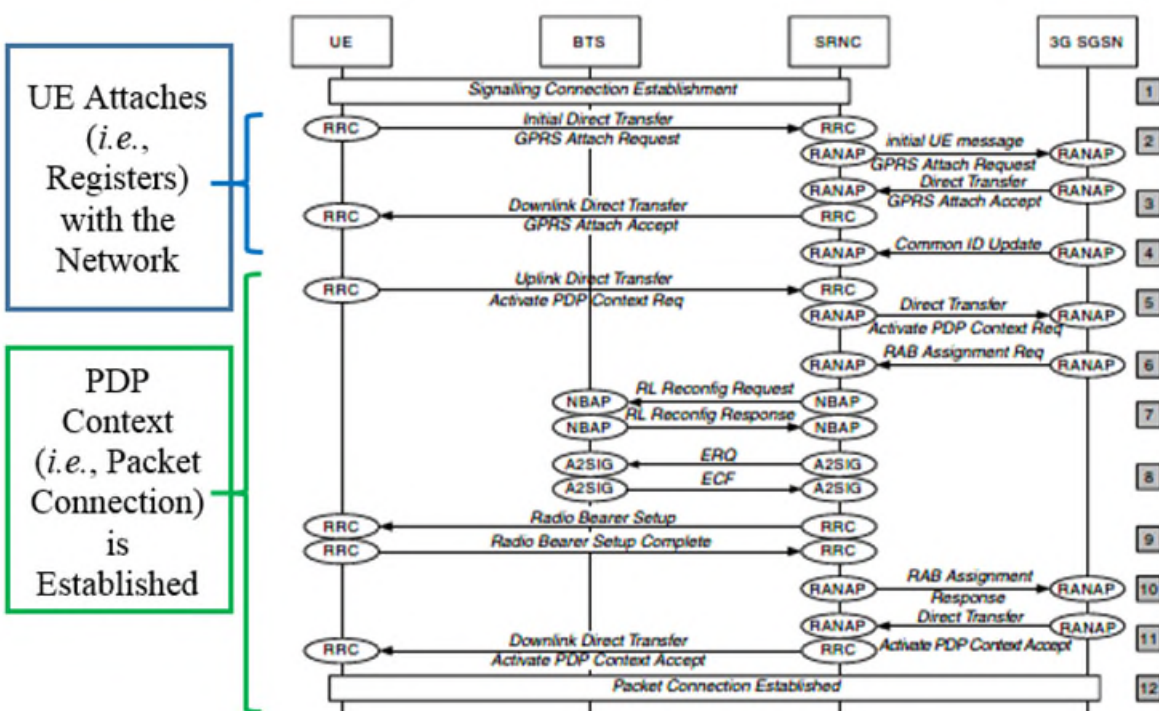


Figure 6.138 Packet connection establishment

EX1016, 413 (Fig. 6.138).

153. As shown in the Figure 6.138, and described above in Section VI.C.2, the PDP context establishment procedure occurs *after* the UE is attached (i.e., registered) with the network and occurs only if additional signaling is used to trigger this additional process. See also EX1016, 413 (“To transfer data, the UE must establish a PDP context. This is done through the *activate PDP context request.*” (emphasis original)). If the UE does not send an “Activate PDP Context Req” message, there will never be a packet connection to the network.

154. Thus, because the *Krco-Benaouda* combination uses a Location Update Request (or Routing Area Update) message (i.e., an attach/registration

request message), and not a session establishment request message (*e.g.*, an “activate PDP context req” message), to transfer the M2M data (*i.e.*, the “*non-signalling application data*”) to an M2M service provider (*i.e.*, a “machine-to-machine server”), the *Krco-Benaouda* combination transmits this data “*while avoiding to establish a complete circuit-switched or packet-switched connection between said communication module and said telecommunications network.*” Indeed, neither *Krco* nor *Benaouda* disclose any procedures for establishing a complete circuit-switched or packet-switched connection. The *Krco-Benaouda* combination therefore renders obvious this claim element.

3. **Claim 18.**

a. **A node according to claim 17, wherein the node is a serving GPRS support node.**

155. The *Krco-Benaouda* combination discloses this limitation. *Krco* describes that a Serving GPRS Support Node (SGSN) can also perform this function of receiving a Routing Area Update Request message that contains secondary data and forwarding the secondary data to additional network nodes. EX1009, 4:24-40, 4:53-60 (“If the method is used in a circuit switched third network 12, the third entity 13 consists in a Mobile Switching Center (MSC). The first message then consists in a Location Area Update Request message. **If the method is used in a packet switched third network 12, the third entity 14**

consists in a Serving Generic Packet Radio Services (GPRS) Support Node

and the first message consists in a **Routing Area Update Request message.**”); see also above, Sections IX.A.1.c-e (describing Krco’s SGSN receiving a Routing Area Update Request message as an alternative to an MSC receiving a Location Update Request message). A POSITA would have understood that the SGSN was a well-known network component that performs functions of the MSC in a packet switched network. This is consistent with the ’098 Patent itself, which describes the SGSN as an alternative to the MSC. EX1001, 2:17-25.

4. **Claim 19.**

- a. **A node according to claim 17, wherein the node is a signalling monitor.**

156. *Krco* discloses this limitation. A POSITA would have understood that the MSC and SGSN described *Krco* receive signalling messages. As part of this role, the MSC and SGSN would have monitored for the signaling messages that they receive and would therefore be considered “signalling monitors.” See Claim limitation [17p] and [17b] above.

5. **Independent Claim 1**

- a. **[1p]: “A method of transferring data from a communication module to a machine-to-machine server over a telecommunications network, the method comprising:”**

157. In my opinion, if the preamble of claim 1 is limiting, then the *Krco-Benaouda* combination discloses the preamble. Claim Element [1p]’s recitation of a “*communication module*” corresponds to Claim Element [17p]’s recitation of a “*communication apparatus*” and thus is disclosed for the same reasons explained in Claim Element [17p]. And *Krco* discloses Claim Element [1p] for at least the same reasons *Krco* discloses a “*telecommunications network configured for transferring data from a communication apparatus to a machine-to-machine server*” discussed above with reference to Claim Element [17p].

b. [1a]: “receiving a wireless signalling message from said communication module at a signalling termination node of the telecommunications network,”

158. *Krco* discloses, or at least renders obvious, this claim element. As discussed above with reference to Claim Elements [17p] and [17b], *Krco* discloses a method for transferring “secondary data” (i.e., M2M sensor data) from a UE (i.e., “*a communications module*”) in a Location Update Request or Routing Area Update Request message (i.e., a “*wireless signalling message*”) through an MSC or SGSN. EX1009, 2:60-3:4, 4:53-60. And as discussed above with reference to Claim Element [17f], *Krco* discloses, or at least renders obvious, that the MSC or SGSN “*terminat[es] further transmission of the received wireless signalling message.*” For at least the same reasons discussed above with reference to Claim

Element [17f], a POSITA would have understood Krco's MSC and SGSN to disclose a "signalling termination node of the telecommunications network."

- c. **[1b]: "said received wireless signalling message inserted in it non-signalling application data generated for a machine-to-machine function by the communication module"**

159. See Claim Element [17c].

- d. **[1c]: "wherein wireless signalling messages of the telecommunications network are of a message type specified for carrying signalling data for managing connections in the telecommunications network,"**

160. See Claim Element [17d].

- e. **[1d]: "retrieving said non-signalling application data from the received wireless signalling message; and"**

161. See Claim Element [17e].

- f. **[1e]: "terminating further transmission of the received wireless signalling message and transferring said retrieved non-signalling application data to said machine-to-machine server,"**

162. See Claim Element [17f].

6. **Claim 2**

- a. **"The method according to claim 1, wherein the wireless signalling message is a network attach request message.**

163. In my opinion, the *Krco-Benaouda* combination teaches this limitation. As discussed above with reference to Claims 1 and 17, *Krco* uses a

Location Update Request message (*i.e.*, a “*wireless signalling message*”) to transmit secondary data from a UE to a cellular network for further processing. *Krco* explains that a location update request message is part of the “registration procedure” in which “the UE is registered in the third network.” EX1009, 4:26-30 (“As a **part of the registration procedure** of the UE in the third network 12, the **location update procedure** (circuit Switched domain) or the **routing area update procedure** (packet Switched domain) is triggered and the **UE is registered in the third network 12.**”) EX1009, 4:24-40. A POSITA would have understood *Krco*’s “Location Update Request” message to be a well-known attach request message that triggers the registration procedure, whereby a UE becomes attached to the network. *See, e.g.*, EX1011, 256 (“**Location updating request. This message** is sent by the mobile station to the network either to request update of its location file (normal updating or periodic updating) or to **request IMSI attach.**”). A POSITA would have understood that by completing the registration procedure, a UE (*e.g.*, an M2M device) would become “attached” to the network because the network would have the UE’s information and location necessary to fulfil future communications. Thus, a POSITA would have recognized *Krco*’s Location Update Request message as disclosing a “*network attach request message.*”

164. The ’098 Patent acknowledges that a “location updating request” message, which a POSITA would have understood to be the same as *Krco*’s

“Location Update Request” message, is an example of “a network attach request message,” which the ’098 Patent characterizes as a “signalling message.” See EX1001, 5:30-32 (“The signalling message S can be a network attach request message in order to provide rapid transfer of the user data.”), EX1001, 5:57-6:1 (In particular, the communication module 2 may send a **location updating request to request IMSI attach** as specified in subclause 9.2.15 of 3GPP TS 24.008 V8.3.0,...)).

165. Therefore, for the reasons above, the *Krco-Benaouda* combination discloses this claim.

7. **Claim 9**

- a. **The method according to claim 1, wherein said received wireless signalling message contains address information indicative of said machine-to-machine server.**

166. In my opinion, *Krco-Benaouda* discloses, or at least renders obvious, this claim limitation. *Krco* teaches that the fourth entity provides a single point of attachment for the M2M service provider. EX1009, 6:64-67 (“The **fourth entity 18 also provides a single point of attachment for the service provider 17**, and enables the service provider to not have to scan different third entities 13.14 for the correct information.”). *Krco* teaches that the fourth entity maintains which service providers have access to what kind of secondary data. *Id.*, 7:17-19 (“1. Maintaining

an access control list specifying **which service providers that have access to what kind of secondary data.**”). *Krco* also teaches that the fourth entity will send secondary data to the service provider providing they have authorization. *Id.*, 7:55-62 (“When the fourth entity 18 receives the third request message or **when there is a publish and subscribe relationship 33, the fourth entity performs the steps of 34:** determining if the service provider has an authorization to receive the secondary data, and **sending the secondary data to the service provider 17 if the service provider has the authorization.**”). Since *Krco* teaches that the fourth entity provides for multiple service providers and that it sends secondary data to these different service providers, there must be information indicative of the M2M service provider in the secondary data or the fourth entity would not know where to send the secondary data when it receives the secondary data. A POSITA would understand that this information was address information indicative of said machine-to-machine server.

167. This understanding is obvious in light of Benaouda. *Benaouda* transmits M2M measurement data from an M2M device to an M2M application via an SMS message, which also includes a short code that identifies the M2M application to which the M2M measurement data is to be sent. EX1010, [0013]; *see also id.*, [0039] (“Each server hosting a M2M application 13 is assigned a short code. Hence, the MC 29 routes outgoing messages using a short code for the

destination address of the M2M application.”). As discussed above with reference to Claim [17p], a POSITA would have understood *Krco*’s service provider to be equivalent to *Benaouda*’s M2M application, which is hosted on a server. See above, Section IX.A.1.a. Accordingly, a POSITA would have found it obvious to include address information indicative of a service provider’s address, as taught by *Benaouda*, in *Krco*’s Location Update Request message (*e.g.*, in the “ExtDeviceInfo” information element) to indicate an authorized service provider’s address to which associated secondary data is to be sent. Thus, the *Krco-Benaouda* combination renders obvious Claim 9.

8. **Claim 10.**

a. **The method according to claim 1, wherein the non-signalling application data comprises alarming data.**

168. In my opinion, the *Krco-Benaouda* combination discloses this claim limitation. *Krco* discloses a communications system wherein an M2M sensors transmit generated and transmit M2M data, which may comprise alarm data.

EX1009, 3:60-64 (“The **UE 10** could be a mobile phone or any **other device** whose intention is to forward information between the second network 15 or **entity 16 and the service provider 17**. Such a device is for instance an M2M device for AMR or a security application such as a **burglar alarm**.”); see also *id.*, 4:10-13 (“The service provider 17 is an entity offering services like environment and

habitat monitoring, health monitoring, burglar alarms, automatic meter reading, home automation and other types of Machine to Machine (M2M) type of services.”); *see also id.*, 1:42-59. (“Similar at home, it may be that the **burglar alarm** should be able to monitor the availability status of the alarm sensors.”).

169. As discussed above with reference to Claim Element [17c], A POSITA would have understood that a UE operating according to the *Krco-Benaouda* combination could transmit the M2M data gathered by *Krco*’s M2M sensors in *Krco*’s Location/Routing Area Update Request message. A POSITA would have also understood that any “burglar alarm” data gathered by *Krco*’s M2M sensors, when packaged into the Location Update/Routing Area Request message (*i.e.*, the “*signalling message*”) of the *Krco-Benaouda* combination, would be “*non-signalling application data*” because this data is associated with the M2M device’s M2M function and does not assist in signaling functions such as connection management. Thus, the *Krco-Benaouda* combination renders obvious Claim 10.

9. **Claim 11**

- a. **The method according to claim 1, wherein the non-signalling application data comprises measurement data.**

170. In my opinion, *Krco-Benaouda* discloses this claim limitation. *Krco* discloses a communications system wherein M2M sensors generate and transmit

M2M data, which may be related to “environment and habitat monitoring, health monitoring, burglar alarms, automatic meter reading, home automation and other types of Machine to Machine (M2M) type of services.” EX1009, 1:42-59. A POSITA would have understood that any of these applications would have involved the gathering and transmission of “measurement data.” For example, a POSITA would have understood a health monitoring application to involve an M2M sensor that measures a user’s physical characteristics (such a heartrate) and transmits that measurement data to a destination application. As discussed above with reference to Claim Element [17c], A POSITA would have understood that a UE operating according to the *Krco-Benaouda* combination could transmit the M2M data gathered by *Krco*’s M2M sensors in *Krco*’s Location Update Request message. And a POSITA would have understood that measurement data (*e.g.*, associated with a health monitoring functionality), when packaged into the Location Update Request message (*i.e.*, the “signalling message”) of the *Krco-Benaouda* combination, would be “non-signalling application data” because this data is associated with the M2M device’s M2M function and does not assist in signaling functions such as connection management. Thus, the *Krco-Benaouda* combination renders obvious Claim 11.

10. **Claim 12**

- a. **The method according to claim 11, wherein the communication module comprises one or more sensors, and wherein the measurement data comprises measurement data obtained using the one or more sensors.**

171. In my opinion, *Krco-Benaouda* discloses this claim limitation. As discussed above with reference to Claim Element [17p], *Krco* discloses a UE that may be connected with a sensor (or network of sensors) “through a wireless or wired connection,” which a POSITA would have understood to mean that the UE and the sensor(s) could be considered to be a single, integrated device. EX1009, 3:57-59. A POSITA would have understood to mean that in this context the UE and the sensor(s) could be considered to be a single module. *See, e.g.*, EX1017, [0023] (describing a “remote station” with integrated sensors, such as a “temperature sensor, a water sensor, a smoke detector, a carbon-monoxide detector, and/or any other suitable sensor or combination of sensors.”)). Indeed, *Krco* states that the UE could itself be “for instance an M2M device for AMR [automated meter reading] or a security application such as a burglar alarm.” EX1009, 3:60-64.

172. And as discussed above with reference to Claim 11, a POSITA would have understood that M2M sensors operating in accordance with their M2M functionalities would generate and transmit measurement data. Accordingly, a

POSITA would have understood that the UE would include “*one or more sensors*” from which the measurement data could be obtained. Thus, the *Krco-Benaouda* combination renders obvious Claim 12.

11. **Claim 13**

i. [13a] **The method of claim 1, wherein said method is a method of transferring non-signalling data from the communication module to the machine-to-machine server over the telecommunications network in a machine-to-machine communications setting; and**

173. See Claim Element [20a].

ii. [13b] **wherein transferring said non-signalling application data generated for a machine-to-machine function by the communication module to said machine-to-machine server comprises transferring said non-signalling application data to said machine-to-machine server while avoiding to establish a complete circuit-switched or packet-switched connection between said communication module and said telecommunications network.**

174. See Claim Element [20b].

12. **Claim 14**

a. **The method of claim 1, wherein said received wireless signalling message comprises data derived from a sensor of the communication module.**

175. For the same reasons discussed above with reference to Claim 12, the *Krco-Benaouda* combination renders Claim 14 obvious.

13. **Claim 15**

a. [15p] A telecommunications network for transferring data from a communication apparatus to a machine-to-machine server, said telecommunications network comprising.

176. If the preamble is limiting, in my opinion the *Krco-Benaouda* combination discloses the preamble. Claim Element [15p]’s recitation of a “telecommunications network for transferring data from a communication apparatus to a machine-to-machine server” which corresponds to Claim Element [17p]’s recitation of a “*telecommunications network being configured for transferring data from a communication apparatus to a machine-to-machine server.*” As discussed above with reference to Claim Element [17p], *Krco*’s “cellular network” discloses a “*telecommunications network,*” and it facilitates the transfer of secondary data from a UE (*i.e.*, a “*communications apparatus*”) to an M2M service provider (*i.e.*, a “*machine-to-machine server*”). *See above*, Section IX.A.1.a.

b. [15a] a signalling termination node; and

177. *See* Claim Elements [1a], [17f] above. *Krco* teaches that the third entities can be either a Mobile Switching Center, “MSC,” or a Serving Generic Packet Radio Services (GPRS) Support Node, “SGSN,” which are signaling termination nodes.

c. [15b] one or more processors for carrying out operations including.

178. In my opinion the *Krco-Benaouda* combination discloses this element.

See Claim Element [17a].

- d. **[15c] receiving a wireless signalling message from said communication apparatus at the signalling termination node,**

179. In my opinion the *Krco-Benaouda* combination discloses this element.

See Claim Element [17b].

- e. **[15d] said received wireless signalling message having inserted in it non-signalling application data generated for a machine-to-machine function by the communication apparatus,**

180. In my opinion the *Krco-Benaouda* combination discloses this element.

See Claim Element [17c].

- f. **[15e] wherein wireless signalling messages of the telecommunications network are of a message type specified for carrying signalling data for managing connections in the telecommunications network**

181. In my opinion the *Krco-Benaouda* combination discloses this element.

See Claim Element [17d].

- g. **[15f] retrieving said non-signalling application data from the received wireless signalling message; and,**

182. In my opinion the *Krco-Benaouda* combination discloses this element.

See Claim Element [17e].

- h. [15g] terminating further transmission of the received wireless signalling message and transferring said retrieved non-signalling application data to said machine-to-machine server.**

183. In my opinion the *Krco-Benaouda* combination discloses this element.

See Claim Element [17f].

14. **Claim 16**

- i. [16a] The telecommunications network of claim 15, wherein said telecommunications network is configured for transferring non-signalling data from the communication apparatus to the machine-to-machine server in a machine-to-machine communications setting; and**

184. In my opinion the *Krco-Benaouda* combination discloses this element.

See Claim Element [20a].

[16b] wherein transferring said non-signalling application data to said machine-to-machine server comprises transferring said non-signalling application data to said machine-to-machine server while avoiding to establish a complete circuit-switched or packet-switched connection between said communication apparatus and said telecommunications network.

185. In my opinion the *Krco-Benaouda* combination discloses this element.

See Claim Element [20b].

15. **Claim 21**

a. [21p] A communication device comprising:

186. If the preamble is limiting, then in my opinion *Krco* discloses the preamble. Claim Element [21p]’s recitation of a “*communication device*” corresponds to Claim Element [17p]’s “*communication apparatus*” and is thus disclosed for the same reasons explained in Claim Element [17p].

b. [21a] a transmitter; and

187. In my opinion the *Krco-Benaouda* combination renders obvious this claim limitation. As discussed above with reference to Claim Element [17p], *Krco*’s UE 10 (*i.e.*, “*communication apparatus*” or “*communication device*”) wirelessly communicates with a third network to transmit device data for example using a Wireless Code Division Multiple Access (WCDMA) interface. EX1009, 3:53-54 (“The **UE communicates wirelessly with a third network 12**, comprising two third entities 13.14.”), 4:7-9 (“The **third network 12** could be a core network of some kind, such as a **Wireless Code Division Multiple Access (WCDMA) network.**”). A POSITA would know that such a device would have required a transmitter that would have allowed the UE to carry out such communications. *See, e.g.*, EX1017, [0025] (describing a “remote station” used in machine-to-machine systems, where the remote station “may also exchange data with other network devices via a wireless communication interface 222 and an **antenna 224**, which connects to a network access server 104” (emphasis added)).

c. [21b] a processor for causing the communication device to carry out operations including:

188. The *Krco-Benaouda* combination discloses this claim element. *Krco* discloses a cellular network that includes UE that transmits data about connected M2M sensors (*see* Limitation [1p]), *Krco* discloses that a UE can be a mobile phone. (“In FIG. 1 a User Entity (UE) 10, inform of a mobile station (mobile phone) is shown.”) A POSITA would know that such a mobile phone would have required a processor that would have allowed the UE device to carry out its operations. *See, e.g.*, EX1017, [0022]-[0023] (describing a “remote station” used in machine-to-machine systems, where the remote station “includes a main unit 202 which preferably includes one or more processors 2014”).

d. [21c] (i) generating non-signalling application data for a machine-to-machine function,

189. The *Krco-Benaouda* combination discloses this claim element. *See* Claim Element [17c].

- e. **[21d] (ii) encapsulating said non-signalling application data in one or more signalling messages from said communication device over a telecommunications network to a machine-to-machine server, wherein wireless signalling messages of the telecommunications network are of a message type specified for carrying signalling data for managing connections in the telecommunications network, and**

190. The *Krco-Benaouda* combination discloses this claim element. See Claim Elements [17b]-[17d].

- f. **[21e] (iii) transmitting, via the transmitter, said signalling messages containing said non-signalling application data to a signalling termination node of said telecommunications network for termination of said signalling messages and transfer of said non-signalling application data to the machine-to-machine server.**

191. The *Krco-Benaouda* combination discloses this claim element. See Claim Elements [17b]-[17d], [17f], [1a], and [21a].

- 16. **Claim 22. A communication device according to claim 21, wherein the non-signalling application data comprises alarming data.**

192. The *Krco-Benaouda* combination discloses this claim element. See Claim 10.

- 17. **Claim 23. The communication device according to claim 21, wherein the non-signalling application data comprises measurement data.**

193. The *Krco-Benaouda* combination discloses this claim element. See
Claim 11.

18. **Claim 24. The communication device according to claim 23,
further comprising one or more sensors, wherein the
measurement data comprises measurement data obtained
using the one or more sensors.**

194. The *Krco-Benaouda* combination discloses this claim element. See
Claim 12.

19. **Claim 25**

**ii. [25a] The communication device of claim 21,
wherein the processor is configured for generating
non-signalling application data in a machine-to-
machine communications setting run by the
communication device; and**

195. The *Krco-Benaouda* combination discloses this claim element. See
Claim Element [13a].

**[25b] wherein the transmitter is configured for
transmitting said signalling messages containing said
non-signalling application data to said
telecommunications network, while avoiding to
establish a complete circuit-switched or packet-
switched connection between said communication
device and said telecommunications network.**

196. The *Krco-Benaouda* combination discloses this claim element. See
Claim Element [13b].

B. Ground 2: *Krco* in view of *Benaouda* and TS 24.008.

197. It is my opinion *Krco* in view of *Benaouda* and TS 24.008 renders obvious claims 2-6.

1. **Claim 2. The method according to claim 1, wherein the wireless signalling message is a network attach request message.**

198. As I described above in Ground 1, *Krco* in view of *Benaouda* teach each element of Claim 2. TS 24.008 also discloses Claim 2.

199. TS 24.008 discloses that an IMSI attach is a type of Location Updating Request. TS 24.008 discloses that a location updating request is sent by the mobile station to the network either to request update of its location or to request IMSI attach. A POSITA would have understood the “mobile station” to be an example of a “*communications module*,” because a mobile station is a well-known term used to describe mobile devices used to communicate via a telecommunications network. The Location Updating Request message includes a “location update type” field, which is used to discriminate between these two types of Location Updating request. EX1011, 256-257 (Section 9.2.15, copied and annotated below).

9.2.15 Location updating request

This message is sent by the mobile station to the network either to request update of its location file (normal updating or periodic updating) or to request IMSI attach. See table 9.2.17/3GPP TS 24.008.

Message type: LOCATION UPDATING REQUEST

Significance: dual

Direction: mobile station to network

Table 9.2.17/3GPP TS 24.008: LOCATION UPDATING REQUEST message content

IEI	Information element	Type/Reference	Presence	Format	Length
	Mobility management protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Skip Indicator	Skip Indicator 10.3.1	M	V	1/2
	Location Updating Request message type	Message type 10.4	M	V	1
	Location updating type	Location updating type 10.5.3.5	M	V	1/2
	Ciphering key sequence number	Ciphering key sequence number 10.5.1.2	M	V	1/2
	Location area identification	Location area identification 10.5.1.3	M	V	5
	Mobile station classmark	Mobile station classmark 1 10.5.1.5	M	V	1
	Mobile identity	Mobile identity 10.5.1.4	M	LV	2-9
33	Mobile station classmark for UMTS	Mobile station classmark 2 10.5.1.6	O	TLV	5

200. Section 10.5.3.5 (copied and annotated below) of EX1011 page 372, confirms that an IMSI attach message is a particular type of a Location Updating Request.

10.5.3.5 Location updating type

The purpose of the *Location Updating Type* information element is to indicate whether a normal updating, a periodic updating or an **IMSI attach** is wanted. It may also indicate that a follow-on request has been received from the mobile station CM layer.

The *Location Updating Type* information element is coded as shown in figure 10.5.79/3GPP TS 24.008 and table 10.5.93/3GPP TS 24.008.

The *Location Updating Type* is a type 1 information element.

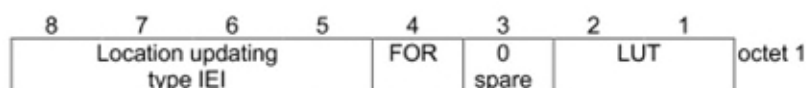


Figure 10.5.79/3GPP TS 24.008 *Location Updating Type* information element

Table 10.5.93/3GPP TS 24.008: *Location Updating Type* information element

LUT (octet 1)		
Bits		
2	1	
0	0	Normal location updating
0	1	Periodic updating
1	0	IMSI attach
1	1	Reserved
FOR (octet 1)		
The Follow-On Request bit (FOR) is coded as follows:		
Bits		
4		
0		No follow-on request pending
1		Follow-on request pending

201. As described above in Section VII.A above, the '098 patent also identifies Location Update messages or Routing Are Update messages as wireless signalling messages.

202. TS 24.008 also discloses a GPRS "Attach request" message, which "is sent by the MS to the network in order to perform a GPRS or combined GPRS attach." EX1011, 295 (Section 9.4.1). In the context of the *Krco*-TS 24.008

combination, a POSITA would have understood that a machine-to-machine device operating in the context of a GPRS telecommunications system would utilize the standardized “Attach request” message to connect with an access network, as described in TS 24.008. A POSITA would have further understood that this message is a “*signalling message*” because it includes signaling data that facilitates the connection between a mobile station (MS) and the access network in a telecommunications system. See EX1011, 295-296.

203. The '098 Patent admits that TS 24.008's GPRS attach request message is an example of a “*signalling message*”: “The signalling message S can be a network attach request message in order to provide rapid transfer of the user data,” (EX1001, 5:30-32) and “[i]n particular, the communication module 2 may send an Attach Request as specified in subclause 9.4.1 of 3GPP TS 24.008 V8.3.0, indicating that the communication module 2 has become active for the telecommunications network, in order to perform a GPRS attach or a Combined GPRS attach” (*id.*, 7:57-61).

204. Thus, *Krco* and TS 24.008 each disclose this claim limitation.

2. **Claim 3. The method according to claim 2, wherein said network attach request message is a location updating request message with a location updating type information element indicating an IMSI attach.**

205. The *Krco-Benaouda*-TS 24.008 *combination* discloses Claim 3. As discussed above with reference to Claim 2, *Krco* and TS 24.008 disclose a Location Update Request and location updating request, respectively. The 3GPP2 standards use the term “location update request” while the 3GPP standards use the term “location updating request”; a POSITA would understand that these messages are functionally equivalent and may be considered to be the same message. Section 10.5.3.5 of TS 24.008 discloses that the location updating request has a “Location Updating Type information element” which may indicate an “IMSI attach” when this information element is set to a “1 0” value:

10.5.3.5 Location updating type

The purpose of the *Location Updating Type* information element is to indicate whether a normal updating, a periodic updating or an **IMSI attach** is wanted. It may also indicate that a follow-on request has been received from the mobile station CM layer.

The *Location Updating Type* information element is coded as shown in figure 10.5.79/3GPP TS 24.008 and table 10.5.93/3GPP TS 24.008.

The *Location Updating Type* is a type 1 information element.

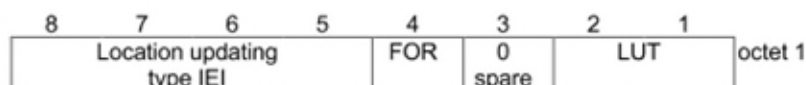


Figure 10.5.79/3GPP TS 24.008 *Location Updating Type* information element

Table 10.5.93/3GPP TS 24.008: *Location Updating Type* information element

LUT (octet 1)		
Bits		
2	1	
0	0	Normal location updating
0	1	Periodic updating
1	0	IMSI attach
1	1	Reserved

FOR (octet 1)

The Follow-On Request bit (FOR) is coded as follows:

Bits

4	
0	No follow-on request pending
1	Follow-on request pending

EX1011, 372 (highlighting added).

206. Thus, a POSITA would have understood that the Location Update Request (*Krco*)/location updating request in view of TS 24.008 discloses Claim 3. The '098 Patent acknowledges that the subject matter of Claim 3 may be found in section 10.5.3.5 of TS 24.008. EX1001, 5:64-6:4 (“IMSI attach can be requested by having the location updating type information element to code for IMSI attach as specified in subclause 10.5.3.5 of the same document.”).

3. **Claim 4. The method according to claim 2, wherein said network attach request message is an attach request with an attach type information element indicating a GPRS request or a combined GPRS/IMSI attach.**

207. The *Krco-Benaouda*-TS 24.008 combination discloses Claim 4. As discussed above with reference to Claim 2, TS 24.008 discloses a GPRS “Attach request” message, which “is sent by the MS to the network in order to perform a GPRS or combined GPRS attach.” *See above*, Section IX.B.1; *see also* EX1011, 295 (Section 9.4.1). For the reasons discussed above for Claim 2, TS 24.008’s attach request message discloses Claim 4. Indeed, the ’098 Patent acknowledges that section 9.4.1 of TS 24.008 teaches the subject matter of Claim 4. EX1001, 7:57-61 (“In particular, the communication module 2 may send an Attach Request as specified in subclause 9.4.1 of 3GPP TS 24.008 V8.3.0, indicating that the communication module 2 has become active for the telecommunications network, in order to perform a GPRS attach or a Combined GPRS attach.”).

4. **Claim 5**

i. **[5a] The method according to claim 2, further comprising: transmitting a network attach accept message to the communication module;**

208. In my opinion, the *Krco-Benaouda*-TS 24.008 combination discloses this claim element. TS 24.008 discloses after a successful location updating the mobile receives a Location Updating Accept Message. EX1011, 77-78 (“Upon

successful location updating the mobile station sets the update status to UPDATED in the SIM/USIM, and **stores the Location Area Identification received in the LOCATION UPDATING ACCEPT** message in the SIM/USIM. The attempt counter shall be reset.”). TS 24.008 discloses that a “Location updating accept” message, which “is sent by the network to the mobile station to indicate that updating or IMSI attach in the network has been completed.” EX1011, 255 (Section 9.2.13). TS 24.008 also discloses a GPRS “Attach accept” message, which is sent by the network to the MS to indicate that the corresponding attach request has been accepted.” *Id.*, 296 (Section 9.4.2). Thus, *Krco* in view of TS 24.008 discloses this claim element.

ii. [5b] transmitting further data to and/or receiving further data from the communication module; and

209. In my opinion, the *Krco-Benaouda*-TS 24.008 combination renders this claim element obvious. TS 24.008 discloses that its various attach procedures (*e.g.*, IMSI attach and GPRS attach) are used to “indicate the IMSI as active in the network” (EX1011, 79 (Section 4.4.3), describing the IMSI attach procedure) or “attach the IMSI” for GPRS or combined GPRS, non-GPRS services (EX1011, 108, describing the GPRS attach procedure). And *Krco* explains that a UE may undergo “registration and attach procedures with the core network before the end user can make a call or use some other network services,” such as “voice calls,

SMS,” and “email.” EX1009, 1:14-28. A POSITA would have understood that when such attach procedures disclosed in *Krco* and TS 24.008 are completed, as indicated by an attach accept message, the corresponding mobile station (*i.e.*, “*communication module*,” such as a machine-to-machine device) would have transmitted additional data through the telecommunications network, through, for example, an SMS, voice call or email.

iii. [5c] receiving a network detach message from the communication module.

210. The *Krco-Benaouda*-TS 24.008 combination discloses this claim element. TS 24.008 discloses an IMSI detach procedure takes place if the mobile station is deactivated (*e.g.*, powered off, or the SIM is detached from the mobile). EX1011, p. 75 (“4.3.4 IMSI detach procedure. The **IMSI detach procedure may be invoked by a mobile station if the mobile station is deactivated or if the Subscriber Identity Module** (see 3GPP TS 42.017 [7] and 3GPP TS 31.102 [112]) is **detached from the mobile station** or as part of the eCall inactivity procedure defined in subclause 4.4.7.”).

211. When the IMSI detach procedure is initiated by the mobile, the mobile sends a IMSI DETACH Indication message to the network. EX1011, p. 75. (“4.3.4.1 IMSI detach initiation by the mobile station. The IMSI detach procedure

consists only of **the IMSI DETACH INDICATION message sent from the mobile station to the network.**")

212. This understanding is confirmed by the '098 Patent, which shows, in Figure 2A, an "MS" (mobile station) sending an "IMSI Detach Request" message to the RAN (radio access network). See EX1001, Fig. 2A, 8:35-37. Therefore, for the reasons above, the *Krco* in view of TS24.008 discloses this limitation.

5. **Claim 6. The method according to claim 2, further comprising transmitting an attach reject message to said communication module, said attach reject message comprising data for said communication module.**

213. The *Krco-Benaouda*-TS 24.008 combination discloses Claim 6. TS 24.008 discloses a "Location updating reject" message, which "is sent by the network to the mobile station to indicate that the updating or IMSI attach has failed." EX1011, 255 (Section 9.2.14). A POSITA would have understood that the "Location updating reject" message to be "*an attach reject message*" because it would be used to indicate an IMSI attach failure. Further, because this message is sent "to the mobile station," which a POSITA would have understood to be a "*communication module*." Indeed, the '098 Patent, in Figures 2B and 3B shows a "RAN" (*i.e.*, a radio access network") transmitting an "IMSI Attach Reject" and a "GPRS Attach Reject," respectively, to an "MS" (*i.e.*, a mobile station).

214. Further, TS 24.008's location updating reject message includes several information elements, each of which carries unique data, as shown in table 9.2.16 of TS 24.008, copied below:

Table 9.2.16/3GPP TS 24.008: LOCATION UPDATING REJECT message content

IEI	Information element	Type/Reference	Presence	Format	Length
	Mobility management protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Skip Indicator	Skip Indicator 10.3.1	M	V	1/2
	Location Updating Reject message type	Message type 10.4	M	V	1
	Reject cause	Reject cause 10.5.3.6	M	V	1

EX1011, 255.

215. As shown, the information elements contained in the location updating reject message include "Mobility management protocol discriminator," "Location Updating Reject message type," and "Reject cause" data. Section 10.5.3.6 of TS 24.008 explains that "[t]he purpose of the Reject Cause information element is to indicate the reason why a request from the mobile station is rejected by the network." EX1011, 373. Thus, TS 24.008's location updating reject message "*compris[es] data for said communication module*" at least because it includes reject cause data that indicates to the mobile station (*i.e.*, the "*communications module*") why the attach request was rejected. Thus, TS 24.008 discloses this claim element.

216. As described above in Section VII.A above, the '098 patent also identifies Location Update messages or Routing Area Update messages as wireless signalling messages. Thus, *Krco* in view of TS 24.008 discloses this claim element.

X. CONCLUSION

217. The '098 Patent challenged claims do not claim a novel or non-obvious invention. For all of the reasons explained above, the identified combinations render all of the challenged claims obvious.

XI. DECLARATION

218. I hereby declare that all the statements made in this Declaration are of my own knowledge and true; 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 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Executed in Dallas, Texas on February 14th, 2023.

/James Olivier/

James Olivier