

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC
Petitioner

v.

HEADWATER RESEARCH LLC
Patent Owner

Case No. IPR2026-00439
Patent 11,096,055

**DECLARATION OF DAVID H. WILLIAMS IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 11,096,055**

**GOOGLE EXHIBIT 1012
Google v. Headwater
IPR2026-00439**

Declaration of David H. Williams In Support of
Petition for *Inter Partes* Review of U.S. Patent No. 11,096,055

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EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 11,096,055, issued August 17, 2021 to G. Raleigh (“’055 Patent”)
1002	File History of U.S. Patent Application No. 16/421,121 through September 22, 2025
1003	U.S. Provisional Application No. 61/206,354, filed January 28, 2009
1004	U.S. Patent Application Publication No. 2002/0056002, published May 9, 2002 to P. Charas (“Charas”)
1005	U.S. Patent Application Publication No. 2009/0170555, published July 2, 2009 to U. Olvera-Hernandez et al. (“Olvera-Hernandez”)
1006	U.S. Patent No. 10,127,530, issued November 13, 2018 to S. Swanburg et al. (“Swanburg”)
1007	U.S. Patent Application Publication No. 2004/0162058, published August 19, 2004 to D. Mottes (“Mottes”)
1008	US Patent Application Publication No. 2010/0107225, published April 29, 2010 to R. Spencer et al. (“Spencer”)
1009	U.S. Patent Application Publication No. 2008/0096559, published April 24, 2008 to C. Phillips et al. (“Phillips”)
1010	U.S. Patent Application Publication No. 2005/0164737, published July 28, 2005 to J. Brown (“Brown”)
1011	U.S. Patent Application Publication No. 2002/0116545, published August 22, 2002 to D. Mandato et al. (“Mandato”)
1013	<i>Curriculum Vitae</i> of David Williams

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Exhibit No.	Description
1014	European Patent Application Publication No. 3,661,242, published June 3, 2020 (“European counterpart”)
1015	File History of European counterpart
1016	European Patent Application Publication No. 1,117,265, published July 18, 2001 to Charas (“Charas”)
1017	U.S. Patent Application Publication No. 2010/0099405, published April 22, 2010 to A. Brisebois et al. (“Brisebois”)
1018	Specification of the Subscriber Identity Module - Mobile Equipment (SIM-ME) interface (3GPP TS 51.011 version 4.10.0 Release 4)
1019	Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface (3GPP TS 51.011 version 4.2.0 Release 4)
1020	Declaration of Friedhelm Rodermund
1021	<i>Curriculum Vitae</i> of Friedhelm Rodermund
1022	Defendant Google LLC’s Opening Claim Construction Brief, filed May 13, 2026 in <i>Headwater Research LLC v. Google LLC</i> , Civ. Action No. 7:25-cv-00369 (W.D. Tex.)
1023	Plaintiff Headwater Research LLC’s Responsive Claim Construction Brief, filed June 8, 2026 in <i>Headwater Research LLC v. Google LLC</i> , Civ. Action No. 7:25-cv-00369 (W.D. Tex.)
1024	Defendant Google LLC’s Reply to Plaintiff’s Responsive Claim Construction Brief, filed June 22, 2026 in <i>Headwater Research LLC v. Google LLC</i> , Civ. Action No. 7:25-cv-00369 (W.D. Tex.)

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Exhibit No.	Description
1025	Plaintiff Headwater Research LLC’s Sur-Reply to Defendant’s Reply to Plaintiff’s Responsive Claim Construction Brief, filed July 7, 2026 in <i>Headwater Research LLC v. Google LLC</i> , Civ. Action No. 7:25-cv-00369 (W.D. Tex.)
1026	Joint Claim Construction Statement, filed July 10, 2026 in <i>Headwater Research LLC v. Google LLC</i> , Civ. Action No. 7:25-cv-00369 (W.D. Tex.)
1027	European Patent Publication No. EP 1247411 B1 (“Charas EP”)

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I, David H. Williams, hereby state as follows:

I. INTRODUCTION

1. I have been retained by Google LLC (“Petitioner”) as an independent expert consultant in this *inter partes* review (“IPR”) proceeding before the United States Patent and Trademark Office (“PTO”).

2. I have been asked by Counsel for Petitioners (“Counsel”) to consider whether certain references teach or suggest the features recited in Claims 1-13 (“the Challenged Claims”) of U.S. Patent No. 11,096,055 (“the ’055 Patent”) (EX1001). My opinions and the bases for my opinions are set forth below.

3. I am being compensated at my ordinary and customary consulting rate for my work, which is \$485 per hour. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other financial interest in this proceeding.

II. BACKGROUND AND QUALIFICATIONS

4. All of my opinions stated in this declaration are based on my own personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in designing, developing, researching, and teaching the technology referenced in this declaration.

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5. I am over 18 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth herein. I understand that a copy of my current curriculum vitae, which details my education and professional and academic experience, is being submitted as EX1013. The following provides a brief overview of some of my experience that is relevant to the matters set forth in this declaration.

6. I have over 30 years of experience in wireless location services, including experience implementing Wireless 911 (E911) systems and designing, implementing, and managing numerous location-based service (LBS) applications such as family tracking and fleet and asset management. I am currently the President of the company E911-LBS Consulting, and I have been with the company since 2002. As the President of E911-LBS Consulting, I provide services across the entire wireless value chain, particularly with respect to technology and business strategic planning and product design and development associated with LBS, Global Positioning Satellite (GPS) systems, E911, Real-Time Location Systems (RTLS), Radio Frequency Identification (RFID), beacon, and other location determination and sensing technologies and services.

7. I have extensive expertise in all aspects of LBS delivery across the wireless location ecosystem including enabling network, map data, geospatial platform, chipset, data management, device, and location determination

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infrastructure and integration providers. I am an expert in all related aspects of LBS, including data privacy and security management.

8. For example, I managed the development and launch of several consumer-oriented LBS applications including mobile social networking, family tracking and local search for a major wireless carrier (AT&T). This work included the development of corporate-wide location data privacy policies and their systemic implementation for all LBS customers. My work in both data privacy and mobile social networking resulted in my co-inventing a patent in this field. I also have several other patents related to mobile location and associated applications and architectures.

9. I also have significant experience related to E911 systems. For example, in 2003-2004, I consulted with AT&T Wireless on their implementation of E911 systems. Specifically, I led the development of implementation and monitoring of systems in AT&T Wireless Western Region as part of their deployment of TDOA (Time Difference of Arrival) non-GPS E911 network location infrastructure to meet the wireless E911 location requirements mandated by the FCC. In 2004-2005, I worked with NAVTEQ, a key provider of LBS and E911 location map data, in developing their application developer ecosystem and website, providing developers with access to all of NAVTEQ's product and technical

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resources for developing location-related applications, including data products involving 911 GIS (Geographical Information Systems).

10. I have extensive experience in the design of various wireline and wireless communications networks and associated architectures, systems, processes, protocols, and associated design issues (e.g. bandwidth/capacity, privacy/security, standards/compatibility, etc.), including for carriers AGT (Alberta General Telephone), AT&T, AT&T Mobility, Bell Atlantic/Verizon, Bell Canada, Bell South, GTE, and Nextel/Sprint, as well as various private/hybrid communications networks across a variety of industries, utilizing/interfacing with a wide range of devices and form factors. These designs often included various security capabilities across the OSI stack as well as for end user devices.

11. I also have extensive experience in the design of microprocessor-based systems, going back to the early-to-mid-1980s working on the digitization of the F-15 Radar system. This work included designing (from individual components such off-the-shelf microprocessors, individual memory chips, and specialty-designed semi-conductors) specialty computers and subsystems for various functions. This work included incorporating various DoD security requirements for protecting various components, subsystems, and data from external parties.

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12. I also have extensive experience in the privacy and security design of applications and other systems, especially in the areas of identification, authentication, authorization, and verification, and including opining in numerous cases on privacy and security dimensions. Three of my twelve (12) patents are specifically on various forms of wireless systems privacy and security.

13. I have authored multiple books on wireless location, including:

- The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (2005 and 2009 versions);
- The Definitive Guide to Wireless E911; and
- The Definitive Guide to Mobile Positioning and Location Management (coauthor).

14. I received a B.S. degree, in Electrical Engineering, from Purdue University in 1983. I received an MBA degree, in Information Systems Management, from The University of Texas at Austin in 1987.

III. INFORMATION CONSIDERED

15. In preparation for this declaration, I have considered the materials discussed in this declaration, including, for example, the '055 Patent, the references cited by the '055 Patent, the prosecution histories of the '055 Patent and applications from which it derives (including the references cited therein), various background articles and materials referenced in this declaration, and the prior art references

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identified in this declaration. In addition, my opinions are further based on my education, training, experience, and knowledge in the relevant field.

IV. RELEVANT LEGAL STANDARDS

16. I am not an attorney and offer no legal opinions. For the purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my analysis, as summarized below.

A. Claim Interpretation

17. I have been informed that during an *inter partes* review proceeding, claims are to be construed in light of the specification as would be read by a person of ordinary skill in the relevant art at the time the application was filed. I have been informed that claim terms are given their ordinary and customary meaning as would be understood by a person of ordinary skill in the relevant art in the context of the entire disclosure. A claim term, however, will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the claim term in the specification. In that case, the claim term will receive the definition set forth in the patent.

18. I have been informed that certain patent claim terms may be interpreted as “means-plus-function” claim terms. I have been informed that terminology is part of the U.S. Patent Law in 35 USC §112, paragraph 6 (pre-AIA) / 35 USC §112(f) (post-AIA), which states the following: “An element in a claim for a combination

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may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.”

B. Perspective of One of Ordinary Skill in the Art

19. I have been informed that a patent is to be understood from the perspective of a hypothetical “person of ordinary skill in the art” (“POSITA”). Such an individual is considered to possess normal skills and knowledge in a particular technical field (as opposed to being a genius). I have been informed that in considering what the claims of a patent require, what was known prior to that patent, what a prior art reference discloses, and whether an invention is obvious or not, one must use the perspective of such a POSITA.

C. Anticipation

20. I have been informed that a claim is not patentable if it is anticipated. I have been informed that anticipation of a claim requires that every element of a claim is disclosed expressly or inherently in a prior art reference, arranged as in the claim, when considered from the perspective of a person of ordinary skill in the relevant art. I have been informed that when the structure recited in a reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. I have been informed that extrinsic evidence may be used

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to explain but not expand the meaning of terms and phrases used in the reference relied upon as anticipatory of the claimed subject matter.

D. Obviousness

21. I have been informed that a patent claim is obvious under 35 U.S.C. §103, and therefore invalid, if the claimed subject matter, as a whole, would have been obvious to a POSITA as of the priority date of the patent based on one or more prior art references and/or the knowledge of a POSITA.

22. I have been informed that an obviousness analysis must consider (1) the scope and content of the prior art, (2) the differences between the claims and the prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations, if any, of non-obviousness (such as unexpected results, commercial success, long- felt but unmet need, failure of others, copying by others, and skepticism of experts).

23. I have been informed that a prior art reference may be combined with other references to disclose each element of the invention under 35 U.S.C. §103. I have been informed that a reference may also be combined with the knowledge of a POSITA, and that this knowledge may be used to combine multiple references. I have been informed that a POSITA is presumed to know the relevant prior art. I have

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been informed that the obviousness analysis may take into account the inferences and creative steps that a POSITA would employ.

24. In determining whether a prior art reference would have been combined with other prior art or other information known to a POSITA, I have been informed that the following principles may be considered:

- whether the references to be combined involve non-analogous art;
- whether the references to be combined are in different fields of endeavor than the alleged invention in the Patent;
- whether the references to be combined are reasonably pertinent to the problems to which the inventions of the Patent are directed;
- whether the combination is of familiar elements according to known methods that yields predictable results;
- whether a combination involves the substitution of one known element for another that yields predictable results;
- whether the combination involves the use of a known technique to improve similar items or methods in the same way that yields predictable results;
- whether the combination involves the application of a known technique to a prior art reference that is ready for improvement, to yield predictable results;
- whether the combination is “obvious to try”;
- whether the combination involves the known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other

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market forces, where the variations are predictable to a POSITA;

- whether there is some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;
- whether the combination requires modifications that render the prior art unsatisfactory for its intended use;
- whether the combination requires modifications that change the principle of operation of the reference;
- whether the combination is reasonably expected to be a success; and
- whether the combination possesses the requisite degree of predictability at the time the invention was made.

25. I have been informed that in determining whether a combination of prior art references renders a claim obvious, it is helpful to consider whether there is some teaching, suggestion, or motivation to combine the references and a reasonable expectation of success in doing so. I have been informed, however, that a teaching, suggestion, or motivation to combine is not required.

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V. SUMMARY OF OPINIONS

26. It is my opinion that the Challenged Claims of the '055 Patent are unpatentable under 35 U.S.C. §103 on the following grounds:

Ground	Reference(s)	Basis	Claims
1	U.S. Pub. 2002/0056002 (“Charas”) (EX1004) alone and/or in view of U.S. Pub. 2009/0170555 (“Olvera-Hernandez”) (EX1005)	§102/103	1-4, 8-10, 12
2	Charas alone and/or in view of Olvera-Hernandez in view of U.S. Pub. 2004/0162058 (“Mottes”) (EX1007)	§103	5
3	Charas alone and/or in view of Olvera-Hernandez in view of U.S. Pub. 2010/0107225 (“Spencer”) (EX1008)	§103	6, 7
4	Charas alone and/or in view of Olvera-Hernandez in view of U.S. Pub. 2008/0096559 (“Phillips”) (EX1009)	§103	11
5	Charas alone and/or in view of Olvera-Hernandez in view of U.S. Pub. 2005/0164737 (“Brown”) (EX1010)	§103	13

VI. TECHNOLOGY BACKGROUND

27. The '055 Patent discloses a wireless end-user device storing multiple service profiles each associated with a service plan and wireless network and including a connection manager that selects a network associated with a selected profile. An adaptive service policy control agent enforces the appropriate network service policies associated with a selected profile. EX1001, Claim 1.

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28. Fig. 21 (shown below) illustrates an end-user device that includes a Wireless Wide-Area Network (WWAN) modem (orange, Element [1.1]), a secure memory storing first and second network profiles (not shown, Elements [1.2]/[1.3]), a connection manager (yellow, Element [1.4]), an adaptive service policy control agent (green, Element [1.5]) and an application service interface (purple, Element [1.6]) at which some policies are implemented/enforced on network connections for selected applications (light blue, Element [1.6]).

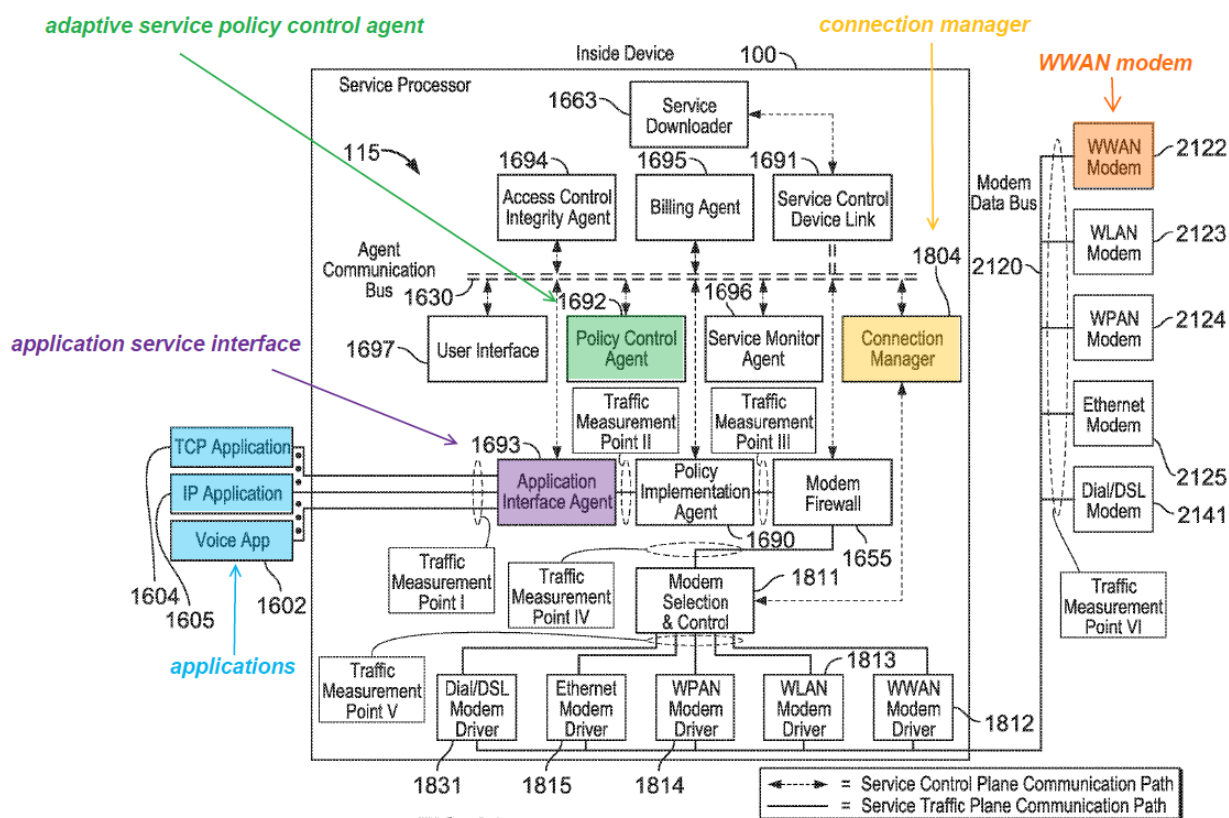


FIG. 21

EX1001, Fig. 21 (Annotated)

VII. THE CHALLENGED '055 PATENT

29. The '055 Patent contains 13 claims. I have been asked to opine on the validity of Claims 1-13.

VIII. THE '055 PATENT PROSECUTION HISTORY

30. I have reviewed the file history of the '055 Patent.

31. Before allowance of the '055 Patent's U.S. Application No. 16/421,121 ("the '121 Application", EX1002), Patent Owner filed European Application No. 19219822.4 (Pub No. 3,661,242, "the European counterpart") on December 27, 2019 (EX1014) claiming priority via an international application number PCT/US2010/021302 that is substantively identical to the '121 Application. EX1015.

32. The claims of the European counterpart were rejected in a European search opinion dated April 17, 2020 — nine months before the '121 Application allowance — as lacking novelty based on EP 1,247,411 A2 ("Charas", EX1027), a European equivalent of EX1004. EX1015, pp.780-789.

33. Patent Owner unsuccessfully argued that Charas EP did not disclose a "connection manager" selecting an access network connection for the WWAN modem "because the service policies are stored on a server, which the terminal has to access through the access network first." EX1015, p.767. The European Examiner maintained the rejection, citing Charas's "access selection function 690" of the user

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terminal as requesting access and presenting credentials to a “desired access network depending on the service requested” and preparing for interconnection “with the chosen access network.” EX1004, ¶[0052]; EX1015, pp.744, 782. Patent Owner conceded and amended the claims to recite the “application service interface” as a distinct element:

“an application service interface (1693) to interface with one or more applications (1602, 1604, 1605) resident on the wireless end-user device (100), characterized in that first policies included in the one or more network service policies are enforced at the application service interface (1693) on network data connections for the one or more applications (1602, 1604, 1605) interfacing with the application service interface (1693).”

34. However, Charas also discloses an application service interface (i.e., “applications interface 650”) in an end-user device at which quality of service “parameters” (i.e., policies defining the connection on which the “requested web-service”) are delivered/enforced. EX1004, ¶[0064]. Charas’s “applications interface 650” implements (i.e., enforces) quality of service “parameters” or policies for a network connection on which a “requested web-service” is delivered. EX1004, ¶[0064]; *see* §VIII.

35. In first action Notices of Allowance dated January 22, 2021 and February 23, 2021, the US Examiner stated that “all the cited prior art, either alone

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or in combination, does not disclose Applicant's inventive claim language." EX1002, p.16. The '055 Patent was granted August 17, 2021, over a year after the European search opinion, but Patent Owner did not disclose Charas or the European search opinion to the USPTO. Patent Owner did not amend the claims of the '121 Application to include the limitations of the European counterpart.

IX. LEVEL OF ORDINARY SKILL IN THE ART

36. A POSITA relating to the subject matter of the '055 Patent as of January 28, 2009 would have had (1) at least a bachelor's degree in computer science, computer engineering, electrical engineering, or a related field, and (2) at least two years of industry experience in wireless communication network applications and software. Additional graduate education could substitute for professional experience, and *vice versa*.

X. PRIORITY DATE

37. I have been informed that the "priority date" or "earliest effective filing date" of a patent is the date on which it is filed, or the date on which an earlier-filed U.S. or international patent application was filed if the patentee claims the benefit of priority to that earlier-filed U.S. or international patent application.

38. The '055 Patent issued from U.S. Patent App. No. 16/421,121, filed on May 23, 2019, which is a continuation of U.S. Patent App. No. 15/427,837, filed Feb. 8, 2017 (US Pat 10,321,318), which is a continuation of U.S. Patent App. No.

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15/239,398, filed Aug. 17, 2016 (US Pat 9,641,957), which is a continuation of U.S. Patent App. No. 14/979,233, filed Dec. 22, 2015 (US Pat 9,532,161), which is a continuation of U.S. Patent App. No. 14/667,353, filed Mar. 24, 2015 (US Pat 9,232,403), which is a continuation of U.S. Patent App. No. 14/263,604, filed Apr. 28, 2014 (US Pat 9,037,127), which is a continuation of U.S. Patent App. No. 12/380,780, filed Mar. 2, 2009 (US Pat 8,839,388), which claims priority to U.S. Provisional App. No. 61/207,739, filed Feb. 13, 2009, U.S. Provisional App. No. 61/207,393, filed Feb. 10, 2009, U.S. Provisional App. No. 61/206,944, filed Feb. 4, 2009, and U.S. Provisional App. No. 61/206,354, filed Jan. 28, 2009.

39. For purposes of this declaration, I have assumed that the '055 Patent is entitled to a priority date of January 28, 2009, and I have not evaluated or formed an opinion on whether the claims of the '055 Patent are actually entitled to that date.

XI. CLAIM CONSTRUCTION

40. For purposes of my analysis in this IPR proceeding, I have been informed that terms that appear in the claims of the '055 Patent should be interpreted according to their plain and ordinary meaning under the *Phillips* standard. In determining the ordinary and customary meaning, I have been informed that the words of a claim are first given their plain meaning that those words would have had to a POSITA at the time of the alleged invention. I also have been informed that the

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claims, specification, and file history may be used to better construe a claim insofar as the plain meaning of the claims cannot be understood. I have been informed that even treatises and dictionaries may be used under limited circumstances to determine the meaning attributed by a POSITA to a claim term at the time of filing.

41. In the Related Litigation, Petitioner proposes “subscriber identity module (SIM)” should be construed as:

Subscriber Identity Module as described in the ETSI/3GPP standards in existence at the time of the claimed invention.

EX1022, 3; EX1026, 2. Patent Owner proposes that the term be given its plain and ordinary meaning. *Id. See also* EX1023, EX1024, and EX1025. The prior art cited herein discloses the noted term under Petitioner’s and PO’s proposed constructions and any other constructions, as demonstrated herein.

42. I also understand that, for terms that evoke a means plus function construction, “the construction of the claim must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function.” 37 C.F.R. §42.104(b)(3). I understand from counsel that construing a means-plus-function claim term is a two-step process that includes (1) identifying the claimed function and (2) then determining what structure, if any, disclosed in the specification corresponds to the claimed function.

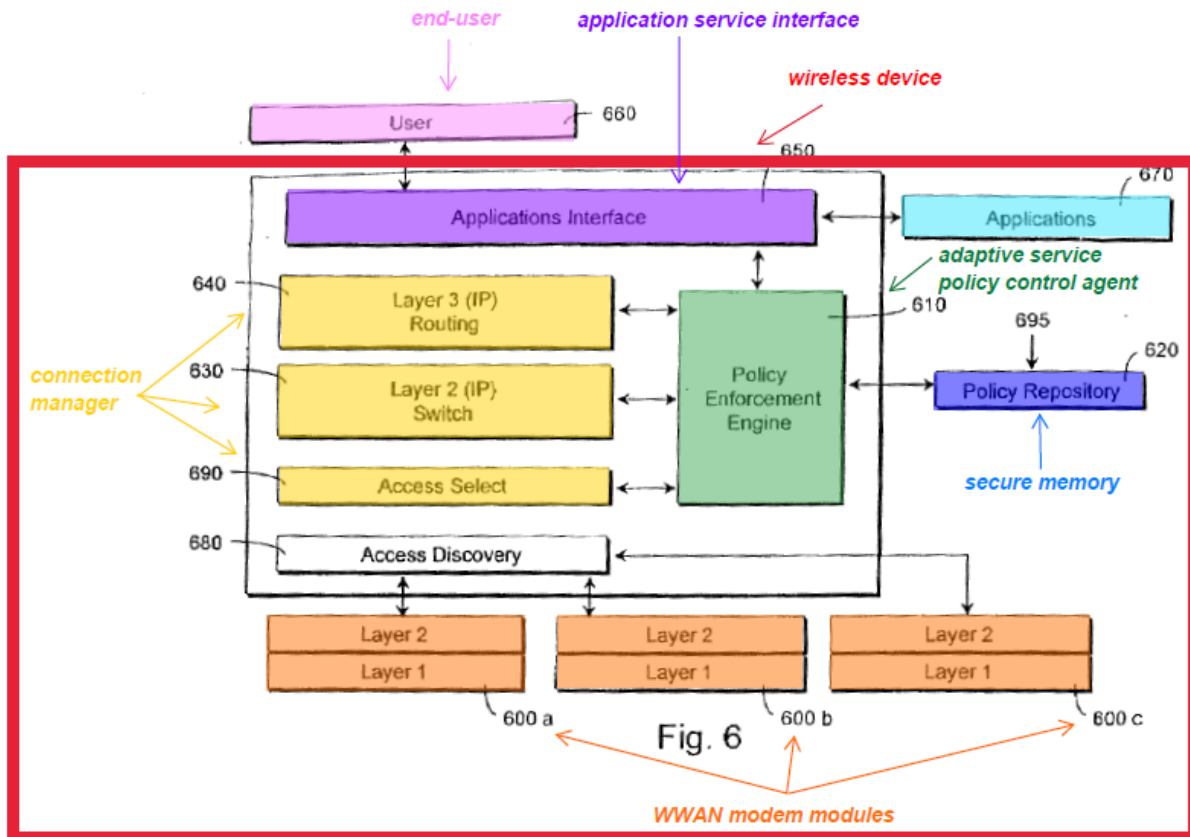
XII. OVERVIEW OF THE PRIOR ART REFERENCES

A. Charas (EX1004) - US Equivalent of Charas EP

43. Charas (EX1004) is the U.S. equivalent of Charas EP relied upon by the EPO in the European counterpart and not considered by the USPTO, both sharing a common parent publication (EP 1,117,265 A1, App. No. 00850007.6, EX1016).

44. Charas's Fig. 6 (annotated below) shows a *wireless end-user device* (i.e., red client/terminal block, with end-user in pink) including a modem (orange) for first and second networks, a policy repository (i.e., blue *secure memory*) secured "by e.g. a personal identification code, a fingerprint reading or other means" for storing policy blocks for each subscription/relationship a user holds with a service provider; an access select function, layer 2 IP switch, and layer 3 IP router (i.e., yellow *connection manager*) that select an access network from those discovered by an access discovery function and route data flows to the appropriate modem; a policy enforcement engine (i.e., green *adaptive service policy control agent*) that "enforces policies defined in policy repositories;" and an applications interface (i.e., purple *applications service interface*) interfacing with one or more *applications* (light blue).

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EX1004, Fig. 6 (Annotated)

45. Charas's end-user device includes an access selection function "responsible for requesting access and presenting credentials to the desired access network depending on the service requested." EX1004, ¶[0052].

46. Charas performs network access selection in the same manner as the '055 Patent. *See* EX1001, 13:19-21 ("The network selection policy allows the selection of the network that corresponds to the most desirable service profile to meet the user's service preferences.").

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47. Charas's policy enforcement engine "enforces policies defined in policy repositories." EX1004, ¶[0059].

48. The policy enforcement engine "set[s] up a channel that complies with the agreed parameters" specified by the user "via the applications interface." EX1004, ¶[0064].

49. The channel facilitates the application's access to the requested service thereby indicating that the policies defining the agreed parameters are enforced on the end-user device's applications service interface (located in the end-user device at a position which exactly matches '055 Patent's application services interface).

B. Olvera-Hernandez (EX1005)

50. Olvera-Hernandez discloses "various technology specific modems" that are combined within a single "multimode modem" (e.g., WWAN modem). EX1005, ¶[0024].

C. Mottes (EX1007)

51. Mottes discloses a method "enabl[ing] an End User to use and or subscribe to several service providers and or Mobile Virtual Network Operators (MVNOs)." EX1007, Abstract.

D. Spencer (EX1008)

52. Spencer discloses as a "user service interface" a "user interface (UI)...send[ing] a web page displaying available service options" from which "[a]

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service profile is selected” from among multiple service profiles “stored in [a] database.” EX1008, ¶[0166].

E. Phillips (EX1009)

53. Phillips discloses a “Subscriber Identity Module (SIM)” as a type of “smart card” that enforces network policies by storing and executing “authentication settings” including “an authentication algorithm.” EX1009, ¶¶[0023], [0024]. Phillips’s SIM also maintains a “preferred network list” and implements “Enhanced Operator Named String (EONS) ... for automatic network selection.” *Id.*, ¶¶[0024], [0026].

F. Brown (EX1010)

54. Brown discloses multiple sets of “subscription parameters” that can be selectively “activated, deactivated and reactivated as many times as desired.” EX1010, ¶¶[0008], [0015], [0018], [0033].

G. 3GPP (EX1018-EX1019)

55. 3GPP TS 51.011 version 4.10.0 (EX1018) and version 4.2.0 (EX1019) of Release 4 disclose identical user authentication procedures and algorithms performed by a Subscriber Identity Module (SIM). EX1018, §§7.1, 7.2, 9.2.16; EX1019, §§7.1, 7.2, 9.2.16. EX1018 represents the most recent version of 3GPP TS 51.011 as of the filing date of Phillips while EX1019 represents the earliest version

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of 3GPP TS 51.011 with which Phillips's SIM implementation complies. EX1009, ¶[0026].

**XIII. DETAILED EXPLANATION OF THE UNPATENTABILITY
GROUNDS**

56. In my opinion, the Challenged Claims are unpatentable over the prior art.

57. The following sections provide reference to where the elements of Claims 1-13 are anticipated by/obvious over the prior art.

A. Claims 1-4, 8-10, and 12 are Anticipated and/or Obvious over Charas (EX1004) alone and/or in view of Olvera-Hernandez (EX1005) (Ground 1)

1. Claim 1 (Preamble): "A wireless end-user device comprising:"

58. To the extent the Preamble is limiting, Charas discloses/suggests a wireless end-user device as a "client" or "mobile terminal" including a transport domain "preferably implemented as interchangeable modules (modems) for different access standards." EX1004, ¶¶[0012], [0041], [0051], [0068] (emphasis added).

59. Charas's Fig. 6 (*see*, §XII.A., *supra*) illustrates a client/terminal as a "user terminal" having "interchangeable modules (modems)" supporting access to, for example, a "W-CDMA" network; Charas's Fig. 1 illustrates an example of a global network technology for "global roaming" between wireless wide-area

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networks (WWANs) of different standards. EX1004, Abstract, ¶¶[0012], [0041], [0066], Figs. 1/6.

60. A POSITA would have understood that the different W-CDMA, EDGE, CDMA 2000, and W-LAN standards referenced by Charas are wireless network standards. EX1004, ¶[0041].

61. Charas's Fig. 6 illustrates a "user" and an exemplary embodiment of a user terminal. EX1004, ¶[0025], Fig. 6.

62. Charas's user client/terminal is a wireless end-user device.

a. [1.1]: "a Wireless Wide-Area Network (WWAN) modem;"

63. Charas discloses/suggests Element [1.1].

64. Charas's wireless end-user device (i.e., client/terminal) in annotated Fig.6, §XII.A., *supra*) includes a WWAN modem to access a first wireless network (e.g., the Fig. 1 "W-CDMA network") and a second wireless network (e.g., the Fig. 1 "GPRS network").

65. Charas's wireless end-user device includes "interchangeable modules (*modems*) for different access standards such as *W-CDMA*, *EDGE*, *CDMA2000*, ... etc." See §XIII.A.1., *supra*; EX1004, ¶[0041] (emphasis added).

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66. The module that connects to the W-CDMA network and the module that connects to the GPRS network are contained within the same “terminal” constituting a WWAN modem. EX1004, Fig. 6 (*see* §XII.A., *supra*).

67. Figure 6 illustrates the WWAN modem modules “physically located in the terminal itself...” (i.e., on the wireless end-user device). EX1004 ¶[0050].

68. Patent Owner did not distinguish the WWAN modem of the European counterpart claims over Charas’s WWAN modem configuration. *See* §XII.A. Patent Owner tacitly conceded Charas’s disclosure of this Element in amending the EP counterpart claims.

69. A POSITA would have understood that “WWAN” encompasses different cellular telecommunication technologies that cover large geographical areas. W-CDMA (wideband code-division multiple access), EDGE (enhanced data rates for GSM evolution), and CDMA2000 are WWAN communication technologies (i.e., standards).

70. The ’055 Patent explicitly identifies W-CDMA as a WWAN technology. EX1001, 158:11-17.

Olvera-Hernandez

71. Charas’s interchangeable modem modules contained within a single terminal provide a multimode capability.

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72. To the extent it is argued that Charas’s multimode capability is not within a single WWAN modem, Olvera-Hernandez discloses multimode capability supporting multiple access standards in a single multimode WWAN modem.

73. Olvera-Hernandez’s WWAN “multimode modem 510” combines “various technology specific modems” to support similar access standards as disclosed by Charas (e.g., 2G, 3G standards). EX1001, 12:52-59; EX1005, ¶[0024], Fig. 5. Element [1.1] is therefore satisfied by Charas alone or in combination with Olvera-Hernandez.

74. Charas enables “access independent global roaming between heterogeneous networks.” EX1004, ¶[0029].

75. Charas’s terminal architecture includes an access discovery function 680 that “continuously” scans for available access networks, and an access selection function 690 that dynamically selects the best network for a requested service. EX1004, ¶[0052]. This architecture contemplates that multiple supported access technologies—W-CDMA, EDGE, CDMA2000, GPRS, and others—are simultaneously available on the terminal. EX1004, ¶[0051].

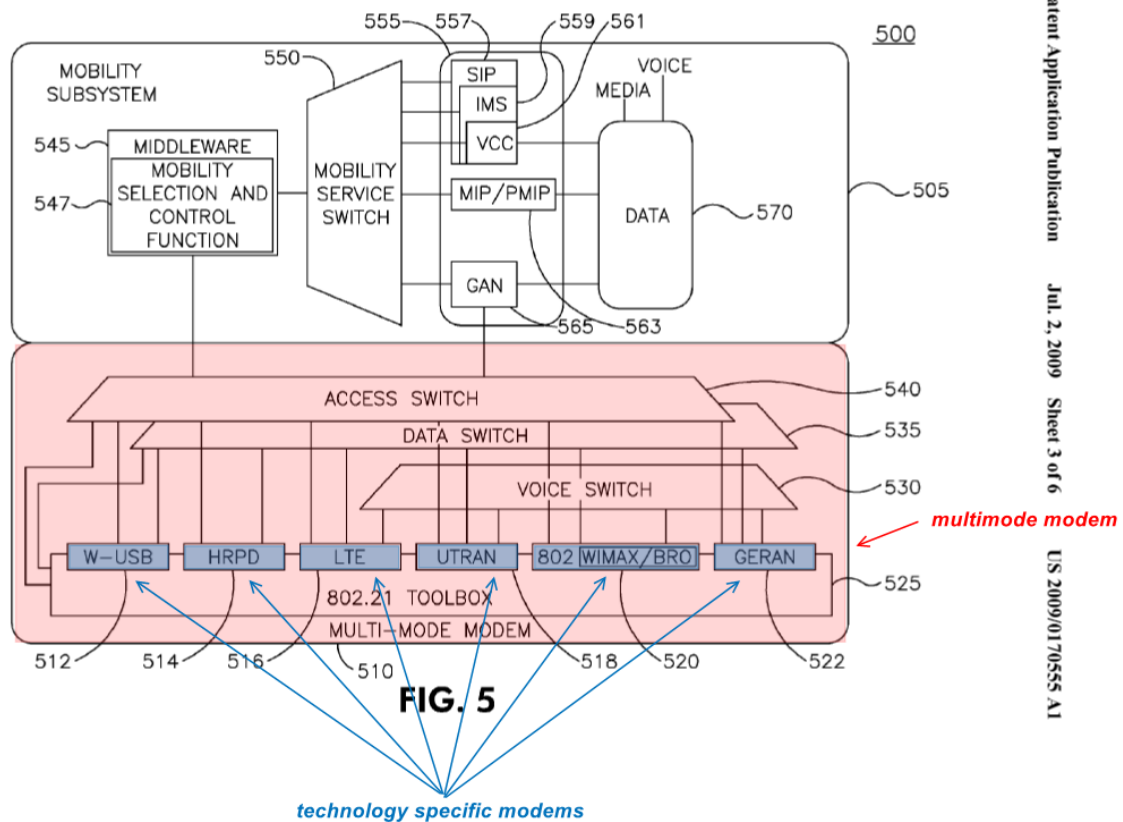
76. A POSITA implementing Charas would have been motivated to integrate the terminal’s various technology-specific modem modules as a single multimode WWAN modem.

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77. Olvera-Hernandez addresses the same problem of mobility between “heterogeneous access networks,” and every terminal it depicts includes a multimode modem as a baseline architecture. EX1004, ¶¶[0029], [0063]; EX1005, ¶¶[0005]-[0006], [0010], Fig. 6.

78. Olvera-Hernandez’s multimode modem 510 houses “various technology specific modems” and specifically multiple WWAN technologies (e.g., LTE modem 516, UTRAN modem 518, WiMAX modem 520, GERAN modem 522) that correspond directly to Charas’s interchangeable modules for “different access standards such as W-CDMA, EDGE, CDMA 2000.” EX1005, ¶[0024], Fig. 5; EX1004, ¶[0041].

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EX1005, Fig. 5 (Annotated)

79. A POSITA would have been motivated to implement the interchangeable modules of Charas's single multimode terminal as an integrated multimode modem as disclosed by Olvera-Hernandez.

80. First, a POSITA would have been motivated to facilitate access to a selected group of heterogeneous network standards through a singular, centralized multimode WWAN modem. EX1005, ¶[0003], ¶[0008] ("mobility functions"

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(which enable switching between access standards) are “supported by the various interface technologies of the multimode modem 420.”).

81. Second, implementing Charas’s interchangeable modules as a single integrated multimode modem would have involved simply consolidating Charas’s modules into a single platform on the terminal or substituting Charas’s modules with a single multimode modem as taught by Olvera-Hernandez.

82. Both Charas and Olvera-Hernandez are directed to facilitating access and switching between heterogeneous network standards. Such a consolidation/substitution would have merely involved grouping the technology specific WWAN modems of Charas’s device into a single multimode WWAN modem as disclosed by Olvera-Hernandez to facilitate access to heterogeneous network standards.

83. Third, the combination would have been straightforward/predictable. Consolidating Charas’s separate interchangeable modules into a single multimode modem as disclosed by Olvera-Hernandez or simply substituting Olvera-Hernandez’s multimode modem into Charas, would have preserved Charas’s control and traffic-flow architecture. Charas’s higher-layer control functions operate above the Fig. 6 modem layer.

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84. Olvera-Hernandez's architecture similarly places higher layer control functions such as "mobility selection and control function (MSCF)" in an application layer above its multimode modem. EX1005, ¶[0011].

85. Charas's traffic flows would also have been preserved among the interchangeable modules via the "layer 2 IP switch 630 and a layer 3 IP router 640" (EX1004, ¶[0008]).

86. A POSITA would have recognized Charas's layer 2 IP switch 630 and layer 3 IP router 640 function similarly to Olvera-Hernandez's access switch 540 and would therefore manage transitions between access standards in a multimode modem as disclosed by Olvera-Hernandez. EX1005, ¶¶[0024], [0027].

87. A POSITA would have had a reasonable expectation of success in combining Charas's modules into a single WWAN multimode modem as disclosed by Olvera-Hernandez without disturbing the higher-layer functionality and traffic flows of Charas.

88. Charas, either alone or in combination with Olvera-Hernandez, discloses a WWAN modem.

b. [1.2]: "a secure memory to store a first service profile associated with a first service plan and a first wireless network accessible through the WWAN modem, the first service profile comprising a first set of network service policies, and"

89. Charas discloses/suggests Element [1.2].

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90. Charas discloses a secure memory (“policy repository 620”; *see* annotated Fig.6, §XII.A., *supra*) to store a first service profile (e.g., a first of “several policy blocks”) associated with a first service plan (e.g., a first “subscription” relationship) and a first wireless network (e.g., the Fig. 1 “W-CDMA network”) accessible through the WWAN modem, the first service profile comprising a first set of network service policies (e.g., policy block “rights”). EX1004, ¶¶[0052], [0054], [0056]-[0058].

Secure memory to store a first service profile

91. Charas’s “*policy repository 620*” is a secure memory on the terminal and is responsible for storing service profiles (i.e., “policy blocks defining the relationships that exists [sic] between the user 660 and different service providers as well as individuals.”). EX1004, ¶[0057]. *See also* §XII.A., (annotated Fig. 6) *supra*.

92. Charas’s policy repository is secure because outside access is achieved via “a personal identification code, a fingerprint reading or other means,” similar to the ’055 Patent’s use of “pass keys and/or other security mechanisms.” EX1001 28:30-39; EX1004, ¶[0058].

First service profile comprising a first set of network service policies

93. Charas’s “policy block” stored in policy repository 620 constitutes a first service profile. EX1004, ¶[0057].

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94. Charas’s policy repository “contains several policy blocks defining the relationships that exist[] between the user 660 and different service providers as well as individuals.” *Id.*

95. The policy blocks comprise “network service policies” as claimed at least because they contain policies for network service in relation to the “different service providers” and other “individuals” with which the user 660 has a defined relationship.

96. Charas specifies that “policies” refer to, “among others, a set of ***rights and obligations pertaining to authentication of users, authorization to access and services...***” EX1004, ¶[0014].

97. Charas’s policy blocks comprise a set of parameters “defin[ing] the relationships that exist between the user 660 and different service providers” and include “rights, obligations, shared secret, and address to a credential verifier or SMP.” EX1004, ¶[0057].

98. These parameters include Quality of Service (QoS) parameters agreed upon by the user and the service provider via “applications interface 650.” To initiate a web-service, a user and provider “agree on parameters, i.e. some Quality of Service value for the session, e.g. the transmission rate.” *Id.*, ¶[0064]. *See also id.*, ¶[0031],

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¶[0042], ¶¶[0057]-[0058] (“[S]ervers” (i.e., “providers”) and “clients” (e.g., “a user”) are connected on “a Quality of Service basis.”).

99. These parameters correspond to the service policies (i.e., “access control settings, traffic control settings” and “authentication settings”) that the ’055 Patent discloses are part of its service profile. EX1001, 8:49-55.

100. A POSITA would have understood that the “rights” and “obligations” of Charas’s policy blocks define the set of services and features to which a user has access, thereby constituting access control settings. EX1004, ¶[0057].

101. A POSITA would have also understood that Charas’s “Quality of Service” policies constitute traffic control settings. EX1001 56: 46-51 (“traffic shaping QoS control”); EX1004, ¶[0064].

102. The “rights,” “shared secret,” and “address to a credential verifier or SMP” constitute exemplary authentication settings. *Id.* ¶[0014].

103. Charas’s first service profile comprises a first set of network policies.

First service profile associated with a first service plan

104. Charas’s policy block is associated with a service plan as recited in Element [1.2]. Charas’s policy blocks “defin[e] the relationships”—e.g., subscriptions—“that exist[] between the user 660 and different service providers.” EX1004, ¶[0057]; *see also id.* ¶[0056] (describing the “relationship” between

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subscriber A and provider X as a “private subscription”). Charas’s “subscription with provider X for voice and web browsing” providing services that are “paid for...per invoice from a service provider” constitutes a first service plan. *Id.*, ¶¶[0014], [0056]. Because Charas’s relationships (i.e., subscriptions) are “defin[ed]” by policies within a “policy block,” they are associated with a service profile. *Id.*, ¶[0057].

First service profile associated with a first wireless network accessible through the WWAN modem

105. Charas’s service profiles (i.e., “policy blocks”) are associated with a first wireless network as recited in Element [1.2]. Charas discloses that service providers can tie their service to a specific wireless access network. EX1004, ¶[0055] (“[A] special access network or a special gateway might need to be used or passed before a particular service can be executed.”).

106. A policy block defining a subscription with a service provider is therefore associated with the wireless network that the service provider requires.

107. Charas discloses that a requested service is associated with a “desired access network” (e.g., a “W-CDMA network”). See EX1004, ¶[0052] (“access selection function 690” is “responsible for requesting access and presenting credentials to the *desired access network depending on the service requested* from the service layers.”) (emphasis added).

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108. The requested services are provided based on a subscription defined by the policy block and are associated with specific networks.

109. Charas's policy enforcement engine 610 "enact[s] the requested web-service" specified by "the applications interface 650" by "collect[ing] data from the policy repository 620 and the access selection function 690 to set up a channel that complies with the agreed parameters...The policy enforcement engine 610 then *launches the requested web-service according to the policies in the policy repository.*" EX1004, ¶¶[0064]-[0065] (emphasis added). The policies of a given policy block define a specific relationship (i.e., subscription) a user has with a respective service provider. *See* EX1004, ¶¶[0057]-[0058].

110. The access selection function then selects the "chosen access network" according to the policies received from the policy repository via the policy enforcement engine (e.g., "depending on the service requested"). EX1004, ¶[0052]. As explained in Element [1.1], the access networks are accessible through a WWAN modem.

111. Combining the interchangeable modules of Charas's single terminal unit into a multimode modem as disclosed by Olvera-Hernandez would not have disrupted Charas's disclosure of a first service profile associated with a first wireless network accessible through a WWAN modem. *See* §XIII.A.1.a., *supra*.

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112. Olvera-Hernandez's MSCF can package a "collection" of "mobility services" (i.e., a first service profile) and "select[] an optimum air interface technology" for those services. EX1005, ¶[0027]. These mobility services require (i.e., are associated with) "specific air interface technologies" which are in turn associated with specific "access networks" (i.e., first wireless network, e.g., E-UTRAN network 810 as shown in Fig. 8) accessible by Olvera-Hernandez's multimode modem (i.e., WWAN modem). *Id.*, ¶¶[0030]-[0031], Fig. 8. *See also id.*, ¶[0031] ("certain mobility service 555, such as GAN 565, require specific air interface technologies").

113. Olvera-Hernandez also discloses a first service profile associated with a first wireless network accessible through a WWAN modem. Consolidating/replacing Charas's interchangeable modules into/with a multimode modem as taught by Olvera-Hernandez would not have disrupted Charas's disclosed functionality and would have been obvious.

114. Thus, Charas discloses and renders obvious Element [1.2].

c. [1.3]: "a second service profile associated with a second service plan and a second wireless network accessible through the WWAN modem, the second service profile comprising a second set of network service policies;"

115. Charas discloses/suggests Element [1.3].

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116. Charas discloses a secure memory (“policy repository 620”) to store a second service profile (e.g., a second of the “several policy blocks”) associated with a second service plan (a second “subscription” relationship) and a second wireless network (e.g., the Fig. 1 “GPRS network”) accessible through the WWAN modem, the second service profile comprising a second set of network service policies (e.g., policy block “rights”). EX1004, ¶¶[0052], [0054], [0056]-[0058].

117. Charas discloses “*several policy blocks* defining the relationships that exist[] between the user 660 and *different* service providers” or “access providers.” EX1004, ¶¶[0054], [0057].

118. A second policy block therefore corresponds to a second access provider and a second wireless network.

119. Charas expressly indicates that access providers have different networks by: (1) noting that a “requested network” is associated with an “appropriate access supplier” (i.e., access provider); and (2) specifying that “access providers can accept different types of payment methods...for access to *their networks*.” EX1004, ¶¶[0042], [0065].

120. Each of Charas’s subscriptions (i.e., service plans), defined by their own “policy blocks” (i.e., service profiles), can be “hierarchical” and can therefore

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be associated with a “***special access network***” (wireless network). *See* §XIII.A.1.b., *supra*; EX1004, ¶[0055] (emphasis added).

121. The “specific policy” defining the relationship a “subscriber A” has with “provider X” for, e.g., a “voice service” and the “policy” defining the relationship “subscriber A” has to another service provider (e.g., “bank at which [they] have an account”) correspond to first and second policy blocks (i.e., service profiles) associated with first and second “special access network[s]” (i.e., first and second wireless networks). EX1004, ¶¶[0056]-[0057].

122. It would have been obvious to a POSITA for the first wireless network (e.g., the Fig. 1 “W-CDMA network”) and the second wireless network (e.g., the Fig. 1 “GPRS network”) to be accessible through “the WWAN modem” as recited in Element [1.3].

123. First, Charas’s interchangeable modules are contained within the same “terminal” constituting a WWAN modem and correspond to access *standards* (e.g., W-CDMA, GPRS, etc.) that are not limited to any particular *network*. *See* EX1004, ¶[0041]; *see* §XIII.A.1.a, *supra*.

124. Where two policy blocks are associated with two networks using the same standard (e.g., where first wireless network and second wireless network are

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both GPRS networks)—a well-known and common occurrence—their networks would both be accessible through the same WWAN modem.

125. Charas contemplates this occurrence as “different services” (e.g., of first and second policy blocks) provided by “non-hierarchical” service providers can be “enacted at the same level, e.g. in that *any access network may be used.*” EX1004, ¶[0055] (emphasis added).

126. A POSITA would have used the single GPRS module of Charas to access both networks as there would be no need for a second WWAN modem.

127. At the time of the '055 Patent, for example, AT&T and T-Mobile each operated GPRS networks, and GPRS modems were compatible with both networks.

128. Patent Owner did not distinguish the WWAN modem of the European counterpart claims over Charas’s WWAN modem configuration. *See* §§VIII and XIII.A.1.a, *supra*.

129. To the extent it is argued that Charas’s multimode capability of its terminal does not constitute a single WWAN modem, Olvera-Hernandez discloses multimode capability supporting multiple access standards in a single multimode WWAN modem. *See* §XIII.A.1.a., *supra*, EX1001, 12:52-55; EX1005, ¶[0024], Fig. 5.

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130. Olvera-Hernandez also discloses a second service profile (i.e., a second “combination[] of mobility services”) associated with a second wireless network (i.e., a second “access network”, e.g., GERAN network 820 as shown in Fig. 8) accessible by the multimode modem (i.e., WWAN modem). EX1005, ¶¶[0030]-[0031], Fig. 8.

131. Because Olvera-Hernandez also discloses a second service profile associated with a second wireless network accessible through a WWAN modem, consolidating/replacing Charas’s interchangeable modules into/with a multimode modem as taught by Olvera-Hernandez would not have disrupted Charas’s disclosed functionality and would have been obvious.

132. Charas either alone or in combination with Olvera-Hernandez discloses and renders obvious Element [1.3].

d. [1.4]: “a connection manager to select an access network connection for the WWAN modem, based on a selected one of the first and second service profiles;”

133. Charas discloses/suggests Element [1.4].

134. Charas discloses a connection manager (i.e., “access selection function 690” and “layer 2 IP switch 630” and “layer 3 IP router 640” (*see* annotated Fig. 6, §XII.A., *supra*) to select an access network connection (i.e., for a “desired access

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network”) for the WWAN modem, based on a selected one of the first and second service profiles (i.e., policy blocks). EX1004, ¶¶[0052], [0057].

135. Charas’s access selection function is “responsible for requesting access and presenting credentials to the *desired access network depending on the service requested* from the service layers and also for preparing to interconnect with the *chosen access network*.” EX1004, ¶[0052] (emphasis added).

136. Because the “requested web-service” is launched “according to the policies in the policy repository 620”, the “desired access network” is selected based on the policies of a subscriber’s service profile (i.e., policy block). EX1004, ¶[0065].

137. Where the first and second service profiles are associated with first and second networks accessed by a common standard (e.g., GPRS), the access selection function 690 selects the access network “for the WWAN modem.” *See* §XIII.A.1.c., *supra*.

138. Charas therefore discloses a connection manager to select a network connection based on the selected service profile.

139. Charas’s layer 2 switch and layer 3 router constitute components of the connection manager to the extent that they route data between access networks. *See* EX1004, ¶[0051]; *see infra* §XIII.A.7 (Claim 10).

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140. Consolidating/replacing Charas's interchangeable modules into/with a multimode modem as taught by Olvera-Hernandez would not disrupt Charas's disclosure of a connection manager to select an access network connection for the WWAN modem based on a selected one of the first and second service profiles.

141. Olvera-Hernandez's architecture also enables routing functionality through a MSCF and various switches (i.e., connection manager). EX1005, ¶¶[0027]-[0028], [0030]-[0031]. Olvera-Hernandez's MSCF "selects and controls a mobility service 555 [or combinations of mobility services (i.e., first and second service profiles)] and a lower layer air interface technology ... that is capable of carrying the mobility service 555 independently via the mobility service switch 550 and the access switch 540," where each air interface technology is associated with an access network (i.e., first and second wireless networks) accessible through the multimode modem. *Id.*, ¶[0030]. See §XIII.A.1.c., *supra*.

142. Because Olvera-Hernandez also discloses a connection manager configured to select an access network connection for the WWAN modem based on a selected one of first and second service profiles, consolidating/replacing Charas's interchangeable modules into/with a multimode modem as taught by Olvera-Hernandez would not have disrupted Charas's disclosed functionality and would have been obvious.

e. [1.5]: “at least one adaptive service policy control agent to enforce network service policies associated with the selected one of the first and second service profiles,”

143. Charas discloses/suggests Element [1.5].

144. Charas discloses at least one adaptive service policy control agent (i.e., “policy enforcement engine 610”; *see* annotated Fig. 6, §XII.A., *supra*) to enforce network service policies (e.g., rights, obligations, etc.) associated with the selected one of the first and second service profiles (i.e., policy blocks). EX1004, ¶¶[0059], [0064]-[0065].

145. Charas’s policy enforcement engine “*enforces policies* defined in policy repositories 620” and “launches the requested web-service *according to the policies* in the policy repository 620.” EX1004, ¶[0065] (emphasis added).

146. These policies are network service policies associated with the selected one of the first or second service profiles as discussed above for Element [1.2]. *See* §XIII.A.1.b., *supra*; *see* EX1004, ¶[0057]. Charas’s policy enforcement engine therefore enforces network service policies associated with a selected service profile.

147. Policies enforced by Charas’s policy enforcement engine are the same as policies enforced by the adaptive service policy control agent of the ’055 Patent.

148. The “set[s] of rights and obligations” stored as policy blocks in Charas’s policy repository and subsequently enforced by Charas’s policy

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enforcement engine include those “***pertaining to authentication of users.***” EX1004, ¶¶[0014], [0057], [0059] (emphasis added).

149. Charas’s policy enforcement engine also enforces Quality of Service parameters (i.e., policies) agreed upon by the user (i.e., subscriber) corresponding to the selected one of the first and second profiles. *See* §XIII.A.1.b., *supra*; *see also* EX1004, ¶[0064] (to initiate a web-service, a user 660 will “agree on parameters, i.e. some Quality of Service value for the session ... policy enforcement engine 610 then collects data from the policy repository 620 [i.e., policy block] to set up a channel that complies with the agreed parameters and the requested web-service”).

150. The ’055 Patent similarly discloses service policies enforced by the adaptive service policy control agent as including “access control settings, traffic control settings, ... ***authentication settings*** and admission control settings.” EX1001, 8:49-55 (emphasis added).

151. Charas’s policy enforcement engine is “adaptive” because it adapts to network conditions, including Quality of Service requirements and network access technology.

152. When a user requests a service, there is an agreement on “parameters, i.e. some Quality of Service value for the session.” EX1004, ¶[0064]. The policy enforcement engine “collects data from the policy repository 620 and the access

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selection function 690 to set up a channel that *complies with the agreed parameters*”—e.g., the Quality of Service—“and the requested service and thereafter activates the connection.” *Id.*, ¶[0064].

153. By collecting data from the access selection function when selecting access networks, Charas’s policy enforcement engine adapts to the selected network. EX1004, ¶¶[0052], [0064].

154. For example, policy blocks in the repository can be organized into hierarchical relationships in which “a special access network or a special gateway might need to be used or passed before a particular service can be executed.” EX1004, ¶[0055]; *see* §XIII.A.1.b., *supra*. When changing between first and second networks under this hierarchy, policy blocks depending on the first network would no longer be enforced, and those depending on the second network would be enforced. *Id.*, Fig. 7.

155. Charas’s policy enforcement engine adapts its enforcement by consulting the policy repository and applying the policy blocks corresponding to the selected network and requested service.

156. This is consistent with the ’055 Patent’s description of adaptive policy control as adjusting “service policy based on one or more other service policy settings, the service profile and/or the service plan associated with the device.”

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EX1001, 49:51-56; *see also id.*, 50:33-44 (policy control agent performs a “service control algorithm to assist in managing overall network capacity or application QoS (Quality of Service)” and “an access network selection algorithm to determine which access network to connect to based on connection options and determine strengths of available wireless networks...”). *See infra.*, §XIII.A.6 (Claim 9).

157. Charas’s policy enforcement engine constitutes at least one adaptive service policy control agent to enforce network service policies associated with the selected one of the first and second service profiles.

f. [1.6]: “the enforced network service policies including policies enforced at an application service interface on network data connections for selected applications resident on the device.”

158. Charas discloses/suggests Element [1.6].

159. Charas’s adaptive service policy control agent (i.e., policy enforcement engine 610; *see* annotated Fig. 6, §XII.A., *supra*) enforces network service policies at an “applications interface 650” (i.e., application service interface) for selected applications (e.g., “applications 670”) resident on the device. *See* §XIII.A.1.e., *supra*; EX1004, ¶¶[0031], [0050]-[0051], [0053] [0064]-[0065].

160. Charas’s applications interface between “applications 670” resident on the device and the network layer stack (i.e., elements 610, 630, 640, 680, and 690 in

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Fig. 6) which establishes the network data connections. *See* EX1004, Fig. 6 (§XII.A., *supra.*).

161. Charas's applications are "selected" applications because they are associated with "requested web-service[s]," and can be selectively disconnected by the policy enforcement engine after data associated with the requested web-service has been received. EX1004, ¶[0064] ("the policy enforcement engine 610 disconnects the application 670 and assembles accounting data" for the "requested web-service").

162. Charas's end-user device (i.e., terminal) includes applications 670. *See* XIII.A.1., *supra* (annotated Fig. 6).

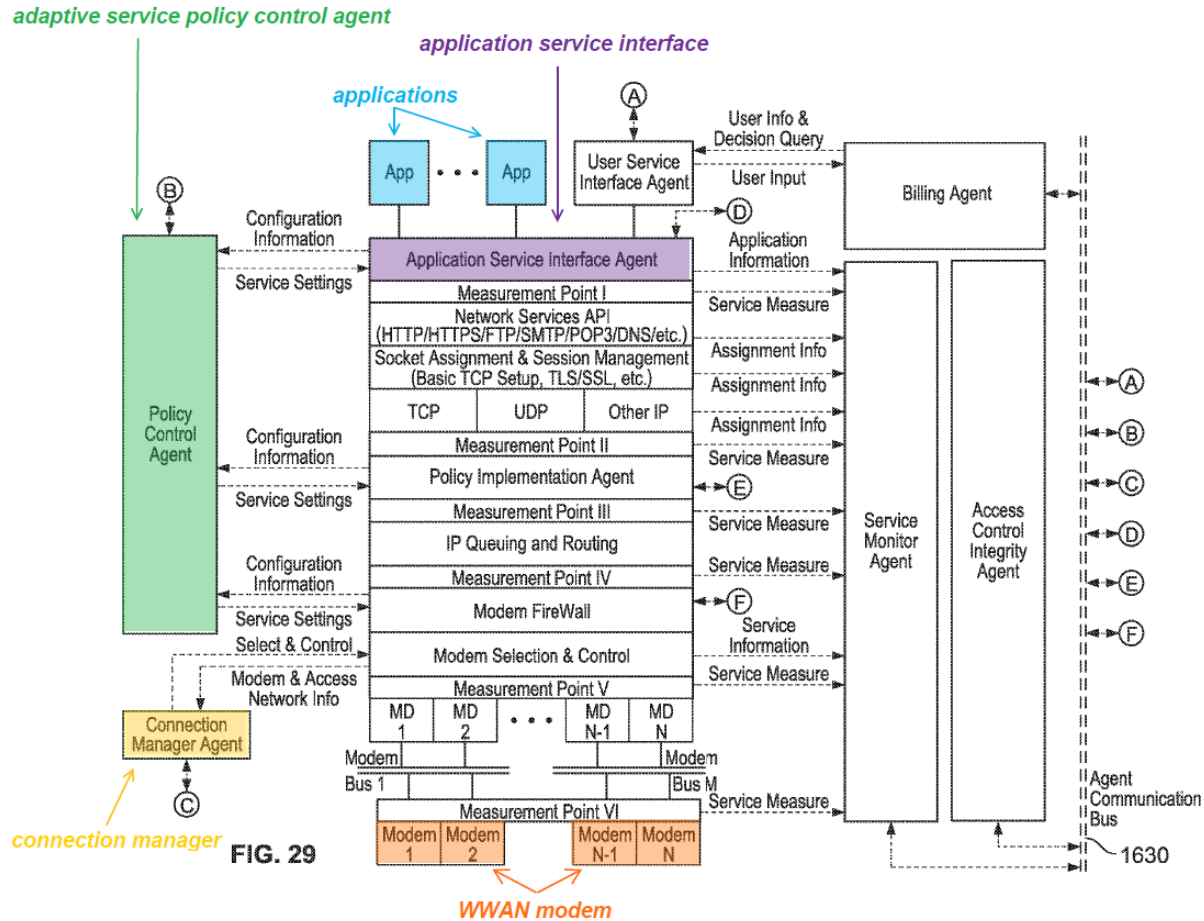
163. Charas therefore discloses enforcing service policies over network data connections for selected applications resident on the device.

164. Charas's applications interface is located between applications resident on the device and the adaptive service policy control agent (i.e., policy enforcement engine 610). EX1004, ¶¶[0050], [0053], [0064], Fig. 6 (*see* §XII.A., *supra.*).

165. Charas's applications interface performs the functions of the applications service interface disclosed in the '055 Patent. The '055 Patent discloses an "application interface agent 1693" or "application service interface layer" located

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“above the standard networking stack API.” EX1001, 95:62-66, Fig. 29 (annotated below).



EX1001, Fig. 29 (Annotated)

166. The enforced network service policies include at least Quality of Service policies. *See* §XIII.A.1.e., *supra*. Charas enforces Quality of Service policies at the applications interface 650 on network data connections established by the

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network layer stack for selected applications resident on the device. *See* EX1004, ¶[0064] (“Quality of Service (QoS) value for the session, e.g. the transmission rate” is agreed upon “via the applications interface 650”; applications interface 650 uses the policy enforcement engine 610 to enact a requested web-service by setting up “a *channel that complies with the agreed [QoS] parameters.*”) (emphasis added).

167. Charas’s QoS policy enforcement is similar to “traffic shaping QoS control,” of the ’055 Patent. EX1001, 56:46-51. Charas’s network data connection (i.e., channel) “complies with the agreed [QoS] parameters.” EX1004, ¶[0064].

168. Therefore, a POSITA would have understood that Charas’s QoS policies are enforced at an applications service interface on network data connections for selected applications resident on the device. *See also* Mandato (EX1011), ¶¶[0025], [0152]. Mandato confirms that a POSITA with knowledge regarding the state-of-the-art would have understood that an applications service interface such as the API of Mandato were configured to “enforce a homogeneous QoS specification” for selected applications resident on a device. EX1011, ¶[0025].

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- 2. Claim 2: “The wireless end-user device of claim 1, the first service profile further comprising first device credentials and the second service profile further comprising second device credentials, the wireless end-user device further comprising a device master agent credential that is independent of the first and second device credentials.”**

169. Claim 2 is anticipated and/or obvious over Charas alone and/or in view of Olvera-Hernandez. *See* §XIII.A.1., *supra*.

170. Charas’s first and second service profiles (i.e., policy blocks) respectively comprise first and second device credentials (i.e., “shared secrets”) and its wireless end-user device (i.e., “terminal”) comprises a device master agent credential (i.e., “LPEP (local policy enforcement point) key 350”) independent of the first and second device credentials. EX1004, ¶¶[0039], [0054], [0057].

171. Each of Charas’s service profiles (i.e., “policy blocks”) includes its own “shared secrets” used to generate encryption keys (which are also shared secrets) authenticating the subscriber with the service provider. EX1004, ¶¶[0039], [0054]. This corresponds to embodiments of credentials in the ’055 Patent, which include “parameters that the network and/or device uses (e.g. requires) to admit the device onto the network and associate it with the appropriate service profile and/or service plan.” EX1001, 136:46-50.

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172. Because each policy block contains such shared secrets, Charas discloses a first service profile further comprising first device credentials and a second service profile further comprising second device credentials.

173. Charas discloses as “a device master agent credential” an “LPEP (Local Policy Enforcement Point) key...used for identifying the LPEP 110” of the wireless end-user device to a server cluster or “SMP (Secure Mobile Portal) 100.” EX1004, ¶[0046]. Thus, where the shared secrets within the policy block (first and second device credentials) authenticate the subscriber with the provider, the LPEP key authenticates the LPEP (e.g., policy enforcement engine) to the server.

174. Charas’s SMP is a server cluster that “acts as a Policy Definition Point (PDP) for the LPEP 110” and “[e]ach LPEP 110 has a set of policies associated with it and the relationship between the PDP and the LPEP 110 i.e. between the SMP 100 and the subscriber is uniquely defined by these policies.” The master agent of the ’055 Patent is likewise a “service owner” or “service distributor” consisting of “multiple activation servers 160.” EX1001, 142:38-46, 143:26-41, 148:32-39.

175. Like Charas’s LPEP key, the device master agent credential of the ’055 Patent is “a unique credential in the device that ... can be recognized and recorded by the network ... or other service entity at time of activation.” EX1001, 120:24-40.

176. Charas's LPEP key therefore constitutes a device master agent credential that is independent of the first and second device credentials. Figure 3 illustrates the LPEP Key 350 as independent from the "Secret" stored in the Authorisation Database 300 for each policy block.

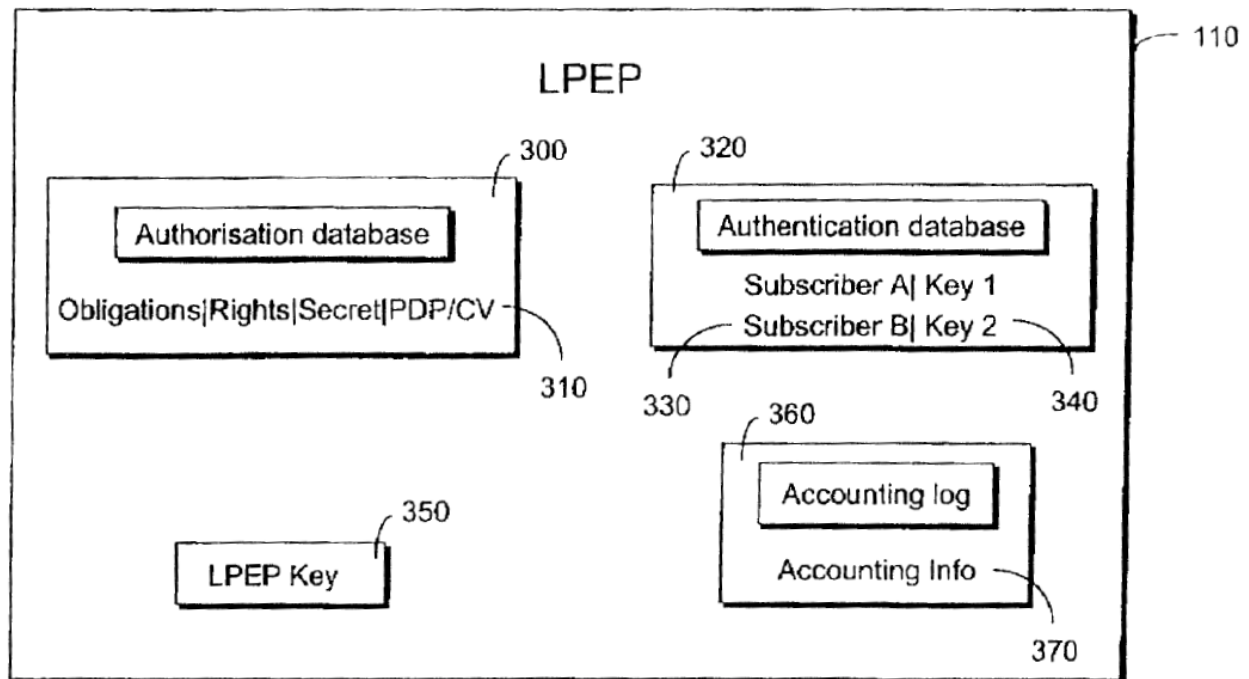


Fig. 3

EX1004, Fig. 3

177. Maintaining the Charas/Olvera-Hernandez combination would have been obvious as Charas's device and master agent credentials satisfying claim 2 would not have been disrupted. *See* Claim 1, §XIII.A.1., *supra*.

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3. **Claim 3: “The wireless end-user device of claim 1, further comprising a service monitor agent to record network service usage categorized by sub-account for different wireless networks, including separate service usage counts associated with each of the first service plan and the second service plan.”**

178. Claim 3 is obvious over Charas, alone or in combination with Olvera-Hernandez. *See* §XIII.A.1., *supra*.

179. Charas discloses a service monitor agent (i.e., “LPEP”) to record network service usage (i.e., “transactions”) categorized by sub-account for different wireless networks (i.e., subscriber-initiated “session”), including service usage counts associated with first and second service plans (i.e., Charas’s multiple subscriptions). EX1001, ¶¶[0049], [0051], [0056].

180. The “service monitor agent 1696” of the ’055 Patent “records and reports device service usage or service activities of device 100.” EX1001, 53:10-12.

181. After “enact[ing] [] the requested service” for the subscriber, Charas’s LPEP similarly “monitors [] all transactions between the LPEP 110 and the SMP 100,” and “maintains an accounting log 360 containing accounting information 310 pertaining to a session, such as start time, stop time and service utilised.” EX1004, ¶[0047]. Because this accounting is done on a per-session basis, a POSITA would have understood that its accounting would include separate service usage counts

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associated with the respective subscriptions associated with each policy block—i.e., with the first and second service plans – into individual sub-accounts.

182. A POSITA would have understood that Charas’s disclosure teaches monitoring service usage by sub-account as such techniques were widely recognized in the prior art. *See also* Swanburg which creates sub-accounts to monitor usage for separate subscriptions. EX1006, 5:47-59 (“MIICR (Micro Intelligent Information Collection Repository) 105 monitors several inputs for new information such as usage, application interaction, etc., and generates a sub-account as a subscriber “sub-profile” based on service usage. EX1006, 3:1 (“[p]atterns of usage can be formed for multiple subscribers”).

183. Charas’s policy blocks can be associated with specific wireless networks via, e.g., hierarchical relationships between policy blocks and “special access network[s]” (*see infra*, §XIII.A.6, Claim 9 to categorize usage by sub-accounts for different wireless networks).

184. Maintaining the Charas/Olvera-Hernandez combination would have been obvious as Charas’s service monitor agent satisfying claim 3 would not have been disrupted. *See* Claim 1, §XIII.A.1., *supra*.

4. Claim 4: “The wireless end-user device of claim 3, wherein for at least one of the first and second service plans, the wireless end-user device synchronizes a local service usage count with a network-based service count.”

185. Claim 4 is obvious over Charas, alone or in combination with Olvera-Hernandez. *See* §XIII.A.3., *supra*.

186. Charas discloses that for at least one of its first and second service plans (i.e., subscriptions), its wireless end-user device (i.e., “terminal”) synchronizes a local service usage count (i.e., “accounting information 570” generated by the LPEP) with a network-based service count (i.e., “accounting information generated in the SMP 100”). EX1004, ¶¶[0047], [0049].

187. The “accounting information 570” generated by the LPEP of Charas includes an elapsed time a service was utilized (i.e., local service usage count).

188. Charas’s LPEP synchronizes its local service usage count with a network-based service count generated by “a server cluster called Secure Mobile Portal (SMP).” *See* §XIII.A.1., *supra*; EX1004, ¶¶[0039], [0047], [0049].

189. When the SMP receives the accounting information from the LPEP, it “compares it with the accounting information generated in the SMP 100 and sends a positive or negative accounting confirmation 575 back to the LPEP 110,” thus synchronizing the local and network-based service counts. EX1004, ¶[0049]; *see*

also id. ¶[0047] (“SMP 100 replies in agreement or disagreement, i.e. compare the accounting log in the SMP 100 with the one generated in the LPEP 110.”).

190. Maintaining the Charas/Olvera-Hernandez combination would have been obvious as Charas’s service count synchronization functionality satisfying claim 4 would not have been disrupted. *See* Claims 1 and 3, §XIII.A.1., XIII.A.3., *supra*.

5. Claim 8: “The wireless end-user device of claim 1, wherein the at least one adaptive service policy control agent applies network service policies from a superset profile that provides capabilities from each of the first and second service profiles.”

191. Claim 8 is obvious over Charas, alone or in combination with Olvera-Hernandez. *See* §XIII.A.1., *supra*.

192. Charas’s adaptive service policy control agent applies network service policies (e.g., rights, obligations, etc.) from a superset profile (i.e., “policy sub-domain”) that provides capabilities from first and second service profiles (i.e., “policy blocks”). *See* §XIII.A.1.e., *supra*; EX1004, ¶[0060].

193. Charas discloses Fig. 7 policy “sub-domains” each containing “multiple policy blocks 625” (e.g., first and second service profiles) having “specific relationships” between a user and service providers. EX1004, ¶[0060], Fig. 7.

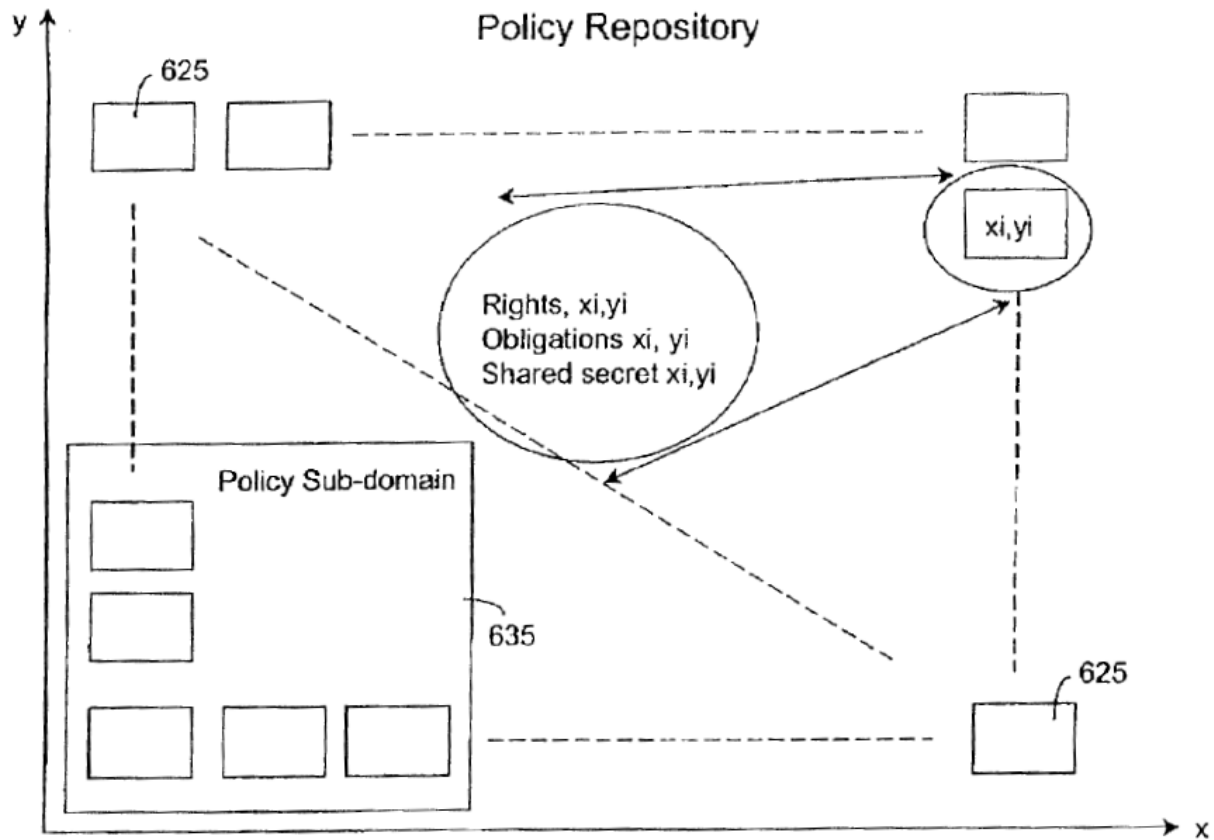


Fig. 7

EX1004, Fig. 7

194. Each sub-domain constitutes a superset profile that provides capabilities from each of its constituent policy blocks (i.e., service profiles). A sub-domain is a “reserved domain space for a particular application” that groups relevant policy blocks for the application thereby providing combined capabilities from those constituent policy blocks. EX1004, ¶¶0060].

195. Charas’s policy enforcement engine (i.e., adaptive service policy control agent) enforces policies drawn from the policy repository, including from

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sub-domains for certain applications. EX1004, ¶[0059]-[0060]. When the user requests a service, “the policy enforcement engine 610 then collects data from the policy repository 620 and the access selection function 690 to set up a channel that complies with the agreed parameters and the requested service.” EX1004, ¶[0064].

196. Charas’s policy enforcement engine can concurrently enforce policies from first and second policy blocks (i.e., service profiles) because Charas’s terminal supports several simultaneous, independent data flows (e.g., VoIP via W-CDMA and multimedia via W-LAN). EX1004, ¶[0051].

197. Maintaining the Charas/Olvera-Hernandez combination would have been obvious as Charas’s adaptive service policy control agent and superset profiles satisfying claim 8 would not have been disrupted. *See* Claim 1, §XIII.A.1., *supra*.

6. Claim 9: “The wireless end-user device of claim 1, wherein the at least one adaptive service policy control agent detects network connection changes from the first wireless network to the second wireless network, and in response enforces the second set of network service policies.”

198. Claim 9 is anticipated and/or obvious over Charas alone and/or in view of Olvera-Hernandez. *See supra* §XIII.A.1.

199. Charas’s adaptive service policy control agent (i.e., “policy enforcement engine 610”) detects network connection changes from the first wireless network (e.g., “W-CDMA network”) to the second wireless network (e.g.,

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“GPRS” network), and in response enforces the second set of network service policies (i.e., network service policies of Charas’s second “policy block”). *See* §XIII.A.1.e. *supra*; EX1004, ¶¶[0051], [0055].

200. Charas expressly discloses that the second wireless network has a corresponding set of network policies that are enforced in response to a network connection change. Charas’s first and second service profiles (i.e., first and second “policy blocks”) possess hierarchical dependencies to access networks such that a network connection change to a second wireless network would require service policies of the second service profile to be enforced. EX1004, ¶[0055].

201. Charas discloses that “the terminal [can] hand over a communication session from one communications network to another, by re-routing the data flow from one modem port to another.” EX1004, ¶[0051].

202. Charas’s policy enforcement engine (i.e., adaptive service policy control agent) is responsible for setting up a channel and enforcing the policies of the requested web-service. *See* §XIII.A.1.e., *supra*.

203. Charas alone or in combination with Olvera-Hernandez discloses an adaptive service policy control agent detecting network connection changes from the first wireless network to the second wireless network, and in response enforcing the second set of network service policies.

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204. A POSITA would have understood, and it would have been obvious, that Charas's policy enforcement engine would have known what access network(s) are connected in order to enforce policies that depend on such connection.

205. The policy enforcement engine would thereby detect network connection changes from the first network to the second network and enforce policies based on that change. This detection of connection changes is enabled by the access selection function, layer 2 IP switch, and the layer 3 IP router coupled to the policy enforcement engine. EX1004, Fig. 6 (*see* §XII.A., *supra.*).

206. A POSITA would have been motivated to accommodate Olvera-Hernandez's multimode modem as it can similarly route traffic flows between "various technology specific modems" in response to network changes. *See* §XIII.A.1.d., *supra.* *See also e.g.*, EX1005, ¶¶[0024], [0027] (Olvera-Hernandez's "MSCF 547" manages "transitions among various mobility services" of different "interface technologies" via an "access switch 540").

207. This modification would have predictably yielded a device configured to support and detect network changes because Charas's interchangeable modules and Olvera-Hernandez's multimode modem are enabled with switching functionality. EX1004, ¶[0051], EX1005, ¶[0024].

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208. Consolidating/replacing Charas's interchangeable modules into/with a multimode modem as taught by Olvera-Hernandez would have been obvious. *See* Claim 1, §XIII.A.1., *supra*.

7. **Claim 10: “The wireless end-user device of claim 1, wherein the connection manager further comprises a modem selection and control layer that routes certain types of data traffic to the first wireless network and other types of data traffic to the second wireless network.”**

209. Claim 10 is anticipated and/or obvious over Charas alone and/or in view of Olvera-Hernandez. *See* §XIII.A.1., *supra*.

210. Charas's connection manager includes a modem selection and control layer (i.e., “a layer 2 IP switch 630 and a layer 3 IP router 640”) that routes certain types of data traffic (i.e., information flows) to a first wireless network (e.g., “W-CDMA network”) and other types of data traffic to a second wireless network (e.g., “GPRS network”). *See* §XIII.A.1.d., *supra*; EX1004, ¶[0051].

211. Charas's “layer 2 IP switch 630 and a layer 3 IP router 640 ... enable[] the user 660 the possibility to have several information flows ... active at the same time.

212. For example [] a voice over IP data flow [can] be maintained through a W-CDMA network, at the same time as a multimedia flow is maintained through a W-LAN network.” EX1004, ¶[0051].

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213. A POSITA would have understood that Charas's disclosure is not limited to routing between W-LAN and W-CDMA networks because Charas broadly teaches routing flows between any available networks.

214. Network connections are established by selecting among Charas's "interchangeable modules (modems) for different access standards such as W-CDMA, EDGE, CDMA 2000, W-LAN etc." Olvera-Hernandez's multimode modem similarly groups multiple technology specific modems (e.g., LTE modem 516, UTRAN modem 518, IEEE 802 modem 520, etc.). EX1004, ¶[0041], EX1005, ¶[0024].

215. Charas's access selection function, layer 2 IP switch, and layer 3 IP router, constitute a connection manager including a modem selection and control layer that routes certain types of data traffic to the first wireless network and other types of data traffic to the second wireless network.

216. The Charas/Olvera-Hernandez combination would not have disrupted Charas's disclosure of a connection manager comprising a modem selection and control layer routing certain types of data traffic to the first wireless network and other types of data traffic to the second wireless network.

217. Olvera-Hernandez discloses as a connection manager a "mobility selection and control function (MSCF) 547" and various switches (e.g., "voice

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switch 530”, “data switch 535”, “access switch 540”). EX1005, ¶¶[0024-25], Fig. 5.
See §XIII.A.1.d., *supra*.

218. Just as the claim 10 modem selection and control layer routes “certain network traffic” to a first network and “some or all of the data traffic” to another network, Olvera-Hernandez’s MCSF “manag[es] transitions among various mobility services in response to changing scenarios (for example, changing from GAN (Generic Access Network) to IMS (Internet protocol (IP) Multimedia subsystem...)” by dynamically selecting “air interface technologies and associated access networks” that support selected mobility services. EX1001, 94:58-95:9, EX1005, ¶¶[0027], [0030-31].

219. A POSITA would have understood that Olvera-Hernandez’s mobility services (e.g., “session initiation protocol (SIP) 557, IMS 559, voice call continuity (VCC) 561, as well as other services including Mobile IP (MIP)/proxy MIP (PMIP) 563, and GAN 565”) generate unique traffic flows.

220. Olvera-Hernandez’s MSCF therefore routes certain data traffic (i.e., of a first mobility service or collection of mobility services) to a first wireless network and other data traffic (i.e., of a second mobility service of collection of mobility services) to a second wireless network.

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221. Maintaining the Charas/Olvera-Hernandez combination would have been obvious as the connection manager functionality of Charas satisfying claim 10 would not have been disrupted. *See* Claim 1, §XIII.A.1., *supra*.

8. Claim 12: “The wireless end-user device of claim 1, the connection manager configured to prompt the WWAN modem to connect to a selected access network and send credentials associated with the selected one of the first and second service profiles to the selected access network.”

222. Claim 12 is anticipated and/or obvious over Charas alone and/or in view of Olvera-Hernandez. *See* §XIII.A.1., *supra*.

223. Charas’s connection manager (i.e., i.e., “access selection function 690”, “layer 2 IP switch 630” and “layer 3 IP router 640,” *see* §XIII.A.1.d., *supra*) is configured to prompt the WWAN modem to connect to a selected (i.e., “chosen”) access network and send credentials associated with the selected one of the first and second service profiles (i.e., “policy blocks”) to the selected access network. *See* §XIII.A.1.c., *supra*; EX1004, ¶[0052].

224. The “access selection function 690” of Charas’s connection manager “is responsible for requesting access and *presenting credentials to the desired access network depending on the service requested* from the service layers and also for *preparing to interconnect with the chosen access network*.” EX1004, ¶[0052] (emphasis added).

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225. Access to the “chosen access network” networks is facilitated through Charas’s interchangeable modules. EX1004, ¶¶[0041], [0053]; *see* §XIII.A.1.a., *supra*.

226. To the extent it is argued that Charas’s multimode modem capability does not constitute a single modem, Olvera-Hernandez discloses a single multimode WWAN modem. *See* §XIII.A.1.a., *supra*.

227. A POSITA would have been motivated to use a multimode modem as disclosed by Olvera-Hernandez to connect to an access network selected by its “MSCF 547” just as Charas’s interchangeable modules connect to an access network selected by its “access selection function 690.” EX1004, ¶[0052], EX1005, ¶[0024]. *See* §XIII.A.1.d., *supra*.

228. Because Olvera-Hernandez’s multimode modem connects to an access network selected by a connection manager (i.e., MSCF 547 and various switches), consolidating/replacing Charas’s interchangeable modules into/with a multimode modem as taught by Olvera-Hernandez would not have disrupted Charas’s disclosed functionality and would have been obvious. *See* Claim 1, §XIII.A.1., *supra*.

229. Each of Charas’s service profiles (i.e., “policy blocks”) defines a relationship between a subscriber and a service provider (i.e., service plan or “subscription”). EX1004, ¶[0057]. These profiles include device credentials (i.e.,

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“shared secrets”) which encrypt each packet sent “between the service provider and the service buyer” (i.e., “subscriber”), the service provider operating the selected access network (i.e., “chosen access network”). *See* §XIII.A.2., *supra*; EX1004, ¶¶[0039], [0051]; *see also* EX1004, ¶[0039] (“each packet received by the SMP 100 will be seen as de facto authentication of the service buyer or subscriber by the service provider.”).

230. Charas’s access selection function is therefore responsible for prompting a WWAN modem to connect to a selected access network and for sending credentials associated with the selected one of a first and second service profiles to a selected access network.

B. Claim 5 is Obvious over Charas alone or in Combination with Olvera-Hernandez in view of Mottes (Ground 2)

- 1. Claim 5: “The wireless end-user device of claim 1, wherein the first service plan is associated with a central provider that operates a WWAN access network, and the second service plan is associated with a virtual network operator.”**

231. Claim 5 is obvious over Charas alone or in combination with Olvera-Hernandez in view of Mottes. *See* §XIII.A.1., *supra*.

232. Charas discloses first and second service plans (i.e., subscriptions) that are associated with access providers operating WWAN access networks. *See* §XIII.A.1.b., *supra*; *see also* EX1004, ¶[0054].

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233. Charas discloses “subscriber A [that] has a private subscription with provider X for voice and web browsing,” maintained through a W-CDMA network. EX1004, ¶¶[0051], [0056]. Although Charas does not expressly distinguish between central providers operating physical access networks and virtual network operators providing services over another operator’s infrastructure, virtual network operators were well-known in the art as demonstrated by Mottes.

234. Mottes discloses a system enabling an end user “to use and or subscribe to several service providers and or Mobile Virtual Network Operators (MVNOs)” from a single device. EX1007, Abstract. Service providers can be MVNOs or mobile network operators (MNOs). EX1007, ¶[0007].

235. Mottes defines an MVNO as “an organization that offers mobile subscription and call services to customers but does not have an allocation of spectrum,” and distinguishes MVNOs from non-virtual (MNOs). EX1007, ¶¶[0008], [0040]. An MNO therefore corresponds to the claimed “central provider that operates a WWAN access network.”

236. Mottes discloses that a single end user can maintain relationships with both types of providers (MNOs and MVNOs) simultaneously, enabling them “to use and or subscribe to several service providers and or Mobile Virtual Network Operators (MVNOs)” from a single device. EX1007, Abstract.

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237. A POSITA reading Mottes would have understood it was well-known for the wireless ecosystem to include both central providers operating physical WWAN access networks (MNOs) and virtual network operators leveraging that infrastructure (MVNOs), and for a user to have relationships (e.g., subscriptions) to both.

238. It would have been obvious to accommodate one virtual network operator within Charas's policy repository 620 and this would have predictably yielded a first service plan associated with a central provider operating a WWAN access network (an MNO) and a second service plan associated with a virtual network operator (an MVNO).

239. Charas's policy repository already supports multiple, discrete policy blocks for different provider relationships, each with its own rights, obligations, and credentials. EX1004, ¶[0054].

240. Adding an MVNO policy block alongside an existing MNO policy block would have been a natural, predictable extension of Charas's existing architecture based on the existing access networks and providers at the time of Charas.

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241. A POSITA would have combined Charas and Mottes to include a virtual network operator, thereby expanding service provider options. EX1007, ¶¶[0002], [0009-11].

242. The combination of Charas, Olvera-Hernandez, and Mottes would have been obvious as Mottes’s central provider and virtual network operator relied upon for claim 5 would not have disrupted the Charas/Olvera-Hernandez combination. *See* Claim 1, §XIII.A.1., *supra*.

C. Claims 6 and 7 are Obvious over Charas alone or in Combination with Olvera-Hernandez in view of Spencer (Ground 3)

- 1. Claim 6: “The wireless end-user device of claim 1, further comprising a user service interface to allow a user to make a user selection between the first and second service profiles, the connection manager to, responsive to the user selection, select an access network connection for the WWAN modem.”**

243. Claim 6 is obvious over Charas alone or in combination with Olvera-Hernandez in view of Spencer. *See* §XIII.A.1., *supra*.

244. Charas’s user service interface is a “user interface and application programming interfaces (API’s)” for user-initiated services. EX1004, ¶[0050]. *See also, e.g.,* EX1004, ¶[0064] (the user “wants to initiate a web-service”), ¶[0068] (“user wishes to make a call”), Fig. 5 (showing “Subscriber” sending “service request (510)” to LPEP).

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245. Charas does not disclose details about how these service requests are made, e.g., the user interface enables service profile selection.

246. A POSITA would therefore have looked to existing solutions for user-initiated services in mobile devices, such as Spencer's disclosed teachings of wireless service access in the technical field of Charas. *See* EX1008, Abstract; EX1004, Abstract.

247. Spencer discloses as a user service interface a “user interface (UI)...send[ing] a web page displaying available service options” from which “[t]he user selects the required services.” EX1008, ¶[0166]. An “Access Management Module determines what service profile the user has access to through the current remote device” and “sends the available service options to the remote device through an appropriate UI.” EX1008, ¶[0165]. The user is therefore presented with service profiles and selects between them. *See* EX1008, ¶[0166] (service profile selected after cross-referencing user selection to profiles in database).

248. Charas and Spencer both define the parameters and permissions governing a user's access to network services: Spencer's service profiles define “allowed or restricted services, resources or applications to be provided” (EX1008, ¶[0045]), and Charas's policy blocks similarly define “rights” and “obligations” associated with each service provider relationship (EX1004, ¶[0056]).

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249. Spencer teaches configuring a user interface, such as that of Charas, to allow a user to make a selection between first and second service profiles (i.e., Charas’s policy blocks).

250. The “service profile rules are sent to the Access Management Module (step 534)” and used to “establish a connection to the network 508 (step 548).” *Id.*, EX1008, Fig. 5. Charas’s access selection function 690 responds to a user-selected policy block (e.g., via a user interface as taught by Spencer) by selecting the appropriate access network and interconnecting with the chosen network. EX1004, ¶[0052].

251. Charas’s connection manager includes an “access selection function 690 [is] responsible for...interconnect[ing] with [a] chosen access network” via interchangeable modules supporting multiple WWAN network technologies (e.g., W-CDMA, EDGE, etc.). EX1004, ¶[0052]; *see* §XIII.A.1.d., *supra*.

252. This access network selection within Charas would have been responsive to the user’s service profile selection, as the access selection function selects the appropriate network based on the service requested by the subscriber. EX1004, ¶[0043].

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253. To the extent it is argued that Charas's multimode modem capability does not constitute a single modem, Olvera-Hernandez discloses a single multimode WWAN modem. *See* §XIII.A.1.a., *supra*.

254. Olvera-Hernandez also discloses a connection manager that selects an access network for its multimode modem. *See* §XIII.A.1.d., *supra*.

255. Because Olvera-Hernandez's multimode modem can also connect to an access network selected by a connection manager (i.e., MSCF 547 and various switches), consolidating/replacing Charas's interchangeable modules into/with a multimode modem as taught by Olvera-Hernandez would not have disrupted Charas's disclosed functionality. *See* §XIII.A.1.a., *supra*.

256. A POSITA would have been motivated to combine Charas's access selection function and Spencer's service profile selection to provide a user interface via the applications interface 650 that would have facilitated Charas's service initiation.

257. Both Charas and Spencer are directed to managing user access to wireless network services through the application of service profiles.

258. Spencer teaches that users benefit from the ability to select among service offerings, disclosing that "a user can select and pre-pay for a service profile based on price and desired functionality." EX1008, ¶[0049].

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259. A POSITA would have recognized that incorporating Spencer's technique of presenting available service profiles to the user for selection into Charas's existing user interface would have improved user engagement and ease-of-use.

260. Charas's terminal architecture separates the service part (containing the user interface and API's) from the access part (containing the modem modules) and the control part (containing the policy enforcement engine, policy repository, and access selection function), making it architecturally amenable to adding an explicit user selection step before the policy enforcement engine and access selection function respond by selecting the appropriate access network.

261. The combination of Spencer's user-interface in Charas's system involves simply applying a user-driven service profile selection through a UI, as taught by Spencer, to Charas's multi-access terminal with its existing user interface to yield the predictable result of allowing a user to select between multiple service profiles through the user interface. The terminal's access selection function thereafter selects the appropriate access network connection.

262. The combination of Charas, Olvera-Hernandez, and Spencer would have been obvious as Charas's connection manager functionality and Spencer's user

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service interface relied upon for claim 6 would not have disrupted the Charas/Olvera-Hernandez combination. *See* Claim 1, §XIII.A.1., *supra*.

2. Claim 7: “The wireless end-user device of claim 1, further comprising a service notification and billing interface to display service usage options for each of the first and second service profiles.”

263. Claim 7 is obvious over Charas alone or in combination with Olvera-Hernandez in view of Spencer. *See* §XIII.A.1., *supra*.

264. Charas discloses a “user interface and application programming interfaces (API’s) for the services.” EX1004, ¶[0050].

265. Charas discloses multiple (e.g., first and second) service profiles defining a user’s relationship with a service provider, which charges the user via an “invoice.” EX1004, ¶¶[0014], [0056]-[0057].

266. Charas also discloses accounting/billing functionality. EX1004, ¶[0047]. Charas, however, does not explicitly describe how the user is informed of, or consents to, charges.

267. A POSITA would have used known prior art techniques to present charging information to users in a multi-network, multi-profile mobile device context, such as those disclosed by Spencer.

268. Spencer discloses as a “service notification and billing interface” a “User Interface (UI)” responsible for “displaying available *service options*...to the

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user so the user can select the required services” and “payment options.” EX1008, ¶[0166] (emphasis added).

269. Spencer’s UI displays billing information and service usage options in the form of “service options” and the corresponding “payment options.” EX1008, ¶[0166]. Spencer indicates that these service options can be selected in order to “pre-pay” for or to “upgrade a service profile.” *Id.*, ¶[0049]; *see id.*, ¶[0096] (“when a user of a given remote device having restrictive access ... may be redirected to an interactive interface providing the user the option of upgrading or enhancing their service profile, for example, for an additional fee”). The service notification and billing interface of the ’055 Patent likewise allows “service plan options/changes ... [to be] configured/updated” and “provides options for automatic pre-buy.” EX1001, 66:9-25.

270. Spencer indicates that service options correspond to a “user’s current service profile” representing a single service profile from among multiple “service profiles stored in a knowledge base” or “established for the [user’s] account” (i.e., first and second service profiles in a secure memory). EX1008, ¶¶[0096]-[0097], [0166]-[0067].

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271. Spencer’s service profiles constitute “subscription packages that enable subscribed users access to certain network-based functions and services.” EX1008, ¶[0091].

272. Charas’s policy blocks and Spencer’s service profiles define distinct relationships with different service providers, each one involving its own rights, obligations, and charges. EX1004, ¶[0056].

273. Because Spencer’s UI displays service options for a current service profile selected from a number of different packages, a POSITA would have understood that the UI would display service options for each of Charas’s profiles (including the first and second service profiles) depending on which was selected. *Id.*

274. Spencer’s UI therefore constitutes a service notification and billing interface to display service usage options for each of the first and second service profiles.

275. Charas alone or in combination with Olvera-Hernandez in view of Spencer discloses a service notification and billing interface to display service usage options for each of the first and second service profiles.

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276. A POSITA would have been motivated to implement Spencer's UI on Charas's terminal as the combination would have predictably yielded a simple, transparent interface that would promote customer satisfaction and ease-of-use.

277. Spencer's UI gives the user an opportunity to pre-pay for services or to upgrade or enhance an existing service profile upfront for an additional fee before charges are incurred. This protects the user from unintended charges and would have been desirable in Charas's system where the user has relationships with multiple service providers. EX1008, ¶¶[0049], [0096].

278. The combination would have been predictable/straightforward. Both references involve packaging and selling network services within subscription-based profiles. Implementing service charging in Charas's existing UI/API layer would have involved a well-known UI modification.

279. The ability to notify and bill users for services incurred under their given subscriber profile was within the knowledge/skill of a POSITA. *See* Brisebois, EX1017, ¶[0076] ("With respect to FIG. 7B, diagram 750 illustrates a pop-up window 755 that prompts a subscriber to accept 758 or decline 762 premium charges, the charges are incurred for utilization of a profiled technology in accordance with a network selection profile. Other information can be presented in pop-up window 755, such as actual charges for profiled technology usage.").

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280. The combination of Charas, Olvera-Hernandez, and Spencer would have been obvious as Spencer's service notification and billing interface relied upon for claim 7 would not have disrupted the Charas/Olvera-Hernandez combination. *See* Claim 1, §XIII.A.1., *supra*. §XIII.A.1.a., *supra*.

D. Claim 11 is Obvious over Charas alone or in Combination with Olvera-Hernandez in view of Phillips (Ground 4)

1. Claim 11: “The wireless end-user device of claim 1, further comprising a Subscriber Identity Module (SIM), the adaptive service policy control agent located at least in part on the SIM.”

281. Claim 11 is obvious over Charas alone or in combination with Olvera-Hernandez in view of Phillips. *See* §XIII.A.1., *supra*.

282. The parties have proposed constructions of the term “Subscriber Identity Module” in the related litigation. Under any proposed construction, the prior art cited herein discloses embodiments that align with embodiments of the '055 Patent which are encompassed by claim 11.

283. Charas discloses an adaptive service policy control agent (i.e., policy enforcement engine 610). *See* §XIII.A.1.e., *supra*; EX1004, ¶[0014].

284. While Charas discloses storing its policy enforcement engine and policy repository on a smart card (*see* EX1004, ¶[0059]), Charas does not expressly disclose that the smart card is a SIM.

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285. However, Phillips discloses the well-known use of a SIM/smart card for storing mobile device policy enforcement functions. *See, e.g.*, EX1009, ¶[0006] (a “Subscriber Identity Module (SIM)... is one type of ‘smart card’ ... connected to the mobile station for customization and for identifying the end user.”), ¶¶[0023]-[0024].

286. Policy enforcement functions disclosed by Phillips (e.g., user authentication/identification) include the exact functions performed by the adaptive service policy control agent of the ’055 Patent (*see* EX1001, 8:49-55) and Charas’s policy enforcement engine (*see* §XIII.A.1.e., *supra*). *See also* EX1004, ¶¶[0014], [0059]. *See also* EX1018, §§7.1, 7.2, and 9.2.16; EX1019, §§7.1, 7.2, and 9.2.16. Under any construction of “Subscriber Identity Module,” locating Charas’s policy enforcement engine at least in part on Phillips’s SIM satisfies claim 11.

287. The adaptive service policy control agent of the ’055 Patent enforces “access control settings, ... authentication settings, and admission control settings.” EX1001, 8:49-55 (emphasis added).

288. Phillips’s SIM uses key generating and authentication algorithms stored on the SIM to implement user authentication/identification procedures, just like the adaptive service policy control agent of the ’055 Patent. EX1009, ¶[0024]. The SIM

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is used for subscriber-specific policy/profile storage and for “identifying [an] end user.” *Id.*, ¶[0006].

289. Phillips discloses that to perform user authentication, the SIM “stores” authentication settings including “(3) a ciphering key generating algorithm (A8)—with Ki and RAND it generates a 64-bit key (Kc); [and] (4) an authentication algorithm (A3)—with Ki and RAND it generates a 32-bit signed response (SRED).” *Id.*, ¶[0024]; *see* EX1018, §§7.1, 7.2, and 9.2.16; EX1019, §§7.1, 7.2, and 9.2.16.

290. Phillips also teaches implementing a SIM in accordance with the “3GPP 51.001 Specifications of the SIM-ME interface R4 (v4.2.0 or later)” per Petitioner/Defendant’s construction proposed in related litigation.¹ EX1009, ¶[0026].

291. Phillips implements certain elements of its SIM in accordance with 3GPP (EX1018, EX1019); *see e.g.*, the EONS procedure and the other functionalities of its SIM. EX1009, ¶¶[0024], [0026].

¹ A POSITA in reading Phillips would have recognized that the citation to “3GPP 51.001 Specifications” was intended to be a reference to the 3GPP 51.011 specification which includes EX1018 and EX1019 discussed herein. EX1020, ¶¶77-81.

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292. 3GPP also teaches storing elements associated with user authentication/identification on a SIM. EX1018, §§7.1, 7.2, 9.2.16; EX1019 §§7.1, 7.2, and 9.2.16. It would have been obvious in view of Phillips to implement user authentication/identification on a SIM in accordance with 3GPP.

293. A POSITA would have been motivated to implement at least a portion of Charas's policy enforcement engine (i.e., adaptive service policy control agent) on Phillips's SIM to leverage the SIM's portability and built-in authentication functionality.

294. A SIM card provides a user with secure access to their subscribed services from multiple wireless devices. *See* EX1009, ¶[0023] ("An advantage of using SIM 140 is that end users are not necessarily bound by any single physical wireless device: and a SIM card "personalizes a wireless device terminal."). *See also* Phillips whose SIM discloses additional identical functionality to that performed by Charas's policy enforcement engine and the adaptive service policy control agent of the '055 Patent. *See* EX1001, 50:38-41 ("the policy control agent ... performs an access network selection algorithm to determine which access network to connect to ***based on connection options ... network preference ... and/or any other criteria***"); EX1004, ¶[0052] "[t]he ***access selection function*** is responsible for requesting access and presenting credentials to the ***desired access network*** depending on the

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service requested”); EX1009, ¶[0024] (“A typical SIM 140 stores ... a preferred network list,”); *id.*, ¶[0026] (Phillips’s SIM includes files for “Enhanced Operator Named String (EONS) ... for automatic network selection”).

295. Implementing at least part of Charas’s policy enforcement engine on a removable SIM would have been a straightforward application of known techniques (implementing policy enforcement logic on a SIM smart card capable of storing files and hosting applications as Charas contemplates) to yield the predictable result of portable, secure, subscriber-specific policy enforcement across devices.

296. Storing service profiles and their subscriber-specific policies and network preferences on a portable SIM was within the skill and knowledge of a POSITA. *See* EX1017, ¶[0072] (“To facilitate operation of mobile device 610 in a multi-technology environment in accordance with aspects described herein, as indicated *supra*, memory 675 can retain subscriber-specific network selection profile(s) 679 and display profile(s) 677. In an aspect, ... memory 675 is at least in part a subscriber-specific removable computer-readable storage medium such as for example a SIM, which can be relocated between mobile devices in order to port display and network selection preferences.”).

297. The combination of Charas, Olvera-Hernandez, and Phillips would have been obvious as Phillips’s SIM relied upon for claim 11 would not have

disrupted the Charas/Olvera-Hernandez combination. *See* Claim 1, §XIII.A.1., *supra*. *See* §XIII.A.1.a., *supra*.

E. Claim 13 is Obvious over Charas alone or in Combination with Olvera-Hernandez in view of Brown (Ground 5)

1. Claim 13: “The wireless end-user device of claim 2, configured to, when the second service plan is inactive, suspend the second device credentials, and when the second service plan is reactivated, reactivate the second device credentials”

298. Claim 13 is obvious over Charas alone or in combination with Olvera-Hernandez in view of Brown. *See* §XIII.A.2., *supra*.

299. Charas’s wireless end-user device (i.e., “terminal”) is configured to identify when a service plan is inactive (i.e., when a “subscriber does not pay the invoice for a particular service”). Charas also discloses multiple device credentials (i.e., “shared secrets”) used to authorize a subscriber (i.e., their subscription or “service plan”) to a given service. EX1004, ¶¶[0046], [0048]; *see* §XIII.A.2., *supra*. Charas does not disclose details of how a service is barred or how credentials are suspended.

300. A POSITA would have looked to the prior art for details of barring services such as Brown.

301. Brown’s “subscription parameters” (IMSI, ICCID, and other parameters needed for operation in a given network/region) “saved in a portion of

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[a] SIM memory” can be selectively “activated, deactivated and reactivated as many times as desired.” EX1010, ¶¶[0032]-[0033]; *see also id.* ¶¶[0008], [0015], [0018]. These subscription parameters constitute “device credentials” because they are (1) stored on Brown’s SIM (and are thus “activated, deactivated and reactivated” on the device itself) and (2) represent information the network uses to admit the device and associate it with a desired service (e.g., “identity of the user and/or account, and the network in which the user account is activated”). EX1010, ¶¶[0005], [0032]-[0033]; *cf.* EX1001, 19:38-39.

302. Brown therefore discloses suspending credentials associated with a given service profile (i.e., the shared secrets of an inactive subscription in Charas).

303. Brown also discloses “reactivat[ing]” credentials associated with a given service profile. EX1010, ¶[0033].

304. Just as Charas discloses deactivating an inactive subscription, Brown reactivates credentials, for example, when a SIM travels to a “market[] or region[] in which a service provider provides service” or to a “network in which the user account [i.e., subscription] is activated.” EX1010, ¶¶[0005], [0033].

305. A POSITA would have been motivated to implement Brown’s method of deactivating and reactivating subscription parameters (e.g., device credentials) with Charas’s subscription identification keys. Charas’s architecture involves

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multiple service provider relationships, each with its own credentials. EX1004, ¶[0057]. Charas expressly discloses barring service when a user fails to pay, and Brown provides an identical mechanism.

306. Suspending credentials associated with a barred service would prevent the policy enforcement engine from attempting to use inactive or unauthorized credentials, improving security. This reactivation capability also allows a user to deactivate and reactivate service plans when roaming between different markets or regions, as taught in Brown. EX1010, ¶¶[0008], [0015], [0018]-[0020].

307. The combination would have yielded the predictable result of a device that efficiently manages active and inactive service provider relationships at the credential level, allowing an SMP to deactivate unpaid plans, and allowing a user to reactivate, or switch between service plans.

308. The combination of Charas, Olvera-Hernandez, and Brown would have been obvious as Brown's credential suspension/activation functionality relied upon for claim 13 would not have disrupted the Charas/Olvera-Hernandez combination. *See* Claims 1 and 2, §§XIII.A.1., XIII.A.2., *supra*.

XIV. SECONDARY CONSIDERATIONS

309. As discussed herein, all elements of the Challenged Claims were known in the art, and any differences would have been obvious to a POSITA based on the disclosures of the applied references and the knowledge in the art.

310. I am not aware of any secondary considerations that would alter my opinion.

311. Any purported evidence of secondary considerations that Patent Owner may present in this proceeding would be insufficient to overcome the strong evidence that the Challenged Claims are obvious.

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XV. CONCLUSION

312. For the reasons set forth above, it is my opinion that all elements of the Challenged Claims of the '055 Patent are disclosed or suggested by the prior art. In my opinion, the Challenged Claims of the '055 Patent would have been obvious over the prior art.

313. In signing this Declaration, I understand that the Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

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



Date: August 26, 2026

David H. Williams