

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS,
T-MOBILE USA, INC., T-MOBILE US, INC.,
AND AT&T MOBILITY, LLC,

Petitioners,

v.

ASPEN NETWORKS, INC.
Patent Owner.

U.S. Patent No. 8,009,554

Issue Date: August 30, 2011

Title: METHOD FOR MULTIPLE LINK QUALITY OF SERVICE FOR VOICE
AND VIDEO OVER INTERNET PROTOCOL

Inter Partes Review No.: IPR2025-00008

**PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,009,554
UNDER 35 U.S.C. §§ 311-319 and 37 C.F.R. §§ 42.1-.80, 42.100-.107**

Mail Stop “PATENT BOARD”

Patent Trial and Appeal Board

U.S. Patent and Trademark Office

P.O. Box 1450

Alexandria, VA 22313-1450

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	GROUND FOR STANDING (37 C.F.R. § 42.104(A))	1
III.	STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED	1
IV.	REASONS FOR THE REQUESTED RELIEF	2
V.	OVERVIEW	3
A.	Summary of the '554 Patent.....	3
B.	Prosecution History	6
C.	Claim Construction	9
D.	Priority Date of the Challenged Claims	9
E.	Person of Ordinary Skill in the Art	10
F.	State of the Art	11
1.	Network Service Plan Provisioning Systems	11
2.	Seamless Handover of Multimedia Based Traffic.....	13
VI.	DETAILED EXPLANATION OF GROUNDS	14
A.	Ground 1: Tagg Renders Claims 1-28 Obvious.....	14
1.	Tagg.....	14
a.	Analogous Art.....	14
b.	Overview.....	15
2.	Independent Claim 1	20
a.	Claim 1.0: “A method of enhancing the reliability of a transmission from a source to a destination in a communications network using a network	

	protocol that operates on top of the Internet Protocol (IP), the method comprising:”	20
b.	Claim 1.1: “transmitting data between a source and destination over a first network path made up of one or more network links where at least one of the network links is to a local area network that is remote from the transmission source; and”	22
c.	Claim 1.2: “switching the transmission from the first network path to one of a plurality of alternative network paths;”	28
d.	Claim 1.3.1: “wherein said transmission is not disrupted as a result of said switch to the one of a plurality of alternative network paths,”	30
e.	Claim 1.3.2: “said transmission contains audio or video data and,”	31
f.	Claim 1.3.3: “at least one Network Address Translation (NAT) is performed on said transmission;”	31
g.	Claim 1.4: “said transmission uses the Real Time Protocol (RTP);”	35
h.	Claim 1.5: “said transmission uses the Session Initiation Protocol (SIP); and”	37
i.	Claim 1.6: “the SIP signaling sequence of the transmission is maintained after said switching from the first network path to the one of a plurality of alternative network paths.”	39
2.	Independent Claim 15	41
a.	Claim 15.3.3: “at least one Port Address Translation (PAT) is performed on said transmission;”	42
b.	Claim 15.5: “said transmission contains data used in the control of the audio or video transmission;”	47

3.	Independent Claims 8, 22.....	47
c.	Claim limitations 8.1-8.4/22.1-22.4: “a transmitting device”; “a receiving device”; “a first network device”; and “a second network device”	49
3.	Claims 2, 9, 16, 23: “The method[/system] of claim 1[/8/15/22] wherein the [/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of a stream quality event.”	50
4.	Claims 3, 10, 17, 24: “The method[/system] of claim 1[/8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of stream load balancing.”	52
5.	Claims 4, 11, 18, 25: “The method[/system] of claim 1[/8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of an administrator move.”	53
6.	Claims 5, 12, 19, 26: “The method[/system] of claim 1[/8/15/22] wherein a[/the] SIP server associated with the one of a plurality alternative network paths may authenticate the transmission before it is switched.”	54
7.	Claims 6, 13, 20, 27: “The method of claim 1[/13/20/27] wherein the source[/transmitting] device is a mobile device.”.	57
8.	Claims 7, 14, 21, 28: “The method[/system] of claim 6[/13/20/28] wherein one or more of said plurality of alternative network paths become available to the mobile device during roaming.”	58
B.	Ground 2: The Kottilingal-Politis Combination Renders Claims 1-28 Obvious	59
1.	Kottilingal	59
a.	Analogous Art.....	59
b.	Overview.....	60

2.	Politis	61
a.	Analogous Art.....	61
a.	Overview.....	62
3.	Motivation To Modify Kottilingal With The Teaching Of Politis	63
4.	Independent Claim 1	66
a.	Claim 1.0: A method of enhancing the reliability of a transmission from a source to a destination in a communications network using a network protocol that operates on top of the Internet Protocol (IP), the method comprising:	66
b.	Claim 1.1: transmitting data between a source and destination over a first network path made up of one or more network links where at least one of the network links is to a local area network that is remote from the transmission source; and.....	67
c.	Claim 1.2: switching the transmission from the first network path to one of a plurality of alternative network paths;.....	68
d.	Claim 1.3.1: wherein said transmission is not disrupted as a result of said switch to the one of a plurality of alternative network paths,.....	70
e.	Claim 1.3.2: said transmission contains audio or video data and	71
f.	Claim 1.3.3: at least one Network Address Translation (NAT) is performed on said transmission;	72
g.	Claim 1.4: said transmission uses the Real Time Protocol (RTP);.....	74
h.	Claim 1.5: said transmission uses the Session Initiation Protocol (SIP); and.....	75

i.	Claim 1.6: the SIP signaling sequence of the transmission is maintained after said switching from the first network path to the one of a plurality of alternative network paths.	75
5.	Independent Claim 15	77
j.	Claim 15.3.3: at least one Port Address Translation (PAT) is performed on said transmission;.....	78
k.	Claim 15.5: said transmission contains data used in the control of the audio or video transmission;	80
6.	Independent Claims 8, 22	81
a.	Claim limitations 8.1-4/22.1-4: “a transmitting device”; “a receiving device”; “a first network device”; and “a second network device”	81
7.	Claims 2, 9, 16, 23: “The method[/system] of claim 1[/8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of a stream quality event.”	82
8.	Claims 3, 10, 17, 24: “The method of claim 1[/8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of stream load balancing.	83
9.	Claims 4, 11, 18, 25: “The method[/system] of claim 1[/8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of an administrator move.”	83
10.	Claims 5, 12, 19, 26: “The method of claim 1 wherein a SIP server associated with the one of a plurality alternative network paths may authenticate the transmission before it is switched.”	85
11.	Claim 6, 13, 20, 27: “The method[/system] of claim 1[/8/15/22] wherein the source[/transmitting] device is a mobile device.”.	86

12.	Claims 7, 14, 21, 28: “The method[/system] of claim 6[/13/20/27] wherein one or more of said plurality of alternative network paths become available to the mobile device during roaming.”	87
VII.	THE BOARD SHOULD NOT EXERCISE ITS DISCRETION AND DENY INSTITUTION.....	88
A.	The Board Should Not Deny Institution Under 35 U.S.C. §325	88
B.	The Board Should Not Deny Institution Under 35 U.S.C. §314(a).....	88
VIII.	MANDATORY NOTICES UNDER 37 C.F.R. §42.8.....	91
A.	Real Party-in-Interest (37 C.F.R. § 42.8(b)(1)).....	91
B.	Related Matters (37 C.F.R. § 42.8(b)(2)).....	91
1.	Judicial Matters	91
2.	Administrative Matters:	92
C.	Lead/Back-up Counsel (37 C.F.R. § 42.8(b)(3)):	92
D.	Notice of Service Information (37 C.F.R. § 42.8(b)(4)):	94
IX.	CONCLUSION	94

TABLE OF AUTHORITIES

CASES

<i>KSR Int'l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007).....	58, 64
<i>Paice LLC v. Ford Motor Co.</i> , 881 F.3d 894 (Fed. Cir. 2018).....	28
<i>PEAG LLC v. Varta Microbattery GMBH</i> , IPR2020-01214, Paper 8 at 17 (Jan. 6, 2021).....	70
<i>Sand Revolution II LLC v. Continental Intermodal Group-Trucking LLC</i> , IPR2019-01393, Paper 24 at 12-13 (PTAB June 16, 2020)	71
<i>Sotera Wireless, Inc. v. Masimo Corp.</i> , IPR2020-01019, Paper 12 (Dec. 1, 2020)	70

PETITIONERS' EXHIBIT LIST

<i>Exhibit #</i>	<i>Description</i>
1001	U.S. Patent No. 8,009,554 (the “’554 Patent”)
1002	Prosecution history of the ’554 Patent (“’554File History”)
1003	Declaration of Petitioners’ Expert, Dr. Daniel van der Weide (“VDW Declaration” or “VDW Decl.”)
1004	<i>Curriculum Vitae</i> of Daniel van der Weide, Ph.D.
1005	U.S. Pat. App. Pub. No. 2005/0286466 (“Tagg”)
1006	U.S. Pat. No. 8,467,377 (“Kottilingal”)
1007	Christos Politis, et al. <i>Multilayer Mobility Management for All-IP Networks: Pure SIP vs. Hybrid SIP/Mobile IP</i> (“Politis”)
1008	Rafidah Noor & Christopher Edwards, <i>A Dynamic QoS Provisioning Model for Network Mobility</i> (“Noor”)
1009	George Lampropoulos, et al., <i>Handover Management Architectures in Integrated WLAN/Cellular Networks</i> by (“Lampropoulos”)
1010	Renata Maria Porto Vanni, et al., <i>DOHand: An ontology to support building services to exploit handover information in mobile heterogenous networks</i> (“Vanni”)
1011	Stefano Salsano, et al., <i>Seamless vertical handover of VoIP calls based on SIP Session Border Controllers</i> (“Salsano”)
1012	Ranjeeth Kumar, <i>MSIP: A Protocol for Efficient Handoffs of Real-time Multimedia Sessions in Mobile Wireless Scenarios</i> (“Kumar”)
1013	U.S. Pat. App. Pub. No. 2004/0076180 (“Satapati”)
1014	RFC2543 Session Initial Protocol
1015	Declaration of June Munford
1016	Complaint, <i>Aspen Networks, Inc. v. AT&T, Inc. et al.</i> , Case No. 2:23-cv-00476 (E.D. Tex. Oct. 10, 2023)
1017	Consolidated Order, Lead Case 2:23-cv-00476 (E.D. Tex. Mar. 8, 2024)
1018	Docket Control Order, Case No. 2:23-cv-00476 (E.D. Tex. Apr. 19, 2024)

LISTING OF CHALLENGED CLAIMS

Reference	Claim Limitations
Claim 1	
1.0	A method of enhancing the reliability of a transmission from a source to a destination in a communications network using a network protocol that operates on top of the Internet Protocol (IP), the method comprising:
1.1	transmitting data between a source and destination over a first network path made up of one or more network links where at least one of the network links is to a local area network that is remote from the transmission source; and
1.2	switching the transmission from the first network path to one of a plurality of alternative network paths;
1.3.1	wherein said transmission is not disrupted as a result of said switch to the one of a plurality of alternative network paths,
1.3.2	said transmission contains audio or video data, and
1.3.3	at least one Network Address Translation (NAT) is performed on said transmission;
1.4	said transmission uses the Real Time Protocol (RTP);
1.5	said transmission uses the Session Initiation Protocol (SIP); and
1.6	the SIP signaling sequence of the transmission is maintained after said switching from the first network path to the one of a plurality of alternative network paths.
Claim 2	
2	The method of claim 1 wherein the switch from the first network path to the one of a plurality of alternative network paths occurs as a result of a stream quality event.
Claim 3	
3	The method of claim 1 wherein the switch from the first network path to the one of a plurality of alternative network paths occurs as a result of stream load balancing.
Claim 4	
4	The method of claim 1 wherein the switch from the first network path to the one of a plurality of alternative network paths occurs as a result of an administrator move.

Claim 5	
5	The method of claim 1 wherein a SIP server associated with the one of a plurality alternative network paths may authenticate the transmission before it is switched.
Claim 6	
6	The method of claim 1 wherein the source device is a mobile device.
Claim 7	
7	The method of claim 6 wherein one or more of said plurality of alternative network paths become available to the mobile device during roaming.
Claim 8	
8	A communications network comprising:
8.1	a transmitting device;
8.2	a receiving device;
8.3	a first network device;
8.4	a second network device;
8.5	the transmitting device and receiving device operable to maintain a data transmission over a first network path that is made up of one or more network links where at least one of the network links is to a local area network is remote from the transmitting device;
8.6	wherein the first network device is operable to switch the transmission from the first network path to one of a plurality of alternative network paths without disrupting the transmission; the second network device is operable to perform a Network Address Translation (NAT) on said transmission;
8.7	said transmission contains audio or video content;
8.8	said transmission is made using the Real Time Protocol (RTP);
8.9	said transmission uses the Session Initiation Protocol (SIP); and
8.10	said transmission's SIP signaling sequence is maintained after said switching from the first network path to the one of a plurality of alternative network paths.
Claim 9	
9	The system of claim 8 wherein said switching from the first network path to the one of a plurality of alternative network paths occurs as a result of a stream quality event.

Claim 10	
10	The system of claim 8 wherein said switching from the first network path to the one of a plurality of alternative network paths occurs as a result of stream load balancing.
Claim 11	
11	The system of claim 8 wherein said switching from the first network path to the one of a plurality of alternative network paths occurs as a result of an administrator move.
Claim 12	
12	The system of claim 8 wherein the SIP server associated with the one of a plurality alternative network paths may authenticate the transmission before it is switched.
Claim 13	
13	The system of claim 8 wherein the transmitting device is a mobile device.
Claim 14	
14	The system of claim 13 wherein one or more of said plurality of alternative network paths become available to the mobile device during roaming.
Claim 15	
15	A method of enhancing the reliability of a transmission from a source to a destination in a communications network using a network protocol that operates on top of the Internet Protocol (IP), the method comprising:
15.1	transmitting data between a source and destination over a first network path made up of one or more network links where at least one of the network links is to a local area network that is remote from the transmission source;
15.2	switching the transmission from the first network path to one of a plurality of alternative network paths;
15.3.1	wherein said transmission is not disrupted as a result of said switch to the one of a plurality of alternative network paths,
15.3.2	said transmission contains audio or video data, and
15.3.3	at least one Port Address Translation (PAT) is performed on said transmission;
15.4	said transmission contains audio or video content;

15.5	said transmission contains data used in the control of the audio or video transmission;
15.6	said transmission uses the Real Time Protocol (RTP);
15.7	said transmission further uses the Session Initiation Protocol (SIP); and
15.8	the SIP signaling sequence of the transmission is maintained after said switching from the first network path to the one of a plurality of alternative network paths.
Claim 16	
16	The method of claim 15 wherein the switch from the first network path to the one of a plurality of alternative network paths occurs as a result of a stream quality event.
Claim 17	
17	The method of claim 15 wherein the switch from the first network path to the one of a plurality of alternative network paths occurs as a result of stream load balancing.
Claim 18	
18	The method of claim 15 wherein the switch from the first network path to the one of a plurality of alternative network paths occurs as a result of an administrator move.
Claim 19	
19	The method of claim 15 wherein a SIP server associated with the one of a plurality alternative network paths may authenticate the transmission before it is switched.
Claim 20	
20	The method of claim 15 wherein the source device is a mobile device.
Claim 21	
21	The method of claim 20 wherein one or more of said plurality of alternative network paths become available to the mobile device during roaming.
Claim 22	
22.0	A communications network comprising
22.1	a transmitting device;
22.2	a receiving device;
22.3	a first network device;
22.4	a second network device;

22.5	the transmitting device and receiving device operable to maintain a data transmission over a first network path that is made up of one or more network links where at least one of the network links is to a local area network is remote from the transmitting device;
22.6.1	wherein the first network device is operable to switch the transmission from the first network path to one of a plurality of alternative network paths without disrupting the transmission; and
22.6.2	said the second network device is operable to perform a Port Address Translation (PAT) on said transmission;
22.7	said transmission contains audio or video content
22.8	said transmission is made using the Real Time Protocol (RTP)
22.9	said transmission further uses the Session Initiation Protocol (SIP); and
22.10	said transmission's SIP signaling sequence is maintained after said switching from the first network path to the one of a plurality of alternative network paths.
Claim 23	
23	The system of claim 22 wherein said switching from the first network path to the one of a plurality of alternative network paths occurs as a result of a stream quality event.
Claim 24	
24	The system of claim 22 wherein said switching from the first network path to the one of a plurality of alternative network paths occurs as a result of stream load balancing.
Claim 25	
25	The system of claim 22 wherein said switching from the first network path to the one of a plurality of alternative network paths occurs as a result of an administrator move.
Claim 26	
26	The system of claim 22 wherein a SIP server associated with the one of a plurality alternative network paths may authenticate the transmission before it is switched.
Claim 27	
27	The system of claim 22 wherein the transmitting device is a mobile device.

Claim 28	
28	The system of claim 27 wherein one or more of said plurality of alternative network paths become available to the mobile device during roaming.

I. INTRODUCTION

Pursuant to 35 U.S.C. §§311 *et seq.* and 37 C.F.R. §§42.1 *et seq.*, Cellco Partnership d/b/a Verizon Wireless, T-Mobile USA, Inc., T-Mobile US, Inc., and AT&T Mobility, LLC, (collectively, “Petitioners”) hereby petitions for an *inter partes* review (“IPR”) of U.S. Patent No. 8,009,554 (the “’554 patent”; EX-1001). Petitioners respectfully submit that Claims 1-28 (the “Challenged Claims”) of the ’554 patent are unpatentable under 35 U.S.C. §103 in view of the prior art herein. This Petition demonstrates that there is a reasonable likelihood that Petitioners will prevail with respect to at least one of these claims. Accordingly, Petitioners respectfully request that the Board institute IPR.

II. GROUNDS FOR STANDING (37 C.F.R. § 42.104(A))

Petitioners certify that the Patent for which review is sought is available for *inter partes* review and that Petitioners are not barred or estopped from requesting *inter partes* review of the Challenged Claims on the grounds identified herein. 37 C.F.R. §42.104(a). This Petition is filed pursuant to 37 C.F.R. §42.106(a).

III. STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED

Petitioners respectfully request review and cancellation under 35 U.S.C. §311 of the Challenged Claims in view of:

Prior Art ¹
Tagg (EX1005), filed May 12, 2005; issued December 29, 2005; qualifies prior art under 35 U.S.C. §§102(a), (b), (e)(2)
Kottilingal (EX1006), filed August 24, 2005; issued June 18, 2013; published March 22, 2007; qualifies as prior art under 35 U.S.C. §102(e)(2)
Politis (EX1007), published April 22, 2003; qualifies as prior art under 35 U.S.C. §§102(a), (b)

Ground (35 U.S.C. §103)	Claims	References
1	1-28	Tagg
2	1-28	Kottilingal, Politis

IV. REASONS FOR THE REQUESTED RELIEF

As explained in the Grounds of this Petition and in the attached Declaration of Petitioners' Expert, Dr. Daniel van der Weide ("VDW Decl."; EX-1003), the systems and methods of non-disruptive VoIP network switches, as described and claimed in the '554 patent, were obvious over the prior art to a person of ordinary skill in the art ("POSITA") at the time of the invention. '554 *patent*, Title, 3:39-4:18 ("Summary of the Invention"); *VDW Decl.*, ¶¶48-49.

¹ The cited statutory law precedes the enactments of the America Invents Act ("Pre-AIA").

V. OVERVIEW

A. Summary of the '554 Patent

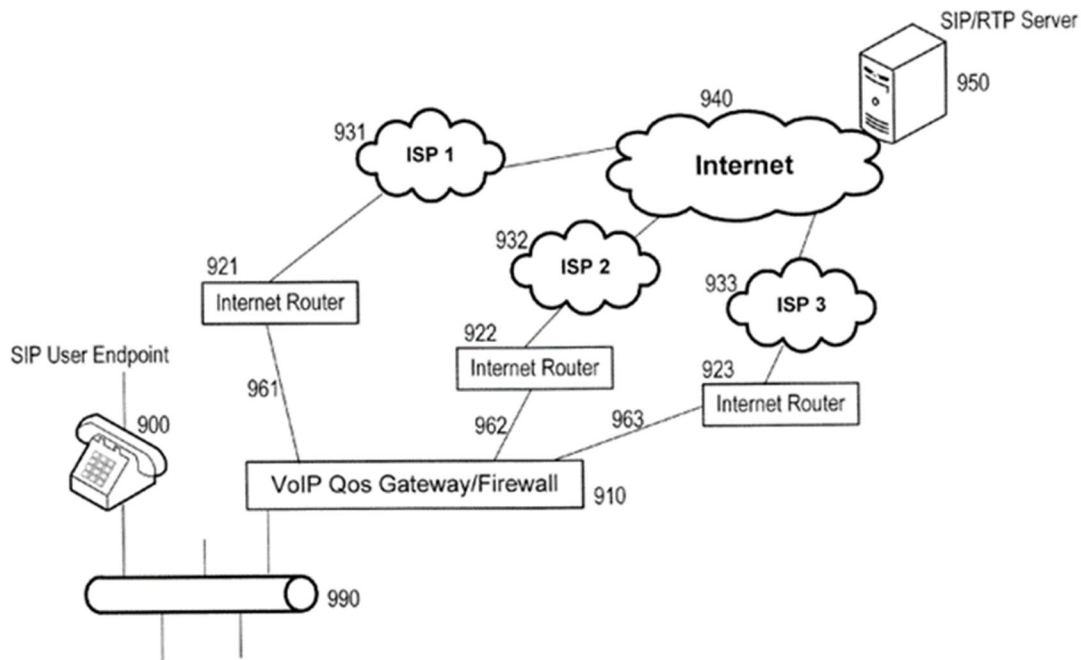
The '554 patent relates to the field of computer and telecommunications networks, where software or other digital logic are used in the control and transmission of video or audio payloads over networks using the Internet Protocol (IP). '554 *patent*, 1:9-13. The '554 patent explains that internet routing protocols are “susceptible to numerous short-lived instabilities that adversely affect audio and video streams transported over the Internet.” *Id.*, 1:43-51. Furthermore, the '554 patent identifies that there is no technology in the prior art “whereby with multiple links or paths available in a mobile or non-mobile domain, where these alternate paths are combined intelligently to provide the best quality of service for VoIP or Video over IP.” *Id.*, 2:7-10. For example, the '554 patent discloses that where multiple communication links exist and an inactive link has significantly higher quality than the active one, it may be desirable to move the voice or video payload from a currently active link to a better quality link. *Id.*, 2:25-37. The '554 patent states that the prior art lacks “the ability to move the call ‘at will’ and with full confidence that the call will not break.” *Id.*; *VDW Decl.*, ¶¶24-25.

To address the problems in the prior art, the '554 patent discloses a “method for achieving multiple link quality of service for video and voice calls over Internet links, or over IP links running in private networks.” '554 *patent*, 3:39-4:8.

Specifically, the '554 patent describes that the invention allows for “voice and video calls [to] be moved at will from one path to another, as many times as required during a single conversation, without breaking the RTP voice or video payload stream.” *Id.*; *VDW Decl.*, ¶26.

As shown in Figure 9 below, the '554 patent discloses a “multi-link QoS gateway 910” that has “3 logical network interfaces 961, 962 and 963” and “3 routers on the user local area network 990 [that] connect the user to the public Internet 940—these routers are 921, 922 and 923.” ’554 *patent*, 5:46-61. “Network interfaces 961, 962 and 963 correspond to globally routable public IP addresses belonging to the 3 access Internet Service Providers shown in FIG. 9 as 931, 932 and 933 respectively.” *Id.*

Fig 9 A QoS Gateway Embodiment of Invention



Id., Fig. 9; *VDW Decl.*, ¶27.

The '554 patent describes in the embodiment of Figure 9 that “a SIP user endpoint 990 is shown communicating with a SIP/RTP server 950.” ’554 patent, 5:62-67. In this embodiment, there are “3 alternate paths for quality of service in the non-mobile-domain are shown: Path 1: 900, 910, 961, 921, 931, 940, 950[;] Path 2: 900, 910, 962, 922, 932, 940, 950 [; and,] Path 3: 900, 910, 963, 923, 933, 940, 950.” *Id.*, 6:37-42. Further in this embodiment (a non-mobile domain example), the QoS gateway is capable of using various undisclosed algorithms “for detecting failures and degrades, as well as relative improvements in quality between links over time.” *Id.*, 6:42-67. Also in the non-mobile domain embodiment, the QoS gateway is

“capable of deciding, while a SIP/RTP session is in progress, that a stream needs to be moved for load balancing reasons.” *Id.*, 7:1-6. *VDW Decl.*, ¶¶28-29.

Alternatively, in a different embodiment (a mobile domain example), “a cell phone with SIP/RTP over IP stack roams from one base station to another, where each base station also implies a different IP default router for the cell phone, as in FIG. 6.” ’554 *Patent*, 4:12-15. In this embodiment, dropped calls are prevented during hand off in all IP type networks as long as “(a) the cell phone uses VoIP protocols SIP and RTP over IP, and (b) the cell phone always communicates with the same SIP server—that it originally registered with, for the entire duration of one call (630 in FIG. 6) as it moved from the first base station (605 in FIG. 6) to a second base station (606 in FIG. 6).” *Id.*, 7:56-8:3; *VDW Decl.*, ¶30.

Each of the embodiments disclosed above “can be implemented as either computer software or other digital logic (ASIC or FPGA).” ’554 *patent*, 3:45-47. *VDW Decl.*, ¶31.

B. Prosecution History

During prosecution, the Examiner rejected claims 1-3, 5-7, 9-14, 16-18 and 20-21 as being anticipated by White (US 2006/0193295) and claims 4 and 15 as being obvious by White in view of Yi (US 2003/0156559). ’554 *File History*, 101-02. The Office also rejected Claims 8 and 19 as obvious over White in view of Nam (US 2008/0130574). *Id.*, 103.

In response to the anticipation rejection, Applicant amended claim 1 and 11 as follows:

Independent claim 1 has been amended to include the limitation “wherein at least one Network Address Translation (NAT) is performed on said transmission.” Independent claim 11 has been similarly amended to include the limitations of a “second network device,” “wherein said transmission traverses the second network device and said second network device is capable of performing a Network Address Translation on said transmission[.]”

Id., 114.

Applicant argued that the invention is “capable of switching a transmission between a source and destination without disruption to the transmission, wherein said transmission undergoes a NAT translation.” *Id.* Applicant further argued that claims 2, 3, 5-7 and 9-10 depend from claim 1 and claims 12-13, 16-18 and 20-21 depend from claim 11, and were therefore allowable over White for the same reason. *Id.* Applicant also argued that claims 4, 8, 15 and 19 also depend from claims 1 and 11 respectively. *Id.*, 115. Applicant also added claims 22-50. *Id.*, 115-16.

In the next Office Action, the Examiner rejected three claim groups, including a rejection of claims 1-3, 11-14, 22-26, 34-38 and 46-50 as being obvious by White in view of Citron (US 2007/0253413), finding that Citron discloses a “router for

performing NAT and PAT...transmission” that POSITAs would have implemented in White’s network switching system “to provide a data format as desired as is known in the art.” *Id.*, 137-38. Additionally, the Examiner rejected claims 4-7, 9-10, 15-18, 20-21, 27-30, 32-33, 39-42 and 44-45 obvious over White in view of Citron and Yi because Yi discloses “maintaining sequencing after a switchover.” *Id.*, 138. Finally, the Examiner rejected claims 8, 19, 31, and 43 over White, Citron, Yi and Nam because Nam discloses authentication in a SIP server that would have been obvious to implement in White’s network switchover system to “authenticate a device before switchover” and therefore “maintain security in the network as is known in the art.” *Id.*, 139.

In response, Applicant cancelled claims 1-3, 11-14, 22-26, 34-38 and 46-50. *Id.*, 148. For claims 4, 15, 27, 39, Applicant argued that the Sequence Number (SN) in Yi is “relates to RTP packets that are transmitted” and the SN value that is incremented during RTP transmission is different than SIP, so that “[n]o disclosure is made of maintaining the claimed ‘SIP signaling sequencing’” is disclosed in Yi. *Id.*, 148-49. Applicant argued that the remaining claims depend on independent claims 4, 15, 27 and 39 and are therefore allowable. *Id.*, 149-50.

Without comment, the Office allowed claims 4-10, 15-31, 27-33, 39-45 and the application issued as the ’554 patent with claims renumbered as 1-28. *Id.*, 165 (Notice of Allowability), 221 (Issue Notification).

C. Claim Construction

For purposes of this Petition solely, Petitioners propose that each claim term in the Challenged Claims be given its plain and ordinary meaning in this proceeding, and that no specific construction of any claim term is required because the prior art relied on in this Petition meets each of the claim terms under any reasonable construction. *VDW Decl.*, ¶¶32-33.

It is noted that this interpretation is only applicable to the *inter partes* review sought herein and should not be construed as constituting, in whole or in part, the Petitioners' own interpretation of any claims for any other purposes, including any litigation. Accordingly, Petitioner expressly reserves the right to present an interpretation of a claim term in other proceedings, which is different, in whole or in part, from that presented in this Petition.

D. Priority Date of the Challenged Claims

The '554 patent issued from U.S. Application No. 12/137,258 filed on June 11, 2008, and claims priority to U.S. Provisional Patent Application No. 61/036,377 filed on March 13, 2008. '554 *patent*, Cover. *VDW Decl.*, ¶34.

The prior art cited below predates the earliest possible priority date, March 13, 2008, and thus the Board need not address priority for purposes of this Petition.²

E. Person of Ordinary Skill in the Art

With respect to the '554 Patent, POSITAs in the March 2008 timeframe would have been familiar with designing rules for implementing policies for service plans for use of an access network and provisioning those rules to network elements for policy enforcement, as demonstrated by the prior art references and description in the State of the Art below. *VDW Decl.*, ¶37.

A POSITA would have gained knowledge of these concepts through a mixture of training and work experience, such as by having a Bachelor's degree in electrical engineering or computer science and two years of experience; or by obtaining a Master's degree in electrical engineering or computer science, but having only one year of experience; or by having no formal education but experience in network service plan provisioning systems of at least four years. *Id.*

Dr. van der Weiden was at least a POSITA in the field of technology of the '554 patent, is familiar with U.S. patent law, and is therefore qualified to opine on

² Petitioners reserve the right to raise and contest the priority of the '554 patent in other proceedings.

what POSITAs would have known and understood as of March 2008 to form the basis of his analysis and opinions. *Id.*, ¶¶1-23, 35-38.

F. State of the Art

The following section describes the state of the art for network service plan provisioning systems as of March 2008. The prior art references, and the discussions of what was known to POSITAs, provide a general description of the state of the art and additional motivation to modify or combine the reference(s). Accordingly, these references should be considered by the Board. *Id.*, ¶39.

1. Network Service Plan Provisioning Systems

Provisioning network service plans to account for dynamic Quality of Service (QoS) was well known to POSITAs prior to March 2008. Contrary to the assertions of the '554 patent specification related to the prior art, determining the “best” link at any given time to provide the link or path that provides the best quality for voice or video was well known in the prior art. For example, Noor (EX-1008) discloses a “dynamic QoS provision model for network mobility.” *Noor*, p.1.³ According to Noor, traffic patterns can be analyzed to provide dynamic QoS provisioning to maintain connectivity when a mobile unit changes its point of attachment. *Id.*,

³ Petitioners cite to internal, original document page numbers where available; otherwise, Petitioners cite to the whole-document pagination sequence.

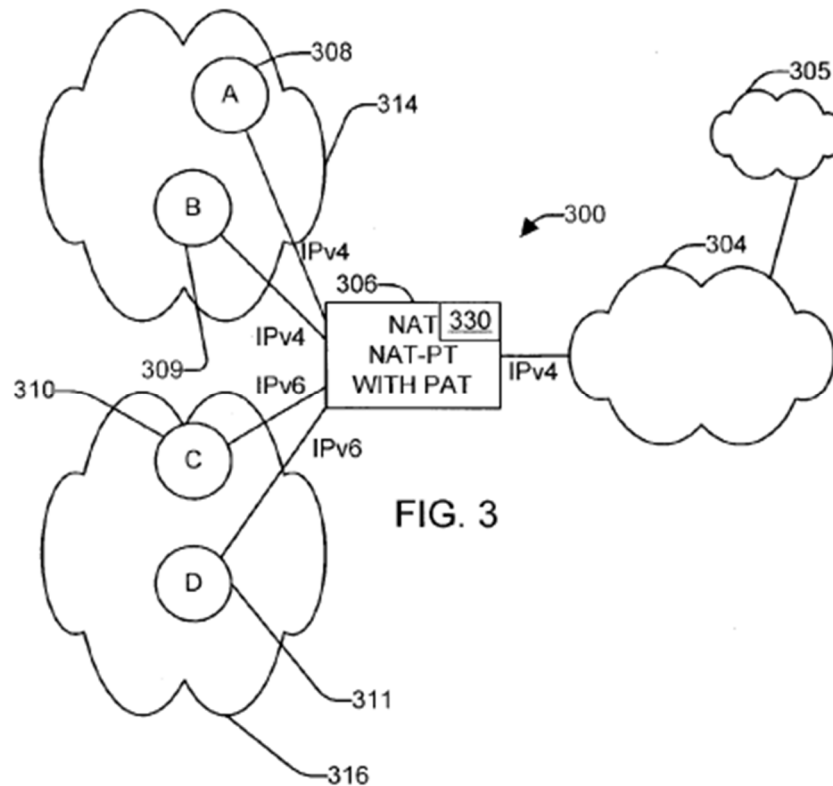
Abstract, pp.1, 4-6. In Noor, packets are prioritized and classified according to service subscriptions and traffic type, and QoS for mobile handovers are determined based on the QoS requirement, traffic volume, packet classification, and packet marking. *Id.*; *VDW Decl.*, ¶¶40-41.

Lampropoulos (EX-1009) identifies solutions related to network service plan provisioning that address authentication, security, QoS support and mobility management. *Lampropoulos*, Abstract. More specifically, Lampropoulos describes mobility management systems related to handover management that provide seamless provisioning of multimedia applications across networks of different technologies, e.g., 802.11-based WLAN networks and GPRS/UMTS cellular networks. *Id.*, Abstract, p.2; *VDW Decl.*, ¶42.

Vanni (EX-1010) discloses solutions in provisioning network services for seamless handovers that takes into account policies on QoS, privacy, security, and pricing, across a variety of different wireless technologies. *Vanni*, Abstract, p.1; *VDW Decl.*, ¶43.

Also, Satapati (EX-1013), addresses prior art IPv4 systems that “have more devices than available Internet IPv4 addresses allocated” and allows a network to multiplex a single IP address across, e.g., 65,536 devices, thereby allowing many more private network devices to connect to a public network. *Satapati*, [0002]-[0004], [0019]. Satapati expressly discloses using network address translation

(NAT) and port address translation (PAT) 330 to connect a local network 314, 316 to the internet 304:



Satapati, Fig. 3, [0026], [0032]; *VDW Decl.*, ¶44.

2. Seamless Handover of Multimedia Based Traffic

Solutions addressing the seamless handover of multimedia communications were well known in the prior art before the earliest priority date of the '554 patent. Salsano (EX-1011) identifies that the proliferation of high data rate wireless networks enables the provisioning of real time multimedia services to mobile devices over IP. *Salsano*, Abstract. Moreover, “the different nature of the adopted radio technologies (802.11/WiFi, Bluetooth, 2.5G/3G networks) has introduced the

problems of supporting seamless communication across these heterogeneous wireless accesses.” *Id.* Salsano proposes solutions to the Session Initiation Protocol (SIP) for mobility management that provides seamless voice services during handovers. *Id.* Moreover, Salsano describes seamless handovers using the SIP protocol and sequencing while addressing the need to support Network Address Translation (NAT) element traversal. *Id.*, pp.1-3. Salsano specifically addresses the importance of maintaining SIP sequencing to increase handover performance. *Id.*, p.5; *VDW Decl.*, ¶¶45-46.

Similarly, Kumar (EX-1012) addresses deficiencies in Mobile IP and SIP to prevent real-time application delays and improved handoff latency for real-time (i.e., multimedia) applications. *Kumar*, p.16. Consistent with the solution identified in the ’554 patent, Kumar discloses utilizing the SIP ReInvite messages with the same Call-ID to reduce latency during a handoff of a mobile node and maintain sequencing to prevent delays in communication. *Kumar*, pp.17-30; *VDW Decl.*, ¶47.

VI. DETAILED EXPLANATION OF GROUNDS

A. Ground 1: Tagg Renders Claims 1-28 Obvious

1. Tagg

a. Analogous Art

Tagg (EX-1005) is analogous art to the ’554 patent. *VDW Decl.*, ¶¶51-52.

Tagg is directed toward “a system that provides VoIP over wireless LAN and WAN,” and is therefore directed toward the same field of endeavor as the ’554 patent. *Compare Tagg*, [0002], [0079], *with ’554 patent*, 1:9-18. Because Tagg seeks to switch between networks seamlessly to avoid call interruptions and voice quality degradation, it is also reasonably pertinent to the problem faced by the ’554 patent inventors. *Compare Tagg*, [0036]-[0037], [0068], [0343], *with ’554 patent*, 2:5-24. *VDW Decl.*, ¶¶51-52.

b. Overview

Tagg was filed as U.S. Patent Application No. 11/129,184 on May 12, 2005, and was published on December 29, 2005. *Tagg*, Cover; *VDW Decl.*, ¶50.

Tagg discloses a system where “one or more servers within the system provid[e] a range of telecommunications functions including call handling and termination.” *Tagg*, [0324]. Users can place voice calls over networks using VoIP protocols to transport voice or data information over a network link. *Id.*, [0081], [0084]-[0085]. The “two main types of wireless network” are WWAN and WLAN—wide area and local area networks, respectively. *Id.*, [0034]. Tagg’s Figure 15 depicts mobile phone 1512 connecting to server 1500 (shaded purple) through wireless networks WLAN 1509 and WWAN 1519 (also shaded purple). *Id.*, [0324]. These connections allow a user to transmit a call from mobile phone 1512 to another phone 1520 (both shaded green).

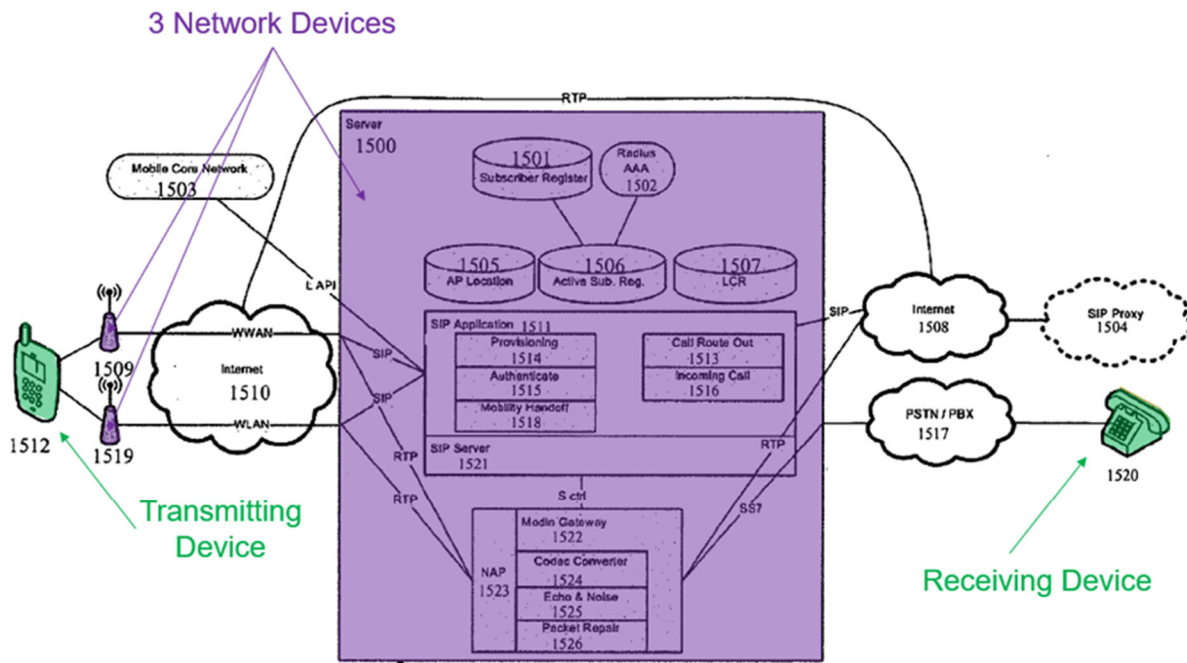


Figure 15

Id., Fig. 15 (annotated); *VDW Decl.*, ¶¶53-55.

Tagg implements a mobile phone voice-over IP (VoIP) protocol that achieves seamless and reliable handoffs between the networks. *Tagg*, Title, Abstract, [0002], [0036]-[0037], [0095]. Tagg relies on protocols such as Session Initiation Protocol (SIP) and Real-time Transport Protocol (RTP) that are “optimized for wireless transport” and “are encoded at a high level within the protocol stack and transmitted down the protocol stack using IP within the phone.” *Id.*, [0100]. For example, the RTP protocol (shaded purple) is stacked upon the IP protocol (shaded red) as shown below:

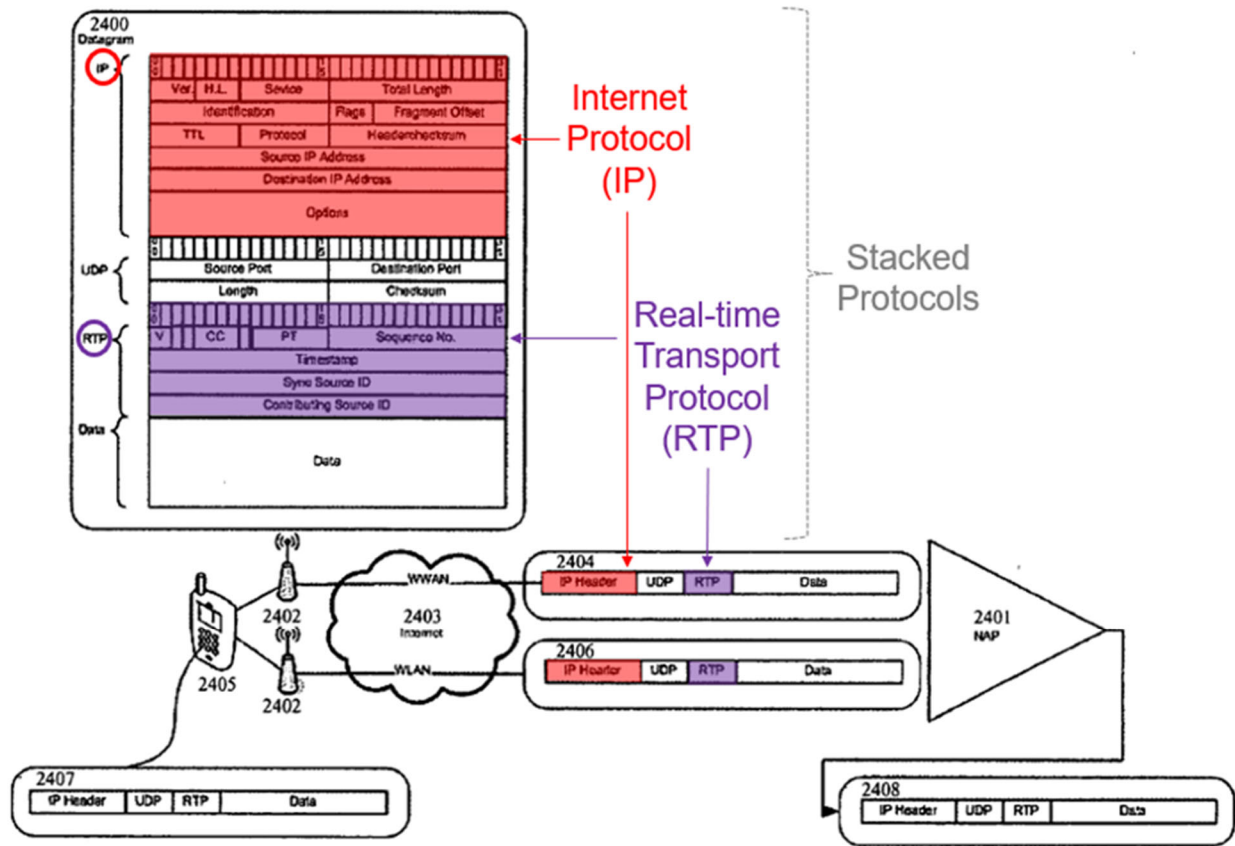


Figure 24

Id., Fig. 24 (annotated); *VDW Decl.*, ¶¶56-58.

Tagg's system executes seamless handoffs by copying a stream to both a WLAN and WWAN socket connection and switching packet transmission between WLAN (shaded yellow) and WWAN (shaded blue). *Tagg*, [0288], [0290].

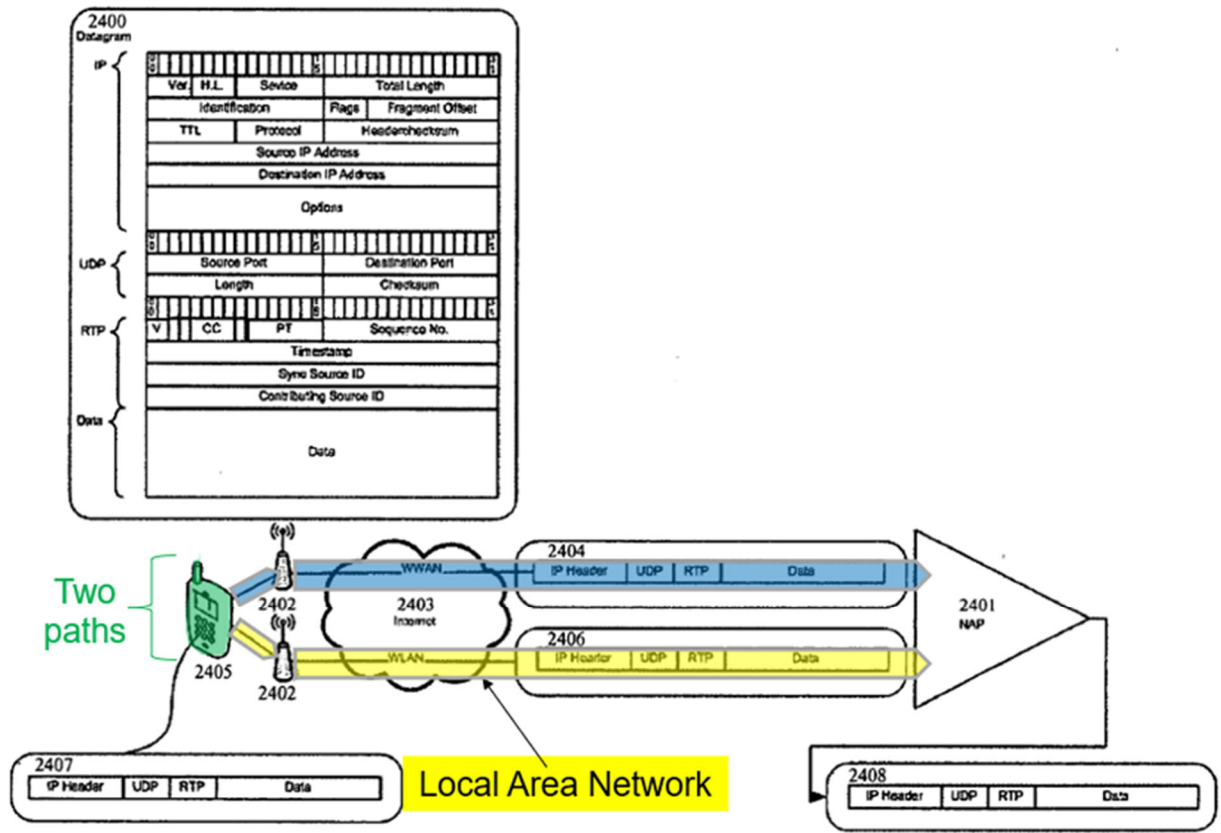


Figure 24

Id., Fig. 24 (annotated) [0095], [0285]. *VDW Decl.*, ¶59.

Tagg's Table 6 expressly discloses an embodiment ("Case 1") of a handoff where a call is switched from WLAN to WWAN and another embodiment ("Case 6") where the call is switched from WWAN to WLAN:

TABLE 6

<u>Handoff Cases</u>				
Case	Handoff from	Handoff to	Arrow	Typical use case
Case 1	Voice call on WLAN (IP Circuit)	Voice call on WWAN (IP Circuit)	1460	Walk away from Wi-Fi AP where 3G is available, picks up UMTS data connection.
Case 2	Voice call on WWAN-Audio Circuit	Voice call on WLAN (IP Circuit)	1459	Walk into Wi-Fi coverage area call is diverted to Wi-Fi and GSM call drops.
Case 3	Voice call on WLAN (IP Circuit)	Voice call on WWAN-Audio Circuit	1458	Walk away from Wi-Fi AP, (no 3G) reverts back to GSM call via conference feature.
Case 4	Voice call on WWAN-Audio Circuit	Voice call on WWAN (IP Circuit)	1454	Voice call on GSM switches to voice call on UMTS-VoIP
Case 5	Voice call on WWAN (IP Circuit)	Voice call on WWAN-Audio Circuit	1457	Voice call on UMTS-VoIP switches to voice call on GSM
Case 6	Voice call on WWAN (IP Circuit)	Voice call on WLAN (IP Circuit)	1464	WLAN becomes available again and call is switched back to use it.

Tagg, Table 6 (annotated), [0285]-[0296]. *VDW Decl.*, ¶60.

Thanks to a “[m]ake-before-break” technique that sends a VoIP packet stream over the two network paths, “[t]here is no break in the call,” and seamless handoff is achieved. *Tagg*, [0280], [0285]. Specifically, a duplicate audio path is created so that the calling handset may switch from one route to the other “when hand-off is looking likely.” *Id.*, [0296]. Indeed, *Tagg* notes that switching a handset between WLAN and WWAN is “straightforward” and “units can flip back and forth freely between...cases [1 and 6]” which allows the “user [to] appear[] to the rest of the world as if they are not moving between networks.” *Id.*, [0320]; *VDW Decl.*, ¶¶61-62.

2. Independent Claim 1

- a. **Claim 1.0: “A method of enhancing the reliability of a transmission from a source⁴ to a destination in a communications network using a network protocol that operates on top of the Internet Protocol (IP), the method comprising:”**

If limiting, Tagg discloses or suggests⁵ 1.0. *VDW Decl.*, ¶63. Tagg discloses a “method and system for connecting to a network.” *Tagg*, [0079]. Tagg’s system and steps implement a packet-based, mobile phone voice-over IP (VoIP) protocol that achieves seamless handoffs between networks by sending packets via “differing routing paths providing for a high degree of redundancy and therefore reliability.” *Id.*, Title, Abstract, [0002], [0036]-[0037], [0095]. In particular, Tagg improves mobile VoIP applications that transmit and stream speech and data, such as music,

⁴ Petitioners reserve the right to challenge this claim’s compliance with the requirements of 35 U.S.C. §112 in other forums and proceedings. Limitation 1.0 introduces “a source” and “a destination,” and limitation 1.1 also introduces “a source and destination.” For purposes of this Petition, Petitioners treat “source” and “destination” in 1.0 and 1.1 as the same rather than different sources and destinations in each limitation.

⁵ As used herein, “discloses” or “teaches” includes that the reference’s disclosure renders the discussed concept (element, claim) obvious to POSITAs.

video, pictures, and games. *Id.*, [0089]-[0092]. Tagg's protocols include Session Initiation Protocol (SIP) and Real-time Transport Protocol (RTP) that are "optimized for wireless transport" and "are encoded at a high level within the protocol stack and transmitted down the protocol stack using IP within the phone." *Id.*, [0100]. The protocols are stacked upon the IP protocols as shown below:

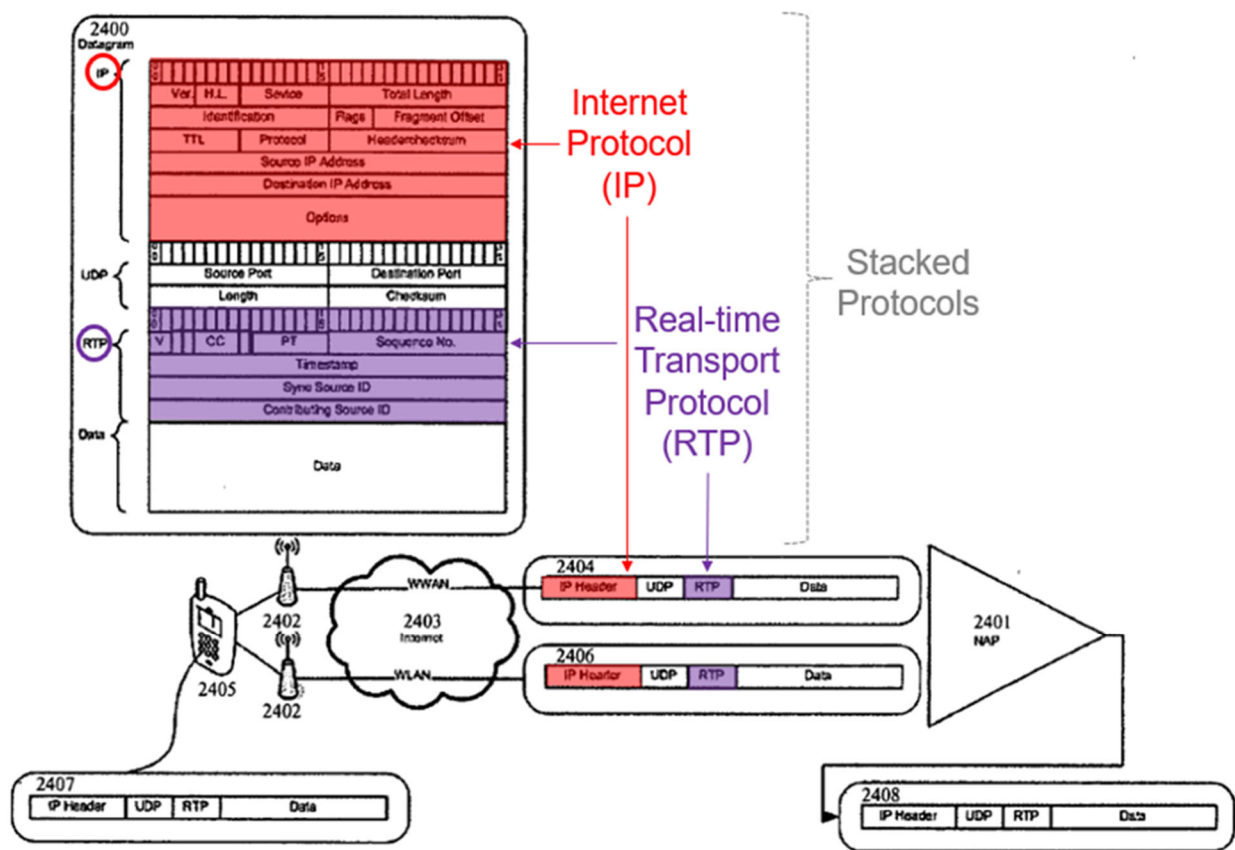


Figure 24

Id., Fig. 24 (annotated), [0161] ("FIG. 24 illustrates the Network Address Processing required to process IP v4 RTP datagrams for the mobile roaming, handoff and handover in accordance with one embodiment of the invention"). Advantageously,

this IP architecture stacks protocols in a way that allows “handoff...without interfacing with the low level stack components of a phone.” *Id.*, [0100]; *VDW Decl.*, ¶¶64-68.

Accordingly, Tagg discloses or suggests a method of using a stacked IP architecture that routes packets among multiple paths during handoffs to increase system reliability (“[a] method of enhancing the reliability of a transmission from a source to a destination in a communications network using a network protocol that operates on top of the Internet Protocol (IP)”). *VDW Decl.*, ¶69.

b. Claim 1.1⁶: “transmitting data between a source and destination over a first network path made up of one or more network links where at least one of the network links is to a local area network that is remote from the transmission source; and”

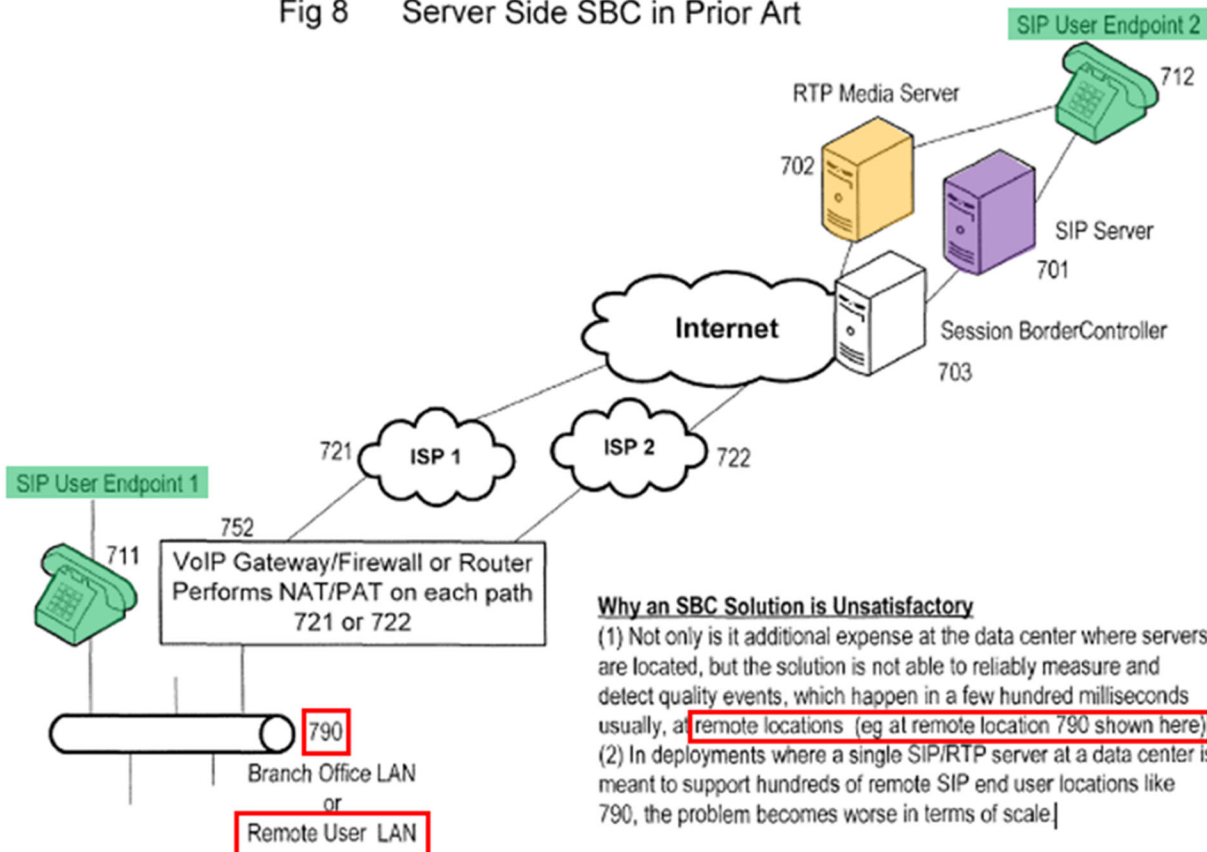
Tagg discloses or suggests 1.1. *VDW Decl.*, ¶70. As discussed in 1.0 above, Tagg discloses an IP architecture suitable for mobile roaming handoffs. *Tagg*, [0100], Fig. 24; *see also* 1.0, above. Users of Tagg’s system place voice calls over networks using VoIP protocols to transport voice or data information over a network link. *Id.*, [0081], [0084]-[0085]. The “two main types of wireless network” are WWAN and WLAN—wide area and local area networks, respectively. *Id.*, [0034]. Tagg’s mobile handoffs require network address processing and SIP or RTP

⁶ *See supra* note 4.

packet routing. *Id.*, [0100], [0402]. Each RTP packet “contains source and destination information for both IP address and port-together known as a socket,” which the “phone sends...to one or more sockets during handoff” as the packets “travel over WWAN...or WLAN...infrastructure.” *Id.*, [0402]; *VDW Decl.*, ¶¶71-73.

POSITAs would have recognized that Tagg’s disclosure in this regard is similar to the ’554 patent’s disclosure. *VDW Decl.*, ¶74. The ’554 patent discloses a remote network in the context of prior art as a “remote user LAN” exemplified by “remote location 790” at Endpoint 1 (below):

Fig 8 Server Side SBC in Prior Art



'554 patent, Fig. 8 (annotated), 3:5-20. POSITAs would have recognized Tagg likewise teaches a remote location as, e.g., a roaming mobile phone subscriber at an endpoint (below):

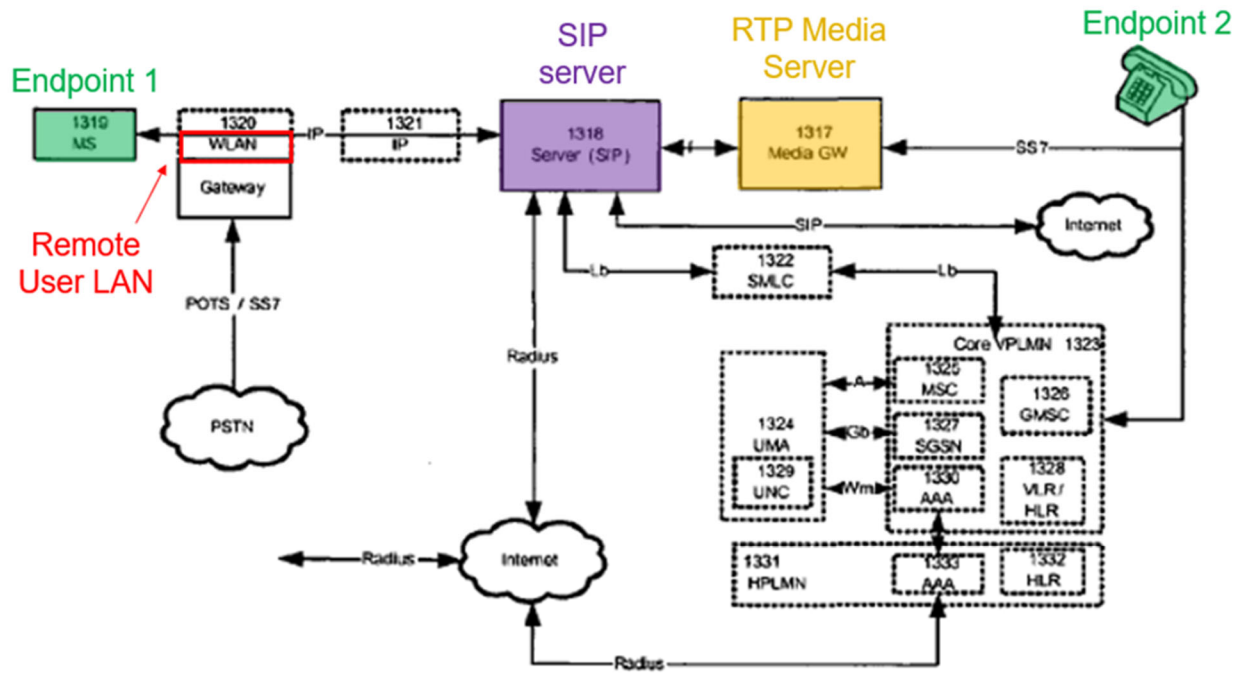


Figure 13b (proposed invention).

Tagg, Fig. 13b (annotated), [0270], [0274]-[0275]; *VDW Decl.*, ¶¶74-76.

Tagg's system executes seamless handoffs by copying an IP stream to both a WLAN and WWAN socket connection and switching packet transmission from the WLAN to the WWAN. *Tagg*, [0288], [0290]. Tagg's "different routing paths" include the following:

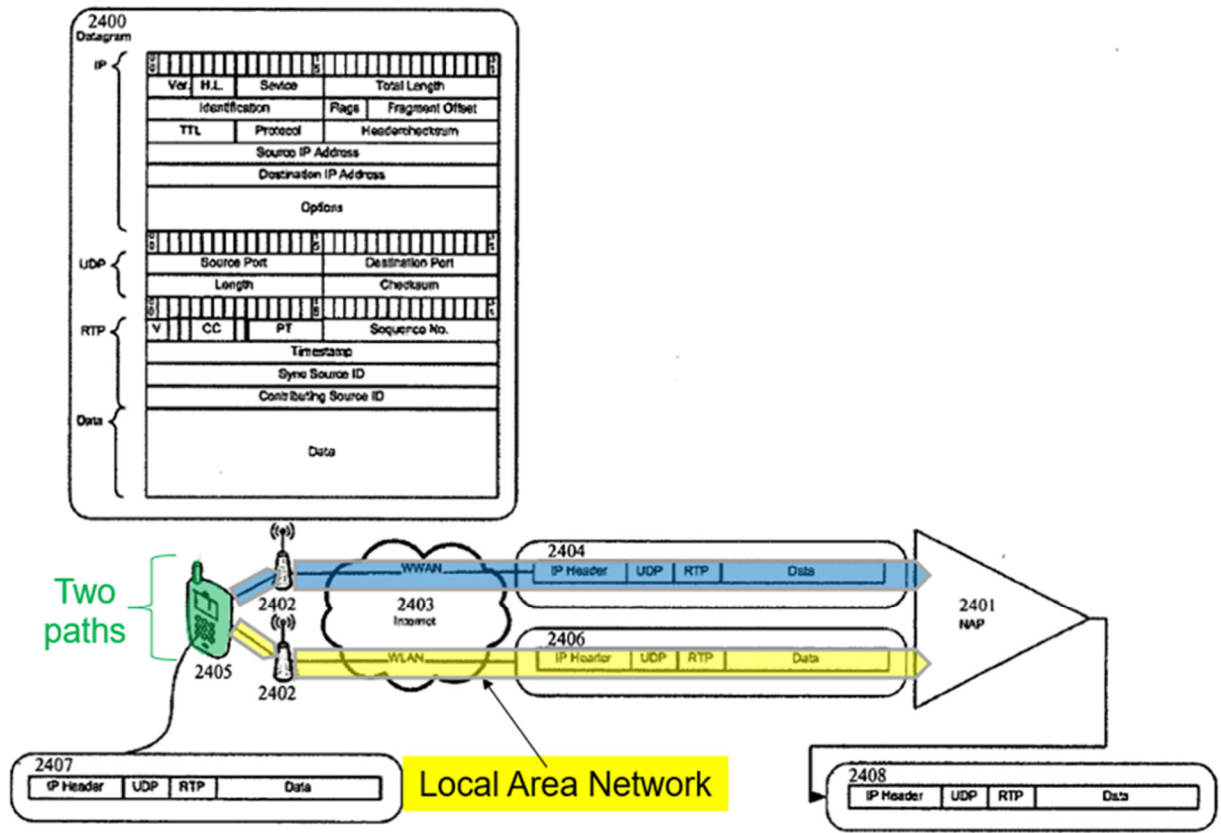


Figure 24

Id., Fig. 24 (annotated) [0095], [0285]. Tagg’s Table 6 expressly discloses an embodiment (“Case 1”) of a handoff where a mobile user switches from WLAN to WWAN, below:

TABLE 6				
Handoff Cases				
Case	Handoff from	Handoff to	Arrow	Typical use case
Case 1	Voice call on WLAN (IP Circuit)	Voice call on WWAN (IP Circuit)	1460	Walk away from Wi-Fi AP where 3G is available, picks up UMTS data connection.

Id., [0285]-[0296]. The flow in Figure 12 further explains this process:

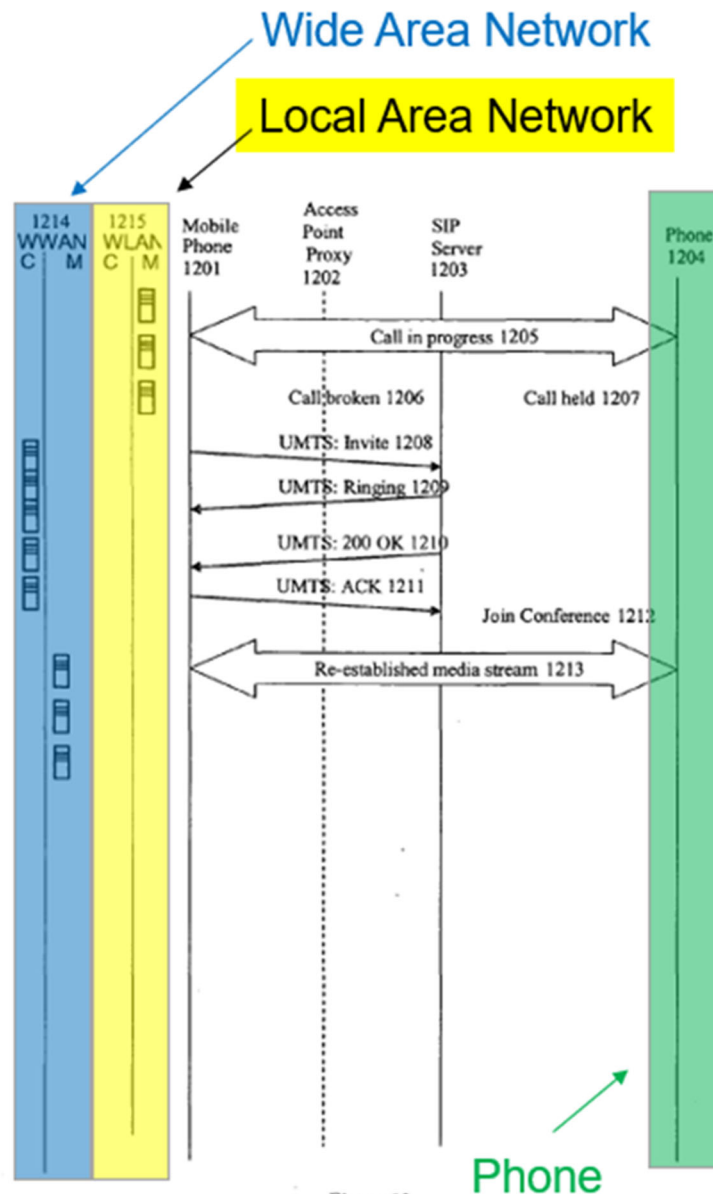


Figure 12

Id., Fig. 12 (annotated), [0292] (“Fig. 12 is a call flow diagram showing one embodiment for handing off a call that was initiated as a WLAN call and will be switched to a WWAN-audio protocol call”). *VDW Decl.*, ¶¶77-79.

Accordingly, Tagg discloses or suggests voice over internet calls placed between two phones over a local WLAN network path and separate WWAN network path (“transmitting data between a source and destination over a first network path made up of one or more network links where at least one of the network links is to a local area network that is remote from the transmission source”). *VDW Decl.*, ¶80.

c. Claim 1.2: “switching the transmission from the first network path to one of a plurality of alternative⁷ network paths;”

Tagg discloses or suggests 1.2. *VDW Decl.*, ¶81. Tagg’s system hands off calls between WWAN and WLAN networks. *Tagg*, [0277]. In the same embodiment as described in 1.1 above (“Case 1”), the handoff occurs using “[s]eamless handoff...achieved by...rapidly switching the IP stream from the WLAN socket to

⁷ Petitioners treat “alternative” as including “alternative network paths of the same network type as the first network path.” *See, e.g., ’554 patent*, 5:39-6:67, Fig. 9, 7:56-8:3. Tagg discloses multiple manners of switching, including switching between network paths where the network paths are of a different type (e.g., WWAN to WLAN) and where the network paths are of the same type (e.g., WLAN to WLAN). *See, e.g., Tagg*, [0037], [0285], [0321]. For the purposes of the below discussion, Petitioners note that Tagg discloses handoffs and handovers follow the same mechanisms. *See, e.g., id.*, [0402], Fig. 24.

the WWAN socket connection.” *Tagg*, [0290]; *see also* 1.1. This occurs when a user on a WLAN call moves out of local network range to transmit packets on WWAN. *Id.*, [0288]. *Tagg*’s system also creates a duplicate audio path via another IP route “when hand-off is looking likely, then...switches over to the new audio-path and disconnects the old one.” *Id.*, [0296]; *VDW Decl.*, ¶¶82-84.

Similarly, the inverse is true in another embodiment—“Case 6” of Table 6, below:

TABLE 6				
<u>Handoff Cases</u>				
Case	Handoff from	Handoff to	Arrow	Typical use case
Case 6	Voice call on WWAN (IP Circuit)	Voice call on WLAN (IP Circuit)	1464	WLAN becomes available again and call is switched back to use it.

Tagg, [0285] (excerpted and combined). *Tagg* notes that switching a handset between WLAN-P and WWAN-IP is “straightforward” and “units can flip back and forth freely between...cases [1 and 6]” because “authentication remains valid and the call path in the higher level stack needs no change,” and further because the server processing element ensures the “user appears to the rest of the world as if they are not moving between networks.” *Id.*, [0320]; *VDW Decl.*, ¶¶85-86.

Accordingly, Tagg discloses or suggests switching a VoIP call between WLAN and WWAN networks (“switching the transmission from the first network path to one of a plurality of alternative network paths”). *VDW Decl.*, ¶87.

d. Claim 1.3.1: “wherein said transmission is not disrupted as a result of said switch to the one of a plurality of alternative network paths,”

Tagg discloses or suggests 1.3.1. *VDW Decl.*, ¶88. As discussed in 1.2 above, Tagg routes packets along local and wide area networks (WLAN and WWAN). *Tagg.*, [0277]; *see also* 1.2.

Tagg’s system switches VoIP packet routing—i.e., voice over internet calls—using seamless handoff. *Tagg*, [0277]-[0281]; *VDW Decl.*, ¶¶89-90. In seamless handoff, “[t]here is no break in the call[.]” *Tagg*, [0280]. Tagg’s system avoids call breaks using a “[m]ake-before-break” technique that sends a VoIP packet stream over two paths during the handoff. *Id.*, [0285]. Specifically, Tagg “cop[ies] the IP stream to two sockets and once end-to-end connectivity is proven[,] stop[s] the stream to the stream to the WLAN socket[.]” *Id.*, [0290]. A duplicate audio path is thus created to and from a proxy via another IP route so that the calling handset may switch from one route to the other “when hand-off is looking likely” without reestablishing, e.g., a conference call because the proxy uses the same IP address as the client and therefore appears to be the same for a server’s processing. *Id.*, [0296]; *VDW Decl.*, ¶¶91-92.

Accordingly, Tagg discloses or suggests a seamless handoff using a make-before-break technique (“wherein said transmission is not disrupted as a result of said switch to the one of a plurality of alternative network paths”). *VDW Decl.*, ¶93.

e. Claim 1.3.2: “said transmission contains audio or video data and,”

Tagg discloses or suggests 1.3.2. *VDW Decl.*, ¶94. As discussed in 1.0 above, Tagg’s system provides a “complete telephony solution that allows a person to use one phone handset for all...telecommunications needs” in “home, office and mobile environments” by converting speech and data (including music, video, pictures, and games) into packets for VoIP protocol transmission—i.e., streaming—over a plurality of routing paths in a network. *Tagg*, [0089]-[0095]; *see also* 1.0. *VDW Decl.*, ¶95.

Accordingly, Tagg discloses streaming packets of media and sound data (“said transmission contains audio or video data and transmission contains audio or video data”). *VDW Decl.*, ¶96.

f. Claim 1.3.3: “at least one Network Address Translation (NAT) is performed on said transmission;”

Tagg discloses or suggests 1.3.3. *VDW Decl.*, ¶97. Tagg’s system requires network address translation in multiple instances. Within a home or office local

network, Tagg's system includes wall outlet-powered SIP and VoIP compatible repeaters that translate between both Wi-Fi and Bluetooth protocols (below):

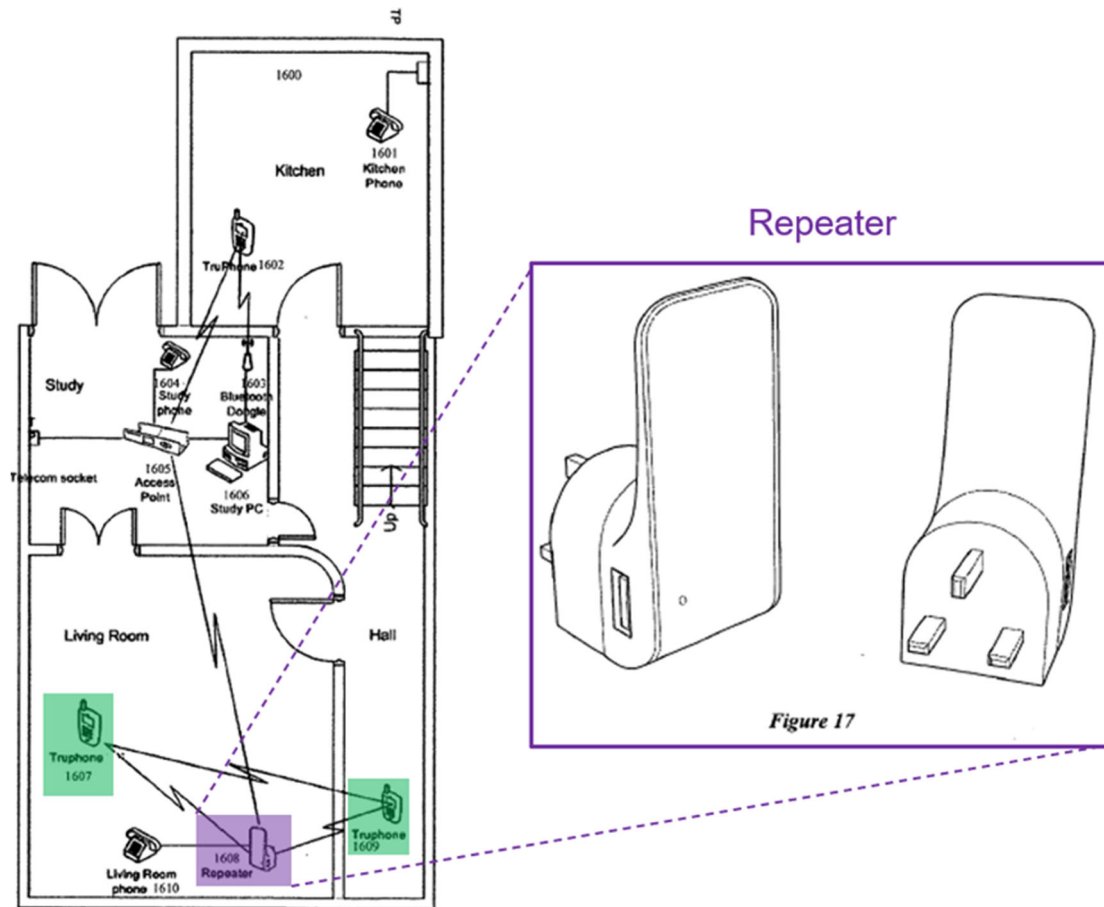


Figure 16

Tagg, Figs. 16-17 (combined and annotated), [0104]. The alternating current-powered repeaters use Network Address Translation (NAT) to keep incoming channels and unblocked ports open to communication with a server. *Id.*, [0108]. Holistically, the repeaters help users navigate “tough conditions” including phone power constraints and link obstacles by creating an increasing number of diversity

back channels using multiple protocols to provide home-powered “range and capacity improvement.” *Id.*, [0104]-[0105]; *VDW Decl.*, ¶¶98-100.

Because Tagg’s outgoing call packets are structured as RTP or SIP datagrams, they require Network Address Processing (“NAP”) to route them between a source phone and destination phone, each identified by respective IP addresses and ports (collectively, a “socket”) during mobile handoff (below):

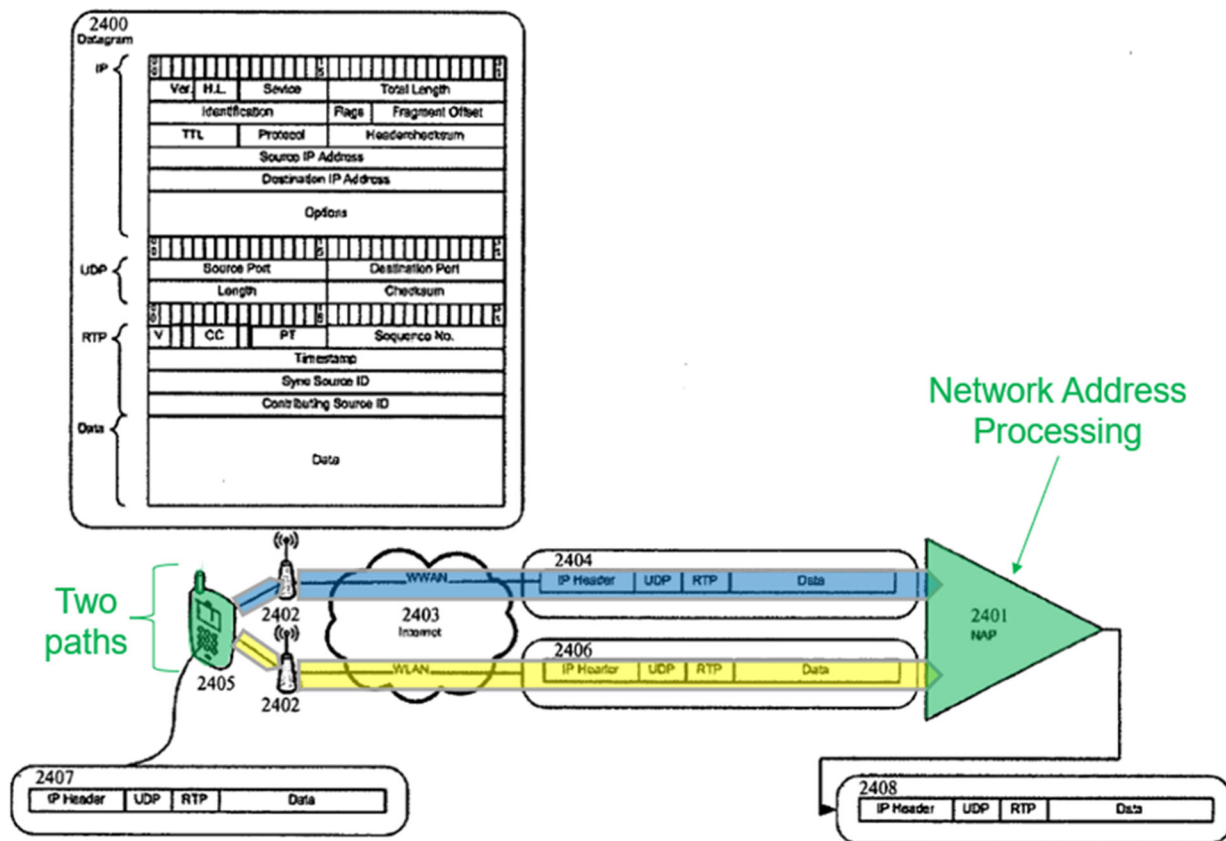


Figure 24

Tagg, Fig. 24 (annotated), [0402]. Specifically, calling phone 2405 is known by two IP addresses transmitting packets over two different paths during handover, which

the Network Address Processor resolves (e.g., de-duplication or duplicate removal until one stream is disconnected) for either SIP- or RTP-structured packet routing. *Id.*, [0288], [0296], [0343] (“the packets must be de-duplicated in conjunction with the NAP function”); *VDW Decl.*, ¶¶101-02. The NAP element and its function are executed in a media gateway that further repairs packets and uses “network address translation to ‘fix-up’ the addresses of all incoming packets so that they appear not to change IP addresses as the user moves between different networks” (below):

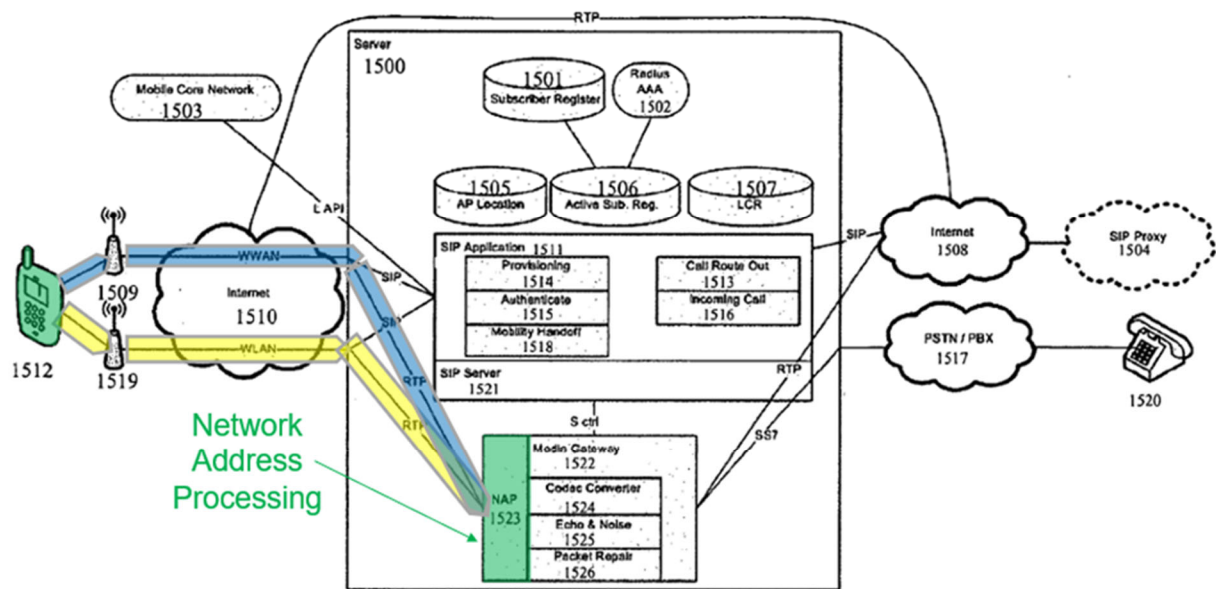


Figure 15

Tagg, Fig. 15 (annotated), [0340]; *VDW Decl.*, ¶103.

Accordingly, Tagg discloses or suggests executing network address translation at both repeaters and a media gateway (“at least one Network Address Translation (NAT) is performed on said transmission”). *VDW Decl.*, ¶104.

g. Claim 1.4: “said transmission uses the Real Time Protocol (RTP);”

Tagg discloses or suggests 1.4. *VDW Decl.*, ¶105. Tagg discloses that “[t]he protocols used in the invention can be Session Initiation Protocol (SIP) and **Real-time Transport Protocol (RTP)** optimized for wireless transport.” *Tagg*, [0100].⁸

Tagg's system uses RTP transmissions between two endpoints (below):

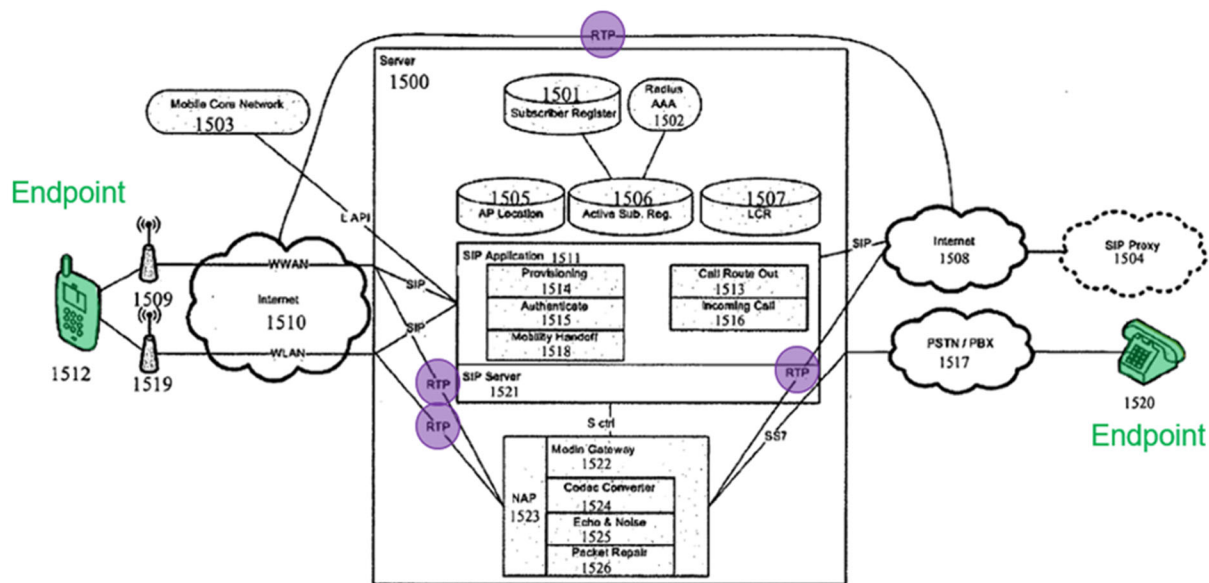


Figure 15

Id., Fig. 15 (annotated), [0154]. Tagg’s system places calls between endpoints using SIP negotiation (green) and RTP (de)packetization (purple) procedures implemented in either an access point (AP) or mobile handset:

⁸ All emphasis added unless otherwise noted.

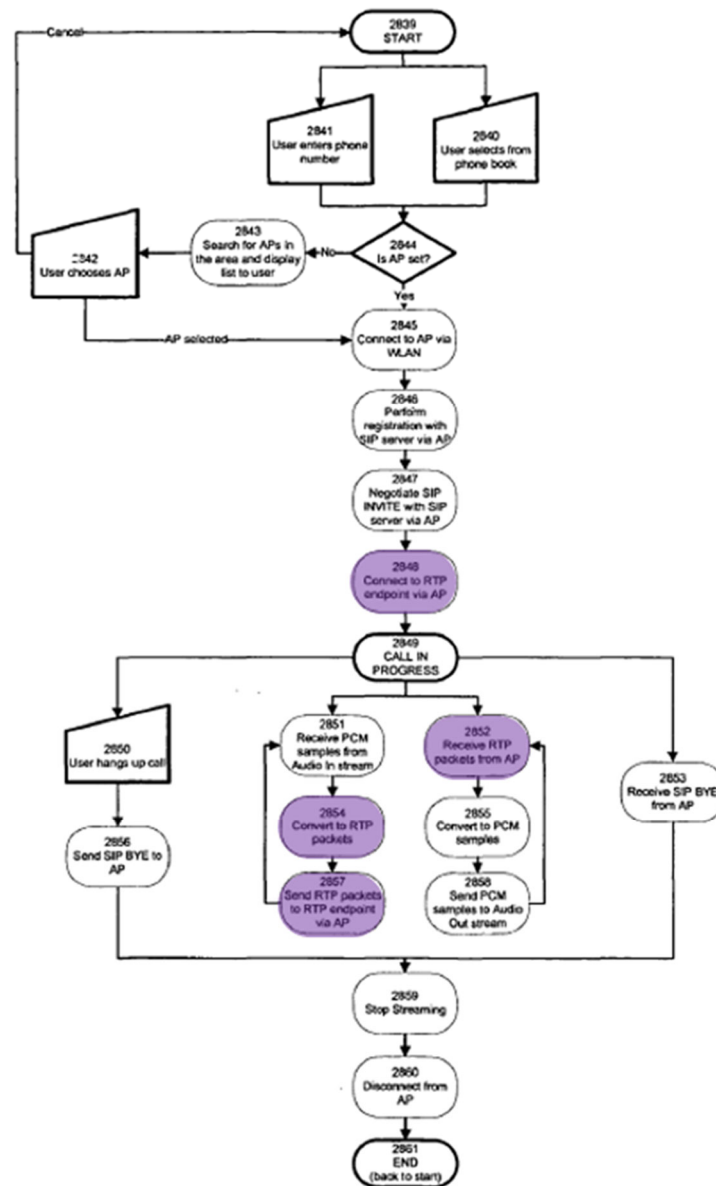


Figure 28c

Id., Fig. 28c (annotated), [0413]-[0416], *see also* Figs. 28a-b, d. Specifically, Tagg's handset initiates a SIP connection that transmits RTP encoded audio streams to an AP over WWAN or WLAN networks as VoIP packets for transmission to an AP. *Id.*, [0247], [0402]; *VDW Decl.*, ¶¶106-09.

Accordingly, Tagg discloses or suggests transmitting RTP encoded audio streams over networks (“said transmission uses the Real Time Protocol (RTP)”).

VDW Decl., ¶110.

h. Claim 1.5: “said transmission uses the Session Initiation Protocol (SIP); and”

Tagg discloses or suggests 1.5. *VDW Decl.*, ¶111. As discussed in 1.4, Tagg discloses that “[t]he protocols used in the invention can be **Session Initiation Protocol (SIP)** and Real-time Transport Protocol (RTP) optimized for wireless transport.” *Tagg*, [0100]; *see also* 1.4. Tagg’s system uses SIP transmissions (red) when placing calls between two endpoints (below):

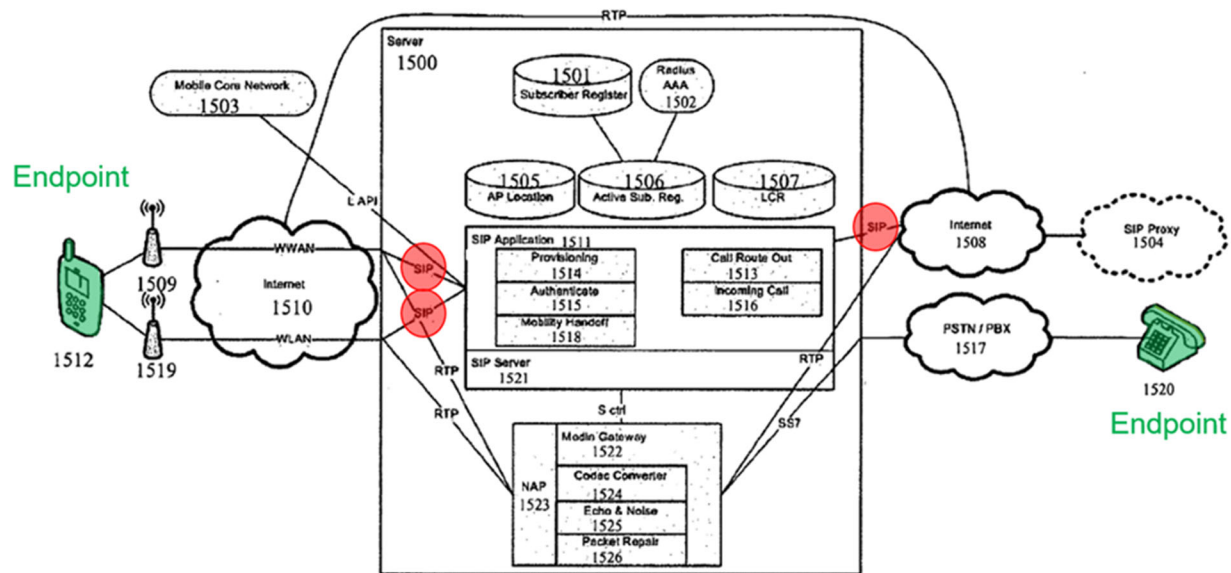


Figure 15

Id., Fig. 15 (annotated), [0154]. Tagg’s system places calls between endpoints using

SIP negotiation (green) procedures implemented in either an access point (AP) or mobile handset:

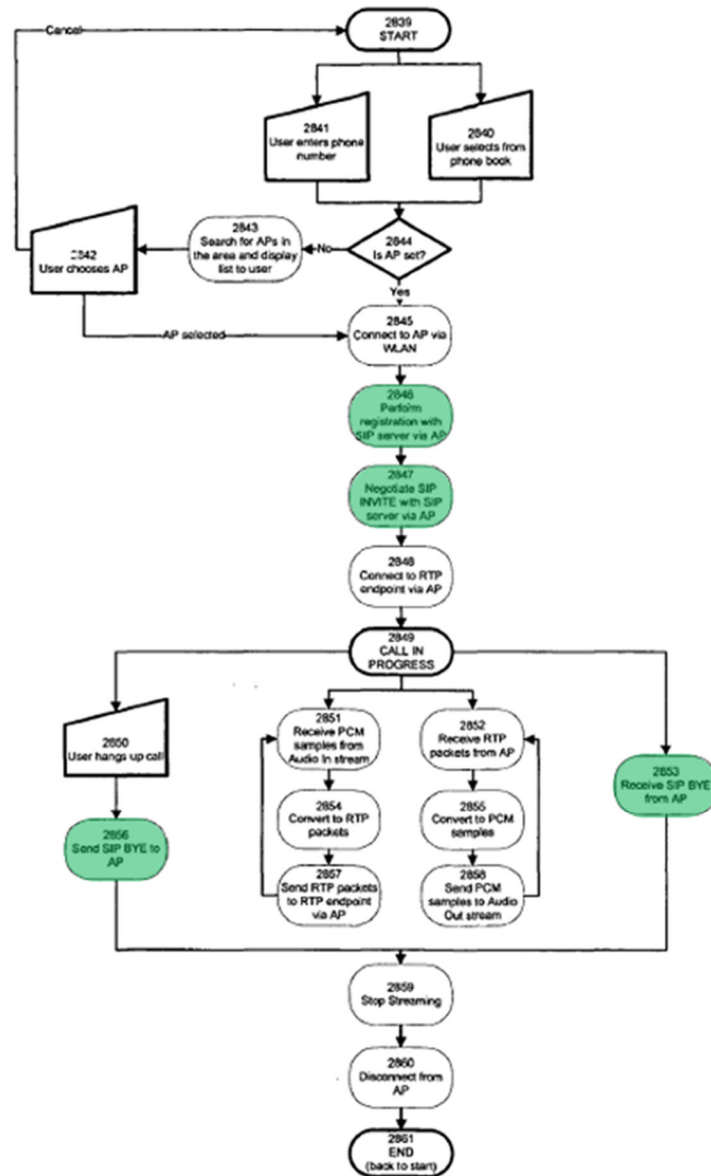


Figure 28c

Id., Fig. 28c (annotated), [0413]-[0416], *see also* Figs. 28a-b, d. Specifically, Tagg's handset initiates a SIP connection that transmits RTP encoded audio streams to an

AP over WWAN or WLAN networks as VoIP packets for transmission to an AP.
Id., [0247], [0402]; *VDW Decl.*, ¶¶112-15.

Accordingly, Tagg discloses or suggests SIP wireless transmissions (“said transmission uses the Session Initiation Protocol (SIP)”). *VDW Decl.*, ¶116.

i. Claim 1.6: “the SIP signaling sequence⁹ of the transmission is maintained after said switching from the first network path to the one of a plurality of alternative network paths.”

Tagg discloses or suggests 1.6. *VDW Decl.*, ¶117. The ’554 patent discloses that a SIP signaling sequence number must be maintained between a SIP device and server unless information is re-transmitted. ’554 *patent*, 5:12-14, 5:25-30 (Table disclosing “SIP signaling”). Tagg discloses placing a call to a SIP proxy or server over WWAN or WLAN by a handset that may further include a “SIP stack...for signaling.” *Tagg*, [0246]-[0247], [0324]. When a call is made at a mobile handset, an AP converts the phone number into a SIP INVITE command to negotiate with the SIP server or SIP proxy “to get an endpoint....for sending and receiving VoIP RTP packets.” *Id.*, [0414], [0416]. Once Tagg’s system identifies an RTP endpoint,

⁹ 1.6 introduces “the SIP signaling sequence” without antecedent basis. Petitioners reserve the right to challenge the claim’s compliance with the requirements of 35 U.S.C. §112 in other forums and proceedings.

“a connection is established...and the call can proceed” until either a caller hangs up or a SIP BYE command is issued. *Id.*, [0414]. As seen in the call handling diagram below, the same SIP signaling sequence is preserved to and through a SIP server or SIP proxy regardless of switching from a WWAN to WLAN network or vice versa:

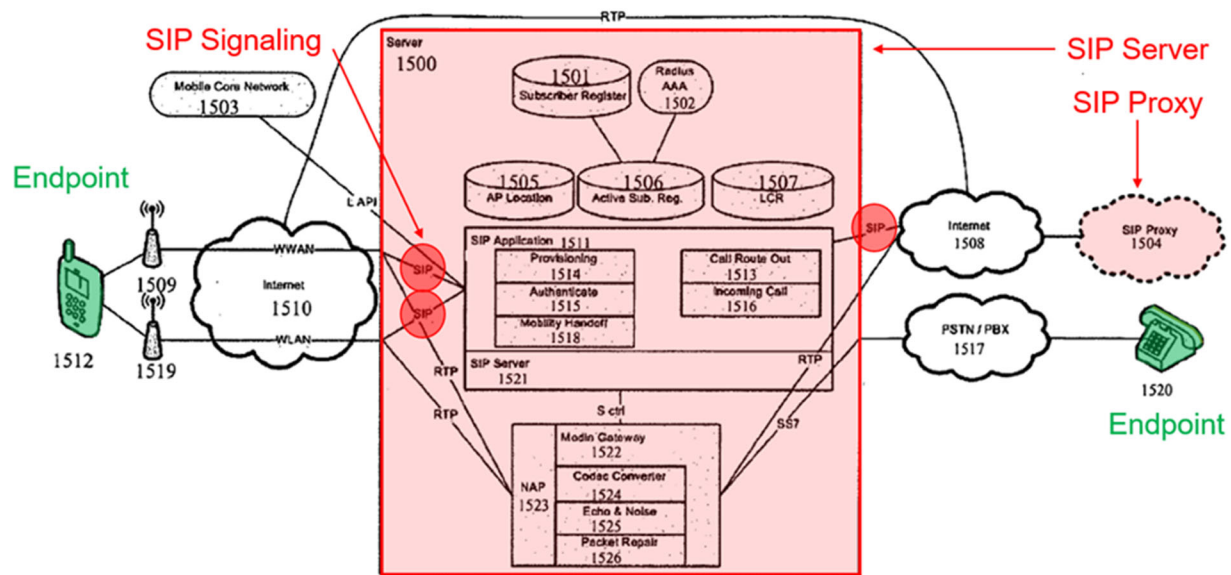


Figure 15

Id., Fig. 15 (annotated), [0154]. Indeed, “[b]oth WWAN and WLAN connections may be made simultaneously providing multiple IP connectivity paths to the same point.” *Id.*, [0246]. POSITAs would have understood that Tagg’s SIP protocol uniformity in directionality teaches that a “SIP signaling sequence...is maintained” regardless of switching between the WWAN and WLAN networks because this allows the user to “appear[] to the rest of the world as if they are not moving between networks” even when “flip[ping] back and forth freely” between WWAN and

WLAN networks (Tagg's cases 1 and 6). *Id.*, Fig. 15, [0247], [0320]; *VDW Decl.*, ¶¶118-23.

Accordingly, Tagg discloses or suggests maintaining a uniform SIP signaling sequence while placing calls over WLAN and WWAN networks regardless the direction of switching (“the SIP signaling sequence of the transmission is maintained after said switching from the first network path to the one of a plurality of alternative network paths.”). *VDW Decl.*, ¶124.

2. Independent Claim 15

Tagg discloses or suggests method claim 15 for substantially the same reasons as method claim 1 because, other than limitation 15.3.3 and 15.5 (which are further discussed below), the claims are substantively identical as shown in the table below. *VDW Decl.*, ¶125.

Method Claim 15	
Limitation	Substantially Similar Limitation(s)
15.0	1.0
15.1	1.1
15.2	1.2
15.3.1	1.3.1
15.3.2	1.3.2
15.3.3	-
15.4 ¹⁰	1.3.2
15.5	-
15.6	1.4
15.7	1.5
15.8	1.6

a. Claim 15.3.3: “at least one Port Address Translation (PAT) is performed on said transmission;”

¹⁰ Both of claim limitations 15.3.2 and 15.4 recite: “said transmission contains audio or video data.” Petitioners treat these limitations as referring to one and the same audio or video data contained in the same transmission, but reserve the right to challenge this claim’s compliance with the requirements of 35 U.S.C. §112 in other forums and proceedings.

Tagg discloses or suggests 15.3.3. *VDW Decl.*, ¶126. As described above, Tagg's system transmits IP v4 RTP packets using Network Address Processing. *Tagg*, [0402]; *see also* 1.3.3. In particular, Tagg's RTP packets "each contains source and destination information **for both IP address and port- together known as a socket.**" *Tagg*, [0402]. When RTP packets are transmitted seamless, they "may arrive from two different sockets." *Id.*, [0402]. This means the RTP packets "may not have the same...port." *Id.*, [0288]. Tagg's system accounts for this; the packets are "processe[d] and de-duplicated into one stream prior to traveling on." *Id.*, [0402]. Specifically, "the phones[']s IP address may remain the same via both paths even though the paths differ and **ports may be used to distinguish the two streams.**" *Id.*, [0288]. Tagg dedicates a "packet repair module" to the task of "duplicate packet removal" that therefore "deduplicate[s packets] in conjunction with the NAP function" even when "duplicate packets may not have the same....port." *Id.*, [0343]. *VDW Decl.*, ¶¶127-31.

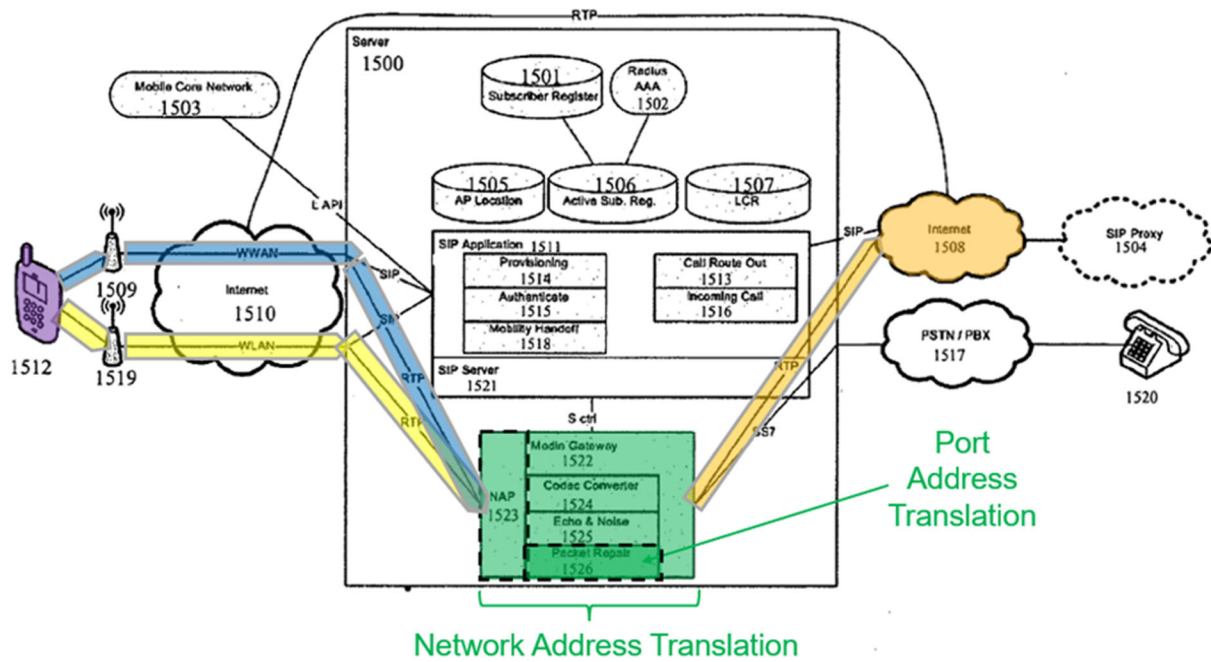
POSITAs would have understood the process of de-duplicating packets by port addresses refers to Port Address Translation (PAT) because the *port* address must be determined (translated) when an *IP* address of two packets is otherwise the same, else two copies of the same packet would persist and would create unnecessary traffic to the Internet when one packet must be removed to create a single stream of

packets for connecting securely and efficiently to the Internet. *Id.*, [0343]; *VDW Decl.*, ¶132.

Furthermore, POSITAs would have recognized Tagg discloses IP address and port address processing as a well-known architecture and technique commonly employed in prior art IPv4 systems that “have more devices than available Internet IPv4 addresses allocated” because including port addresses allows the system to multiplex a single IP address across, e.g., 65,536 devices, thereby allowing many more private network devices to connect to a public network. EX-1013 (U.S. Pat. App. Pub. 2004/0076180 (“*Satapati*”)),¹¹ [0002]-[0004], [0019]; *VDW Decl.*, ¶133.

Further, POSITAs would have found Tagg’s system connects a device (purple) to the internet (orange) over one of two network paths (blue, yellow) using both NAT and PAT (green) as was known in the art:

¹¹ *Satapati* is cited in this Petition to demonstrate POSITA’s knowledge and/or as evidence supporting motivation to modify Tagg. *KSR*, 550 U.S. at 420. This exhibit is not part of the unpatentability grounds.



Tagg, Fig. 15 (annotated). This is shown in Satapati:

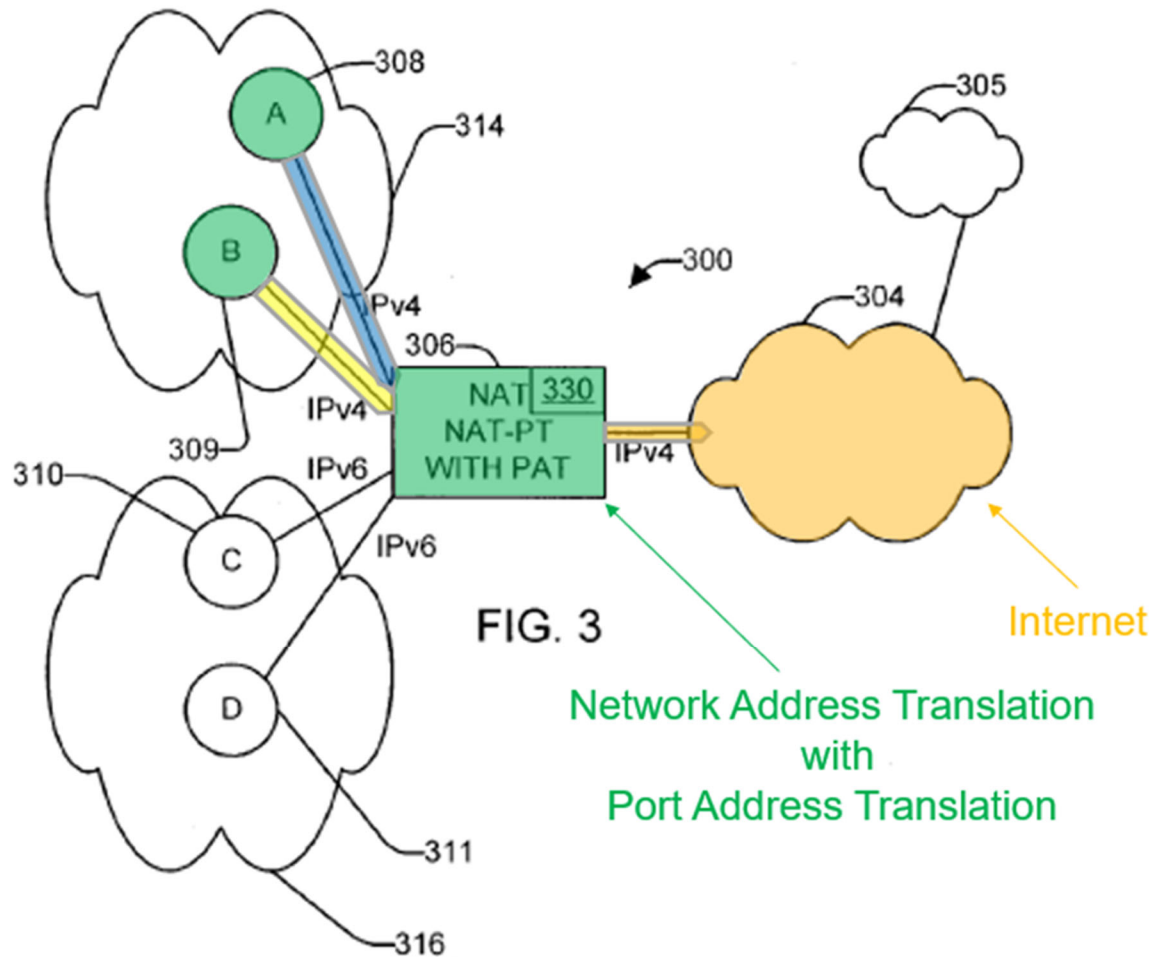


FIG. 3

Satapati, Fig. 3 (annotated). Thus, POSITAs would have further recognized Tagg’s network address translation includes port address translation because Tagg uses the same NAT-with-PAT structure as that known to achieve the same result in the same way: improved private network connection to the public internet. *Satapati*, Fig. 3, [0002]-[0004], [0019]; *VDW Decl.*, ¶¶134-35.

Accordingly, Tagg discloses or suggests transmitting and processing RTP packets bearing port address information (“Port Address Translation”) while

connecting user devices to the Internet (“performed on said transmission”). *VDW Decl.*, ¶136.

b. Claim 15.5: “said transmission contains data used in the control of the audio or video transmission;”

Tagg discloses or suggests 15.5. *VDW Decl.*, ¶137. The ’554 patent discloses a “SIP Control Flow and RTP Stream” pictorial and tabular format, both of which disclose moving RTP streams through a series of SIP INVITEs managed by a SIP server. ’554 patent, Fig. 4, 4:37-5:36. Likewise, Tagg discloses connecting a handset to an access point by converting a calling phone number into a SIP INVITE command and “negotiat[ing] with the SIP server to get an endpoint...for sending and receiving VoIP RTP packets” to facilitate an “exchange of audio/RTP data” until a call-ending SIP BYE command is received. *Tagg*, Fig. 28b, [0414]; *VDW Decl.*, ¶¶138-39.

Accordingly, Tagg discloses or suggests its transmission includes SIP server commands for controlling RTP packet flow (“said transmission contains data used in the control of the audio...transmission”). *VDW Decl.*, ¶140.

3. Independent Claims 8, 22

Tagg discloses or suggests system claims 8 and 22 with components executing steps that are substantially identical, other than 8.1-8.4 and 22.1-22.4 which are

further discussed below, to the method steps recited in claims 1 and 15, as shown in the tables below. *VDW Decl.*, ¶141.

System Claim 8	
Limitation	Substantially Similar Limitation(s)
8.0	1.0
8.1	-
8.2	-
8.3	-
8.4	-
8.5	1.1
8.6.1	1.3.1
8.6.2	1.3.3
8.7	1.3.2
8.8	1.4
8.9	1.5
8.10	1.6

System Claim 22	
Limitation	Substantially Similar Limitation(s)
22.0	15.0
22.1	-
22.2	-
22.3	-
22.4	-
22.5	15.1
22.6.1	15.3.1
22.6.2	15.3.3
22.7	15.3.2
22.8	15.4
22.9	15.5
22.10	15.6

c. Claim limitations 8.1-8.4/22.1-22.4: “a transmitting device”; “a receiving device”; “a first network device”; and “a second network device”

Tagg discloses or suggests claim limitations 8.1-8.4 and 22.1-22.4. *VDW Decl.*, ¶142. Tagg discloses a handset phone, i.e., mobile phone 1512 (“transmitting device”). *Tagg*, Fig. 15 (green), [0324], [0326]. Tagg’s phone connects to wireless WLAN (1509) and WWAN (1512) radio resources connections that further connect to a server (1521) (“a first...[and] second network device”). *Id.*, Fig. 15 (orange), [0324]-[0327]. These connections allow a user to connect to another endpoint phone

(1520) (“receiving device”). *Id.*, Fig. 15 (green), [0414] (describing an RTP endpoint and hangup commands).

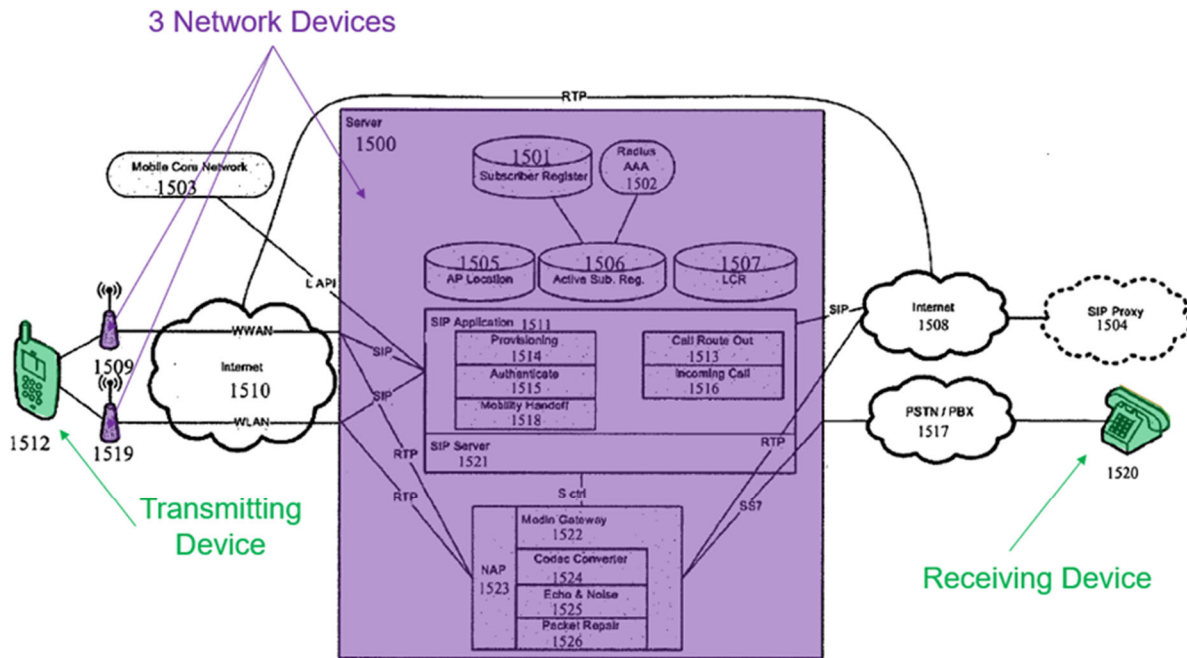


Figure 15

Id., Fig. 15 (annotated); *VDW Decl.*, ¶¶143-44.

Accordingly, Tagg discloses or suggests two phones (“transmitting device,” “receiving device”) wirelessly connected via a plurality of network devices including a server as well as WLAN and WWAN radio resources (“first” and “second network device”). *VDW Decl.*, ¶145.

3. **Claims 2, 9, 16, 23: “The method[/system] of claim 1[8/15/22] wherein the [/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of a stream quality event.”**

Tagg discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶146.

Additionally, Tagg discloses or suggests claims 2, 9, 16, and 23's additional limitations. *VDW Decl.*, ¶147. As described above, a seamless handoff uses a make-before-break technique to rapidly switch an IP stream from WLAN to WWAN. *Tagg*, [0290]; *see* 1.3.1. Tagg's handoffs occur when any of a "Receive Signal Strength Indication (RSSI), Bit Error Rate (BER) or Network Location Services (NLS)" metric detects an "edge of range." *Tagg*, [0289]. POSITAs would have recognized Tagg monitors these metrics to determine when to switch networks because low enough signal strength, high enough bit error rate, or out-of-range location may each, independently or together, "lose the call." '554 *patent*, 2:17-24; *VDW Decl.*, ¶¶148-50.

More specifically, the '554 patent discloses "packet loss, jitter, packet re-sequencing, packet duplicate creation, MOS scores, etc." as the earmark metrics of degraded quality of service over a given packet route. '554 *patent*, 2:17-20. POSITAs would have recognized that Tagg expressly mitigates those same metrics during handoff using a Packet Repair module. *Tagg*, [0343] (describing how the Packet Repair module "provides for jitter buffering, duplicate packet removal, missing packet request or masking, and packet re-ordering"). Therefore, a POSITA would have understood that Tagg's system switches networks as the result of a stream quality event because it is specifically tuned to repair the same list of quality

of service events and switch networks to avoid losing the call. *VDW Decl.*, ¶¶151-52.

- 4. Claims 3, 10, 17, 24: “The method[/system] of claim 1[/8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of stream load balancing.”**

Tagg discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶153.

Additionally, Tagg discloses or suggests claims 3, 10, 17, and 24’s additional limitations. *VDW Decl.*, ¶154. Tagg discloses “balancing the transmit and receive link budget” in the system for co-existing WiFi and Bluetooth WLAN systems. *Tagg*, [0109]-[0112]. Specifically, the system “attempts to look for the shortest signal path” between two handsets, which may mean routing a call only through a LAN and not to the public internet (PSTN). POSITAs would have understood that Tagg’s switching between WiFi and Bluetooth LAN networks to achieve the shortest, most efficient transmission path teaches stream load balancing because most often WiFi and Bluetooth coexist, and therefore a need exists to ensure they can “be used in a seamless fashion without causing interference with each other.” *Id.*, [0110]; *VDW Decl.*, ¶¶155-57.

By doing so, POSITAs would have understood that the network would benefit from using a plurality of low-cost devices relying upon the same signaling protocol and system architecture, allowing for optimization of the WiFi and Bluetooth roles.

Tagg, [0116]-[0118] (describing the benefits of using either Bluetooth or WiFi as the “backbone” and the other as the “local link” to “maximize range and throughput”); *VDW Decl.*, ¶158.

5. Claims 4, 11, 18, 25: “The method/system] of claim 1[8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of an administrator move.”

Tagg discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶159.

Additionally, *Tagg* discloses or suggests claims 4, 11, 18, and 25’s additional limitations. *VDW Decl.*, ¶160. Besides seamless handoff, *Tagg* also teaches the option for non-seamless handoff, “[w]here [a] user has to make a decision and take some action—such as to walk back into WLAN coverage.” *Tagg*, [0282]-[0283]. *Tagg*’s non-seamless handoff implements a “[b]reak-before-make” technique that notifies a user by some form of audio/visual indication that a WLAN connection is degrading, and “giving [users] the option to either move back into coverage, accept the handoff, or terminate the call.” *Id.*, [0291]. POSITAs would have recognized that by giving users these options, an administrator determines the options. *VDW Decl.*, ¶¶161-63.

Specifically, one option is a handoff—the opportunity to switch from one network to another—that occurs when “costs associated with the new mobile data link may be higher,” which POSITAs would have recognized only an administrator

setting those rates would know. *Tagg*, [0292]; *VDW Decl.*, ¶164. POSITAs would have recognized allowing subscribers to select (or avoid) higher costs therefore improves a subscribing user's experience by notifying the user before charging significantly more money to have the same call a user could maintain by simply stepping back into an internet café. *Id.*, [0292]; *VDW Decl.*, ¶165.

6. Claims 5, 12, 19, 26: “The method[/system] of claim 1[/8/15/22] wherein a[/the] SIP server associated with the one of a plurality alternative network paths may authenticate the transmission before it is switched.”

Tagg discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶166.

Additionally, *Tagg* discloses or suggests claims 5, 12, 19, and 26's additional limitations. *Id.*, ¶167. For the several handoff cases *Tagg* discloses, at least one models the situation when a user makes a call over a local network (WLAN-IP) and moves out of range, requiring the mobile phone to switch to a wide area network (WWAN-IP). *Tagg*, [0320]. When this happens, the handoff is a “straightforward switch” because “authentication remains valid”; authentication happened before the switch and need not change with respect to the switch; therefore, the call is authenticated before it is switched. *Id.*; *VDW Decl.*, ¶¶168-69. *Tagg* further discloses that authentication precedes switching networks in the “handoff states” tabulated below:

TABLE 9

State Table	
	Phone off
	Phone on
	Discovered WWAN
Authentication	Authenticated to WWAN
	Connected WWAN-Audio
	Connected WWAN-DATA
	Discovering WLAN
	Connected to WLAN
	Authenticated WLAN-IP
	Authenticated WLAN-VoIP
	In call incoming WWAN-Audio
	In call incoming WWAN-VoIP
	In call incoming WLAN-VoIP
	In call outgoing WWAN-Audio
	In call outgoing WWAN-VoIP
	In call outgoing WLAN-VoIP
Precedes Handoff	Handing off
	Handing over

Tagg, [0355] (disclosing Table 9, annotated). Further, Tagg's system expressly uses a SIP server executing a SIP application with authentication logic to authenticate VoIP calls placed by a mobile device moving between access points:

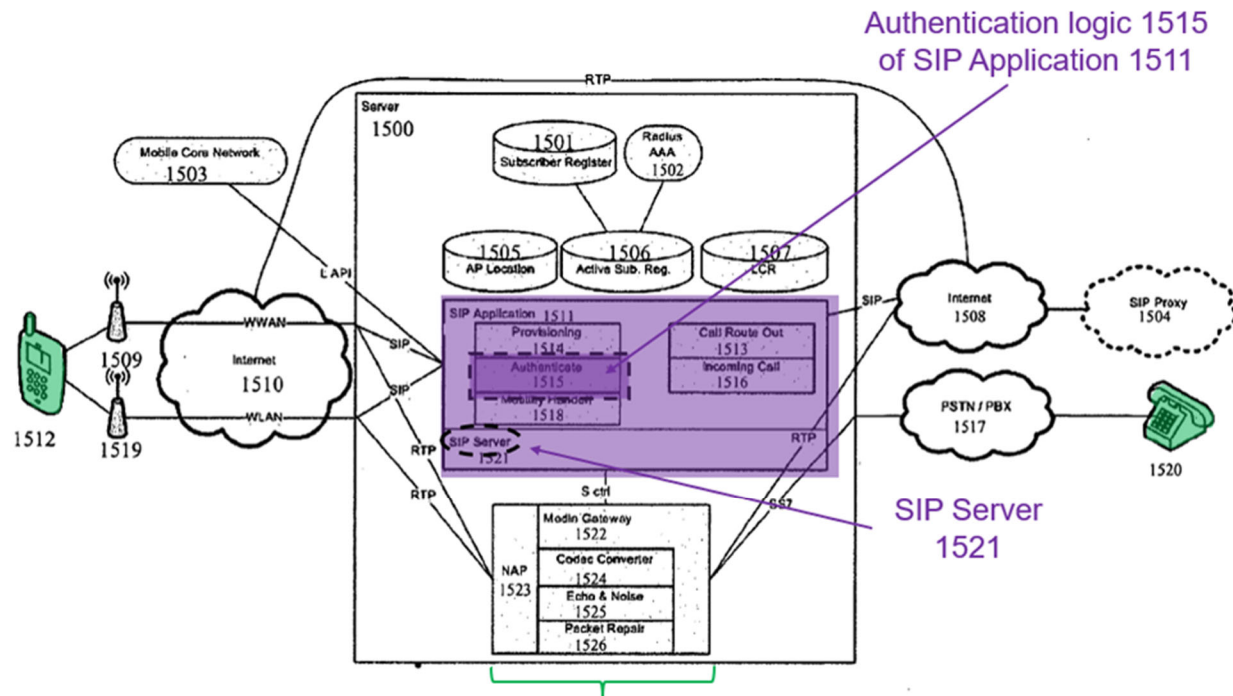


Figure 15

Id., Fig. 15 (annotated), [0324]-[0327]; *VDW Decl.*, ¶¶170-71.

Furthermore, POSITAs would have recognized that a SIP-supported data transmission is authenticated by a SIP server in the network path. *VDW Decl.*, ¶171. For example, Salsano’s seamless VoIP call handover solution includes a mobile terminal with SIP client that “relies” on the ability “to authenticate and get an IP address on the different visited networks.” *Salsano*, pp.2, 8. Additionally, as published in 1999, the IETF multimedia data and control architecture incorporated a SIP protocol (EX-1014; “RFC 2543”) disclosing that SIP servers may issue authentication requests and responses. *RFC2543*, 113-14. Thus, POSITAs would have understood that Tagg’s disclosure of a SIP-supported data transmission and

authenticating SIP server includes authenticating the transmission before switching.

VDW Decl., ¶171.

7. **Claims 6, 13, 20, 27: “The method[/system] of claim 1[13/20/27] wherein the source[/transmitting] device is a mobile device.”**

Tagg discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶172.

Additionally, Tagg discloses or suggests claims 6, 13, 20, and 27’s additional limitations. *Id.*, ¶173. Tagg discloses a multi-server for providing telecommunication call handling and termination in which “[a] call originates on...mobile phone 1512 and connects to the server 1500 via wireless connections WLAN 1509 and WWAN 1519” (below):

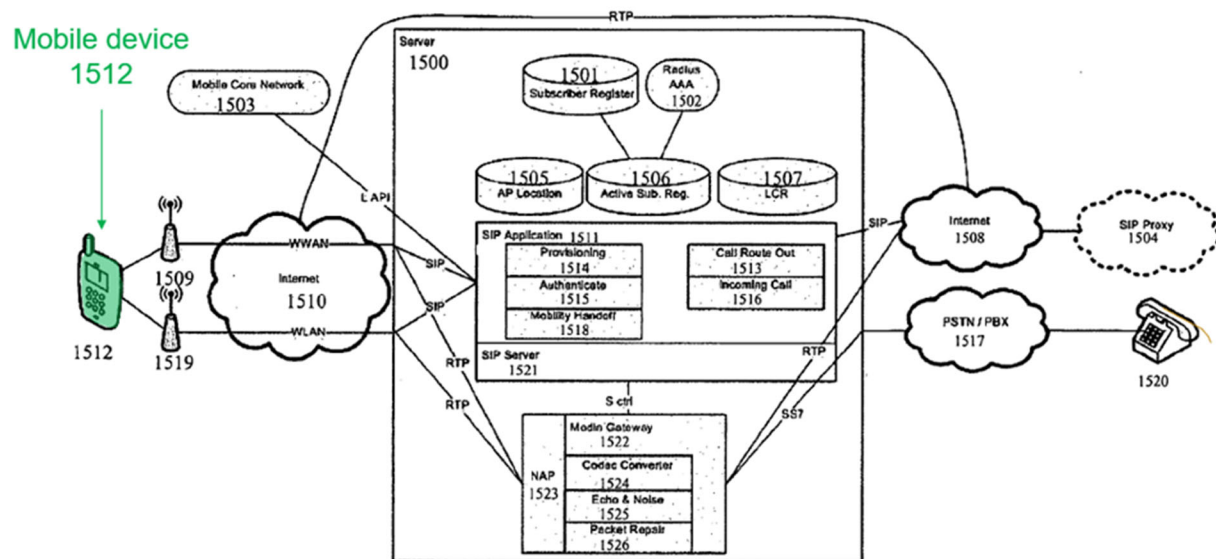


Figure 15

Tagg, Fig. 15 (annotated), [0324]. Calls placed by mobile devices (“source/transmitting devices”) are subject to handoffs. *Id.*, [0287] (disclosing

Case 1, or the handoff from a mobile device-initiated VoIP call on WLAN to WWAN); *VDW Decl.*, ¶¶174-75.

8. Claims 7, 14, 21, 28: “The method[/system] of claim 6[/13/20/28] wherein one or more of said plurality of alternative network paths become available to the mobile device during roaming.”

Tagg discloses or suggests independent claims 6, 13, 20, and 27. *VDW Decl.*, ¶176.

Additionally, Tagg discloses or suggests claims 7, 14, 21, and 28’s additional limitations. *Id.*, ¶177. Tagg’s mobile device “initiates a search for WLAN resources...and locates them” while roaming. *Tagg*, [0325]-[0326]. The SIP server manages mobile roaming for a handset—i.e., mobile phone—using at least Network Address Processing of IP v4 RTP packets over multiple networks as discussed in 1.0 above. *Id.*, [0274], [0402]. Further, Tagg’s six “handoff/handover cases apply in a broadly similar manner to the situation where a persona has traveled internationally,” i.e., “[i]nternational [r]oaming.” *Tagg*, [0349]-[0350]; *see also id.*, [0285] (disclosing six handoff cases). This allows a mobile phone to acquire a WLAN Access Point by “the person roaming in Germany on one of the German Networks.” *Id.*, [0130]; *VDW Decl.*, ¶¶178-81.

B. Ground 2: The Kottilingal-Politis Combination Renders Claims 1-28 Obvious

1. Kottilingal

a. Analogous Art

Kottilingal (EX-1006) is analogous art to the '554 patent. *VDW Decl.*, ¶¶183-85.

Kottilingal is directed toward VoIP packet communications between, e.g., IP telephones that have one interface for wireless LAN communication and another for cellular e.g., WAN communication and is therefore directed toward the same field of endeavor as the '554 patent. *Compare Kottilingal*, Title, Abstract, 1:53-2:41, *with '554 patent*, 1:9-18; *VDW Decl.*, ¶183. Because Kottilingal seeks to switch networks seamlessly to avoid call interruptions and voice quality degradation, it is also reasonably pertinent to the problem faced by the '554 patent inventors. *Compare Kottilingal*, 1:33-49, *with '554 patent*, 2:5-24; *VDW Decl.*, ¶184. Kottilingal was filed as U.S. Patent Application No. 11/211,249 on August 24, 2005, and was issued on June 18, 2013. *Kottilingal*, Cover. Kottilingal is directed towards the “[i]nterleaving of VOIP/VIP transmission in multiple sessions to increase quality of service in mobile devices,” and is thus in the same field of endeavor as the '554 patent. *Id.* Moreover, it is reasonably pertinent to the problem cited by the '554 patent inventors, because it is concerned with the seamless switching of data payloads from the first to the second session. *Id.*, 10:19-21. *VDW Decl.*, ¶185.

b. Overview

Kottilingal was filed as U.S. Patent Application No. 11/211,249 on August 24, 2005, published as U.S. Patent Application Publication 2007/0064684 on March 22, 2007, and issued as U.S. patent 8,467,377 on June 18, 2013. *Kottilingal*, Cover; *VDW Decl.*, ¶182.

Kottilingal describes a mobile communication device that can switch between two air interfaces for wireless communication. *Kottilingal*, 1:53-2:24. Kottilingal's device can use one air interface for a media stream and then switch to the other air interface when the first interface is no longer available or the QoS degrades. *Id.* To make this switch, "PARTY A's mobile communication device sends a SPAWN SIP message to PARTY B's target communication device." *Id.*, 2:26-28. The second session is created using "a SIP INVITE request," which "contains a spawn identifier." *Id.*, 2:29-36. "The target communication device uses the spawn identifier received in the SIP INVITE request to associate the first and second sessions" (*id.*, 2:38-41), as depicted in Figure 7:

SPAWN SIP:BOB@BILOXI.COM SIP/2.0
VIA: SIP/2.0/UDP PC33.ATLANTA2.COM;BRANCH=ADFS
MAX-FORWARDS: 70
TO: BOB <SIP:BOB@BILOXI.COM>
FROM: ALICE <SIP:ALICE@ATLANTA2.COM>;TAG=876767776
CALL-ID: D7878-0-A2@PC33.ATLANTA2.COM
CSEQ: 314160 SPAWN
CONTACT: SIP:ALICE@PC33.ATLANTA2.COM.
CONTENT-TYPE: APPLICATION/SDP
CONTENT-LENGTH: 142

MASTER VIA: PC33.ATLANTA1.COM;BRANCH=Z9HG4BK776ASDHDS
MASTER TO: BOB <SIP:BOB@BILOXI.COM>
MASTER FROM: ALICE <SIP:ALICE@ATLANTA1.COM>;TAG=1928301774
MASTER CALL-ID: A84B4C76E66710@PC33.ATLANTA1.COM
MASTER CSEQ: 314159 INVITE
MASTER CONTACT: <SIP:ALICE@PC33.ATLANTA.COM>

} SO CALLEE CAN
IDENTIFY WITH
FIRST SESSION

SPAWN MESSAGE

FIG. 7

Id., Fig. 7 (annotated); *VDW Decl.*, ¶¶186-87.

2. Politis

a. Analogous Art

Politis (EX-1007) is analogous art to the '554 patent. *VDW Decl.*, ¶¶188-90.

Politis is directed toward VoIP heterogenous network handoffs and is therefore directed toward the same field of endeavor as the '554 patent. *Compare Politis*, Figs. 1, 2, 4, pp.1, 3, *with '554 patent*, 1:9-18; *VDW Decl.*, ¶188. Because Politis seeks to switch between networks seamlessly to avoid call interruptions and voice quality degradation, it is also reasonably pertinent to the problem faced by the

'554 patent inventors. *Compare Politis*, Figs. 1, 2, 4, pp.4-5, with '554 patent, 2:5-24. *VDW Decl.*, ¶189.

Because *Politis* is directed towards “mobility management architectures based on SIP and Mobile IP protocols,” it is in the same field of endeavor as the '554 Patent. Because it is concerned with the “disruption caused during a handoff” and the data packets lost during handoffs, it is also reasonably pertinent to the problem faced by the '554 Patent’s inventors. *Politis*, p.4; *VDW Decl.*, ¶190.

a. Overview

Politis is a conference paper published April 23, 2003, entitled: “Multilayer Mobility Management for All-IP Networks: Pure SIP vs. Hybrid SIP/Mobile IP.” *Politis*, p.1; *see also generally* Declaration of June Munford (EX-1015). *Politis* describes two multilayer mobile communications architectures that enable mobile devices to switch between different networks, including those that employ NAT functionality. *Politis*, p.3; *VDW Decl.*, ¶191.

The first architecture uses SIP messages sent between a mobile host and its corresponding hosts to support the mobile host’s mobility amongst distinct networks. *Politis*, p.2. The second architecture uses SIP in combination with Mobile IP functionality, with SIP signaling supporting the inter-network mobility of real-time data traffic, and Mobile IP (“MIP”) supporting the same for non-real-time

traffic. *Id.*, p.3. The second architecture involves the use of NAT/STUN¹² functionalities to overcome the challenges posed by NAT-enabled networks. *Id.*; *VDW Decl.*, ¶¶192-93.

3. Motivation To Modify Kottilingal With The Teaching Of Politis

A POSITA would have been motivated to combine the teachings of Kottilingal and Politis. *VDW Decl.*, ¶194.

First, both references are directed toward the same field of endeavor in that both concern the enablement of inter-network mobility of, for example, VoIP devices. *Compare Kottilingal*, Abstract (“A first mobile device has two air interfaces. The first mobile device uses its first interface to transmit VoIP/VIP packets to a second device in a first session. If a quality of service decreases, then the first device causes a second session to be set up where the second session uses the second air interface.”), *with Politis*, p.1 (“In this paper, we present two mobility

¹² “STUN,” a naming convention used in 2008, refers to Session Traversal Utilities for NAT, which is a type of protocol used for IP network voice, video and messaging transmissions to help users communication behind NAT firewalls that keeps local network (LAN) IP addresses private. *See, e.g.*, <https://www.pcmag.com/encyclopedia/term/stun>.

management architectures based on SIP and Mobile IP protocols. These configurations mainly allow/provide mobility in two different layers namely the application and network layers.”); *VDW Decl.*, ¶195.

Second, both references are concerned with the issue of preserving the reliability of data transmission during the inter-network handoffs. *Compare Kottilingal*, 10:19-22 (“Data payloads of the media stream are therefore seamlessly switched from the first active session to the second active session without the call being perceptively broken.”), *with Politis*, p.1 (“The two mobility architectures are evaluated in terms of various performance metrics, i.e. hand off latency and packets loss.”); *VDW Decl.*, ¶196.

Third, to the extent Kottilingal did not already disclose solutions to traversing NAT-enabled networks, POSITAs would have been motivated to apply the solutions found in Politis to Kottilingal to enable the traversal of NAT-enabled networks. Specifically, POSITAs would have been aware of the issues posed by NAT-enabled networks to data traffic supported by SIP signaling. *Politis*, p.3 (“The use of NAT for real-time traffic introduces problems...because the IP voice and video devices behind the NAT have private IP addresses that are not...on the public Internet.”). Thus, POSITAs facing the issue of switching a SIP-supported data transmission from one network to another, where one of the networks employs NAT, would have sought out a solution such as that taught in Politis: “NAT/STUN functionalities”

may be used during network handoff of a SIP-supported data stream. In other words, Politis's STUN request and response help Kottilingal's network "see" local network devices concealed behind LAN firewalls before connecting to them using SIP protocols, allowing more users to benefit from Kottilingal's SIP-based switching methods. *Politis*, Fig. 5, p.3; *VDW Decl.*, ¶¶197-99.

And Politis was published in 2003, well in advance of Kottilingal. Thus, POSITAs seeking to implement the teachings of Kottilingal would have been well-aware of the NAT/STUN functionalities taught by Politis when faced with the challenge posed by network handoff involving a NAT-enabled network. *VDW Decl.*, ¶200.

In view of the above, it would have been obvious to POSITAs to modify Kottilingal using Politis' teachings, to the extent any modification was necessary. Both references enable inter-network mobility of SIP-supported data transmissions, concern the preservation of data transmission quality during network handoff, and to the extent necessary, POSITAs would have been motivated to use the teachings provided by Politis to solve the obvious problem of network handoff involving a NAT-enabled network. At least for these reasons, modifying Kottilingal in view of Politis would have been obvious to POSITAs. *VDW Decl.*, ¶¶201-02.

4. Independent Claim 1

- a. Claim 1.0: “A method of enhancing the reliability of a transmission from a source to a destination in a communications network using a network protocol that operates on top of the Internet Protocol (IP), the method comprising:”**

If the preamble is limiting, then Kottilingal discloses or suggests 1.0. *VDW Decl.*, ¶203. For example, Kottilingal discloses two-party (Party A and Party B) VoIP calls between IP telephones and switching the IP packet routing between different “interface[s]” such as a local area network (LAN) or cellular telephone network. *Kottilingal*, 1:53-2:24, 3:11-18. Kottilingal switches calls should a longer (cellular) or shorter (LAN) range for the call be desired or if call quality (quality of service) drops to an “undesirable or unacceptable level.” *Id.*, 2:6-24, 3:19-31. The VoIP packets are stacked using Real-Time Protocol (RTP) over User Datagram Protocol (UDP) over Internet Protocol (IP) and Session Initialization Protocol (SIP) over Transmission Control Protocol (TCP) over IP. *Id.*, 1:61-2:41; *VDW Decl.*, ¶203.

Accordingly, Kottilingal discloses or suggests a process of switching between networks to maintain acceptable call quality (“a method of enhancing the reliability of a transmission from a source to a destination in a communications network”) using RTP or SIP over IP in VoIP transmissions (“using a network protocol that operates on top of the Internet Protocol (IP)”). *VDW Decl.*, ¶204.

b. Claim 1.1: “transmitting data between a source and destination over a first network path made up of one or more network links where at least one of the network links is to a local area network that is remote from the transmission source; and”

Kottilingal discloses or suggests 1.1. *VDW Decl.*, ¶205. For example, Kottilingal discloses a source, corresponding to Party A's IP Phone, and a destination, corresponding to Party B's IP Phone:

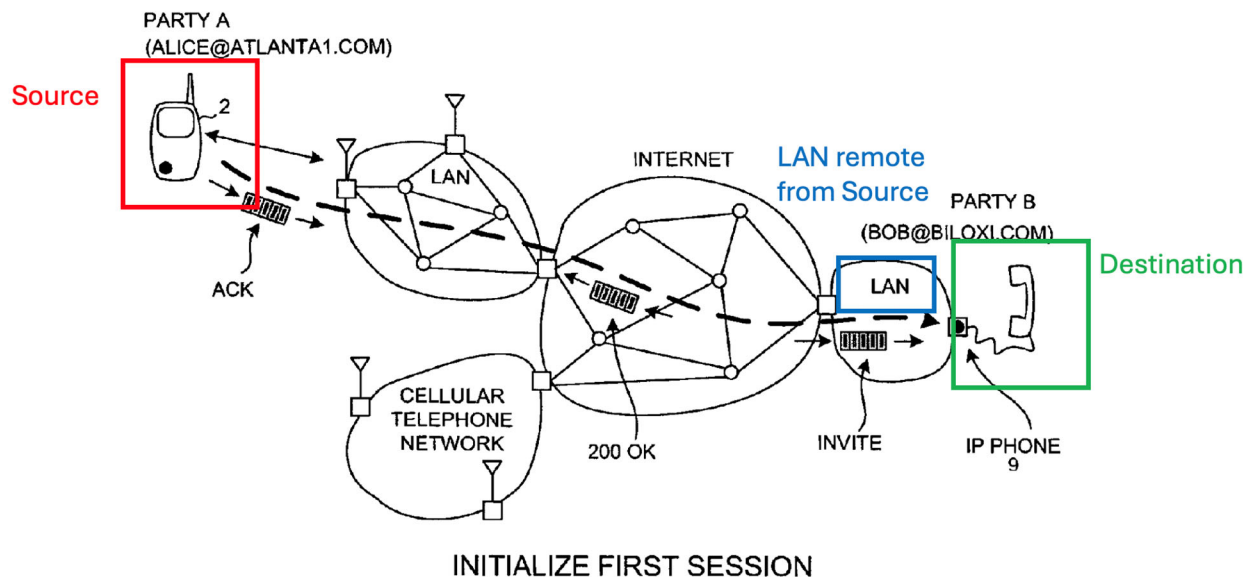


FIG. 5

Kottilingal, Figure 5 (annotated); (“Both the first and second air interfaces are then used to communicate packets of a single media stream from the first device to the second device.”). And, as depicted above, at least one of the network links is to a local area network that is remote from the transmission source. The “first network path” is illustrated by the dotted line in Figure 5. *Id.*; *VDW Decl.*, ¶¶206-07.

Accordingly, Kottilingal discloses or suggests a Party A IP phone calls a remote Party B IP phone over a LAN, the Internet, and another LAN (“transmitting data between a source and destination over a first network path made up of one or more network links where at least one of the network links is to a local area network that is remote from the transmission source”). *VDW Decl.*, ¶207.

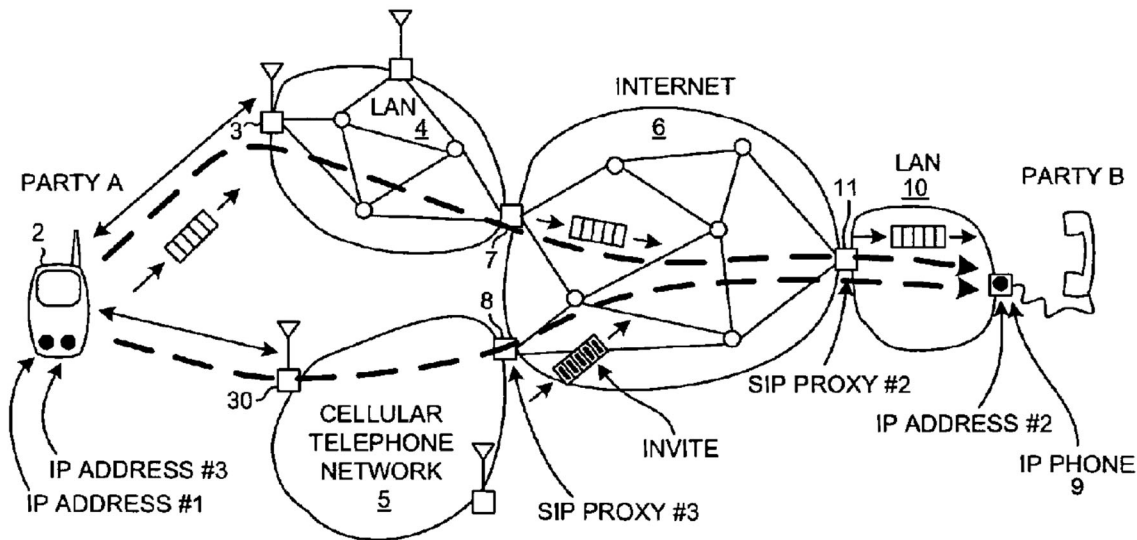
c. Claim 1.2: “switching the transmission from the first network path to one of a plurality of alternative network paths;”

Kottilingal discloses or suggests 1.2. *VDW Decl.*, ¶208. Kottilingal discloses various reasons for switching a call from a first air interface to another air interface. *Kottilingal*, 2:6-24. For example, the switch may be desired “due to the air interface initially being used being a short range wireless LAN interface. PARTY A may move out of the coverage area of the short range wireless LAN. It is desired to continue the call by switching to using the longer range cellular telephone air interface.” *Id.*, 2:8-13. Or:

it may be desired to switch from using the first air interface to the second air interface where the first interface is a longer range cellular telephone interface and the second air interface is a shorter range wireless LAN interface. Initially, the cellular telephone air interface is used, but then PARTY A moves into the coverage area of the wireless LAN. If, for example, PARTY A’s cellular telephone provider charges to carry a voice conversation

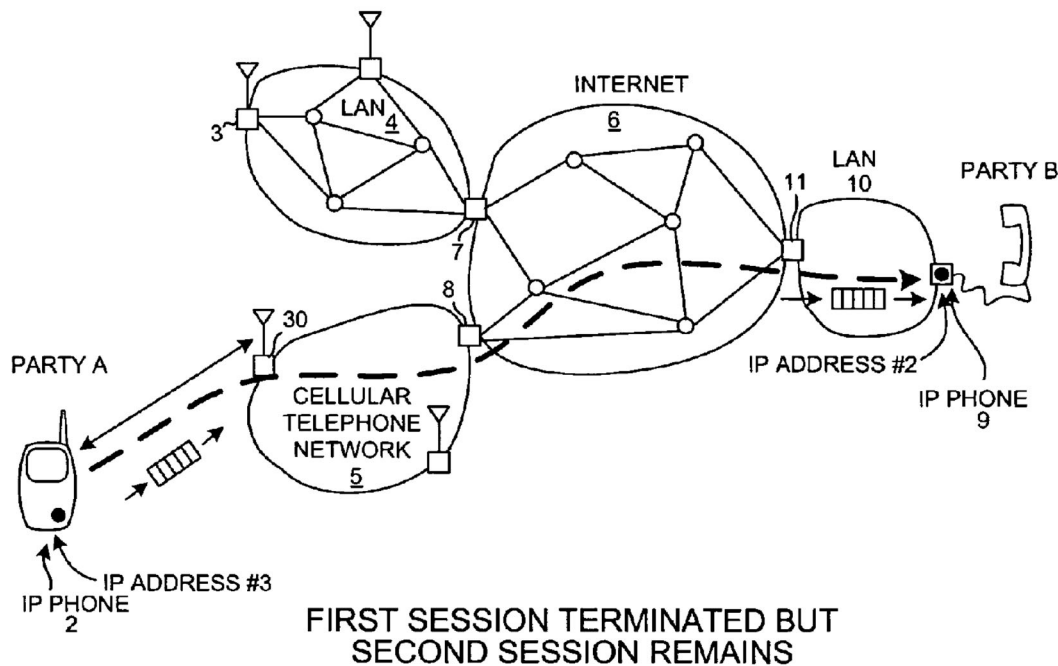
on its cellular telephone network, then it may be desirable for PARTY A to stop using the cellular air interface and to continue the call using the less expensive wireless LAN air interface.

Id., 2:13-24. Kottilingal provides an example of switching a transmission from the first network path to one of a plurality of alternative network paths in Figures 10 and 17:



INVITE FOR SECOND SESSION

FIG. 10



Id., Figures 10, 17; *VDW Decl.*, ¶¶208-11 (explaining that the “first session” and “second session” in Kottilingal occur over a “first network path” and “second network path,” respectively).

Accordingly, Kottilingal discloses or suggests switching a VoIP call from or to a LAN or cellular telephone network (“switching the transmission from the first network path to one of a plurality of alternative network paths”). *VDW Decl.*, ¶212.

d. Claim 1.3.1: “wherein said transmission is not disrupted as a result of said switch to the one of a plurality of alternative network paths,”

Kottilingal discloses or suggests 1.3.1. *VDW Decl.*, ¶213. For example, Kottilingal discloses “a subsequent step wherein payload data media flow between

IP phone 2 and IP phone 9 is switched (or ‘handed off’) from the first session to the second session.” *Kottilingal*, 9:49-51. As part of this switch, IP phone 2 (the source) transmits a “media flow handoff control packet” to IP phone 9 (the destination). *Id.*, 10:3-7, Figures 13 and 14. “After sending the media flow handoff control packet, IP phone 2 switches from sending data payloads of the media stream in the first session to sending data payloads of the media stream in the second session.” *Id.*, 10:7-10. The destination device (IP phone 9), then orders packets using a first-in-first-out (FIFO) memory according to RTP sequence number and timestamps. *Id.*, 10:16-19. “Data payloads of the media stream are therefore **seamlessly switched** from the first active session to the second active session **without the call being perceptively broken.**” *Id.*, 10:19-22; *VDW Decl.*, ¶¶213-15.

Accordingly, Kottilingal discloses or suggests seamless data media payload handoffs that avoid broken VoIP calls (“wherein said transmission is not disrupted as a result of said switch to the one of a plurality of alternative network paths”). *VDW Decl.*, ¶¶216.

e. Claim 1.3.2: “said transmission contains audio or video data and”

Kottilingal discloses or suggests 1.3.2. *VDW Decl.*, ¶217. For example, Kottilingal expressly discloses transmitting “data payload VoIP packets of a media stream” including “voice data for a conversation” between Party A and Party B.”

Kottilingal, 2:2-5, *see also* 2:62–3:3. Kottilingal’s SIP sessions between the parties also expressly transmit “IP packets having voice and/or video data payloads.” *Id.*, 8:2-17; *VDW Decl.*, ¶217.

Accordingly, Kottilingal discloses or suggests transmitting voice data in VoIP packets of a VoIP media stream (“said transmission contains audio or video data”). *VDW Decl.*, ¶218.

f. Claim 1.3.3: “at least one Network Address Translation (NAT) is performed on said transmission;”

Kottilingal in view of Politis discloses or teaches 1.3.3. *VDW Decl.*, ¶219. Figure 5 of Kottilingal illustrates network switching in the context of a NAT-enabled network.

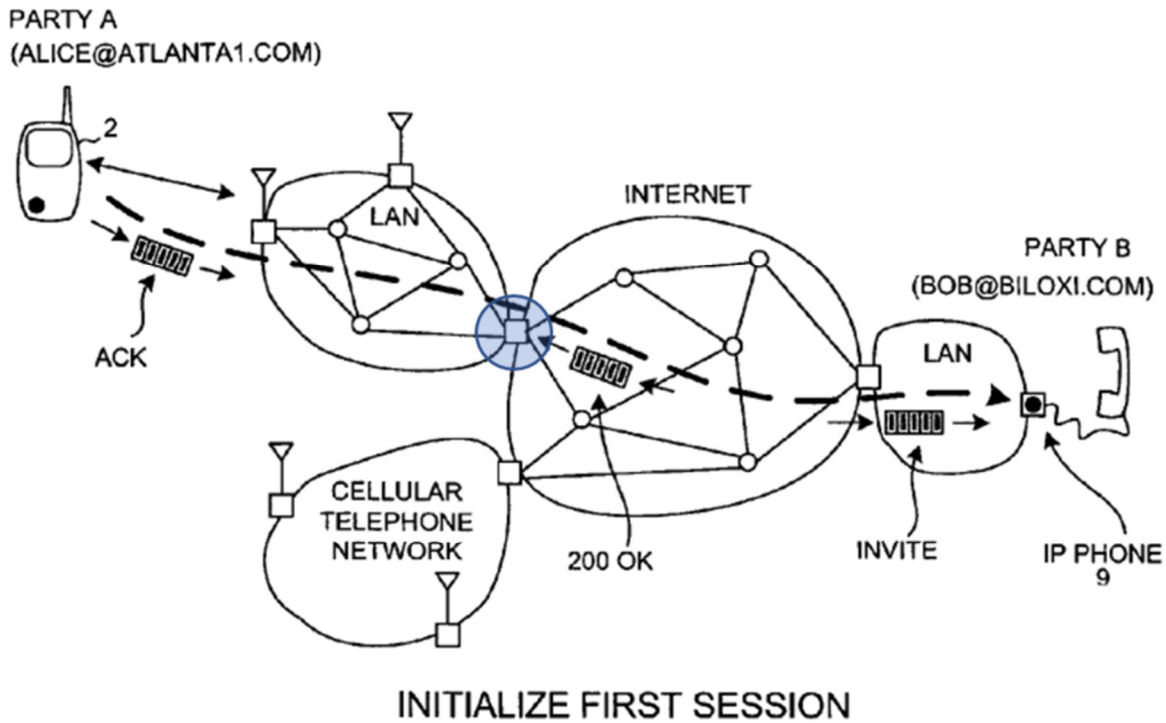


FIG. 5

Kottilingal, Fig. 5 (annotated). *VDW Decl.*, ¶219.

As seen above, Kottilingal Figure 5 discloses network switching in the context of a multi-node LAN with a single connection (circled in blue) to the internet. POSITAs would have understood and found it obvious that this configuration employs a form of NAT, such as PAT, to enable the nodes of the LAN to receive data transmissions from the rest of the internet via a public-facing IP address. Kottilingal thus discloses or suggests the above claim element. *VDW Decl.*, ¶220.

If Patent Owner argues, and the Board finds, Kottilingal alone does not disclose or suggest 1.3.3., POSITAs would have found it obvious to combine Politis's teachings with Kottilingal to perform NAT on the transmission in

Kottilingal. *VDW Decl.*, ¶221. Politis discloses a mobility management architecture that contemplates inter-network switching of a VoIP data transmission where at least one of the networks involves NAT functionality. *Politis*, p.3. Politis teaches that the use of “NAT/STUN functionalities” could overcome the challenges posed by a NAT-enabled network in this scenario. *Id.* Thus, POSITAs would have been motivated to perform NAT translation as taught in Politis on the transmission of Kottilingal where network switching is performed Politis’s STUN request and response help Kottilingal’s network “see” local network devices concealed behind LAN firewalls before connecting to them using SIP protocols, allowing more users to benefit from Kottilingal’s SIP-based switching methods. *Politis*, Fig. 5, 3; *VDW Decl.*, ¶¶222-24.

Accordingly, Kottilingal alone and in combination with Politis, discloses or teaches a NAT-enabled network comprising single-node LAN-to-Internet connections ripe for NAT/STUN translations on that network (“at least one Network Address Translation (NAT) is performed on said transmission”). *VDW Decl.*, ¶225.

g. Claim 1.4: “said transmission uses the Real Time Protocol (RTP);”

Kottilingal discloses or suggests 1.4. *VDW Decl.*, ¶226. Kottilingal discloses that the “VoIP packets are communicated using RTP (Real-Time Protocol) over

UDP (User Datagram Protocol) over (IP Internet Protocol).” *Kottilingal*, 1:67-2:2; *VDW Decl.*, ¶226.

Accordingly, Kottilingal discloses or suggests sending VoIP packets using RTP over UDP over IP (“said transmission uses the Real Time Protocol (RTP”). *VDW Decl.*, ¶227.

h. Claim 1.5: “said transmission uses the Session Initiation Protocol (SIP); and”

Kottilingal discloses or suggests 1.5. *VDW Decl.*, ¶228. Kottilingal discloses a transmission in which Party A’s mobile communication device sends a SPAWN SIP message to Party B’s target communication device, and the SPAWN SIP message is communicated using SIP. *Kottilingal*, 2:25–41 (“The SPAWN SIP message is communicated using SIP (Session Initialization Protocol).”); *VDW Decl.*, ¶228.

Accordingly, Kottilingal discloses or suggests sending SPAWN messages using SIP (“said transmission uses the sessions Initiation Protocol (SIP)”). *VDW Decl.*, ¶229.

i. Claim 1.6: “the SIP signaling sequence of the transmission is maintained after said switching from the first network path to the one of a plurality of alternative network paths.”

Kottilingal discloses or suggests 1.6. *VDW Decl.*, ¶230. For example, Kottilingal’s Figure 7 discloses a CSEQ value placed at the same sequential position

(green) in SIP messaging between an IP phone 2 to IP phone 9 (To→From→Call-ID→CSEQ parallels Master To→Master From→Master Call-ID→Master CSEQ):

```
SPAWN SIP:BOB@BILOXI.COM SIP/2.0
VIA: SIP/2.0/UDP PC33.ATLANTA2.COM;BRANCH=ADFS
MAX-FORWARDS: 70
TO: BOB <SIP:BOB@BILOXI.COM>
FROM: ALICE <SIP:ALICE@ATLANTA2.COM>;TAG=876767776
CALL-ID: D7878-0-A2@PC33.ATLANTA2.COM
CSEQ: 314160 SPAWN
CONTACT: SIP:ALICE@PC33.ATLANTA2.COM.
CONTENT-TYPE: APPLICATION/SDP
CONTENT-LENGTH: 142

MASTER VIA: PC33.ATLANTA1.COM;BRANCH=Z9HG4BK776ASDHDS
MASTER TO: BOB <SIP:BOB@BILOXI.COM>
MASTER FROM: ALICE <SIP:ALICE@ATLANTA1.COM>;TAG=1928301774
MASTER CALL-ID: A84B4C76E66710@PC33.ATLANTA1.COM
MASTER CSEQ: 314159 INVITE
MASTER CONTACT: <SIP:ALICE@PC33.ATLANTA.COM>
```

SO CALLEE CAN IDENTIFY WITH FIRST SESSION

SPAWN MESSAGE

FIG. 7

Kottilingal, Figure 7 (annotated), 2:25-35, 4:28-30; *VDW Decl.*, ¶230.

This use of sequential “CSEQ” values corresponds to the ’554 patent’s description of the meaning of the claim element “the SIP signaling sequence of the transmission is maintained after said switching[.]” ’554 *patent*, claim limitation 1.6. *VDW Decl.*, ¶231. Specifically, in the “Flow Chart Description” spanning columns 4 and 5, the ’554 patent explains that as part of the SIP dialogue during a switch, “[t]he state involving the SIP signaling sequence number (often referred to as the

‘cseq’ value, must be maintained throughout the dialog. **For a new ‘transaction’ this number must monotonically increase;** for a re-transmit of an old transaction, it must remain the same.” ’554 *patent*, col. 5, Flow Chart Description Number 210. This description corresponds precisely to Kottilingal’s disclosure of a SPAWN message with a CSEQ value (314159) that has “monotonically increased” from the CSEQ value in the previous SIP “Invite” message (314160). *Kottilingal*, Figs. 7-9, 2:25-41, 8:45-67; *VDW Decl.*, ¶232.

Accordingly, Kottilingal discloses or suggests sending SPAWN SIP messaging between IP phones when switching between interfaces that places the CSEQ value at the same position in both SIP messages (“the SIP signaling sequence of the transmission is maintained after said switching from the first network path to the one of a plurality of alternative network paths”). *VDW Decl.*, ¶233.

5. Independent Claim 15

Kottilingal alone and in combination with Politis discloses or suggests method claim 15 for substantially the same reasons as method claim 1 because, other than limitation 15.3.3 and 15.5, the claims are substantively identical as shown in the table above. *See* Ground 1, claim 15, above; *VDW Decl.*, ¶234.

j. Claim 15.3.3: “at least one Port Address Translation (PAT) is performed on said transmission;”

Kottilingal discloses or suggests this claim element. *VDW Decl.*, ¶235. For similar reasons discussed for limitation 1.3.3 above, Figure 5 of Kottilingal illustrates that it contemplates network switching in the context of a PAT-enabled network.

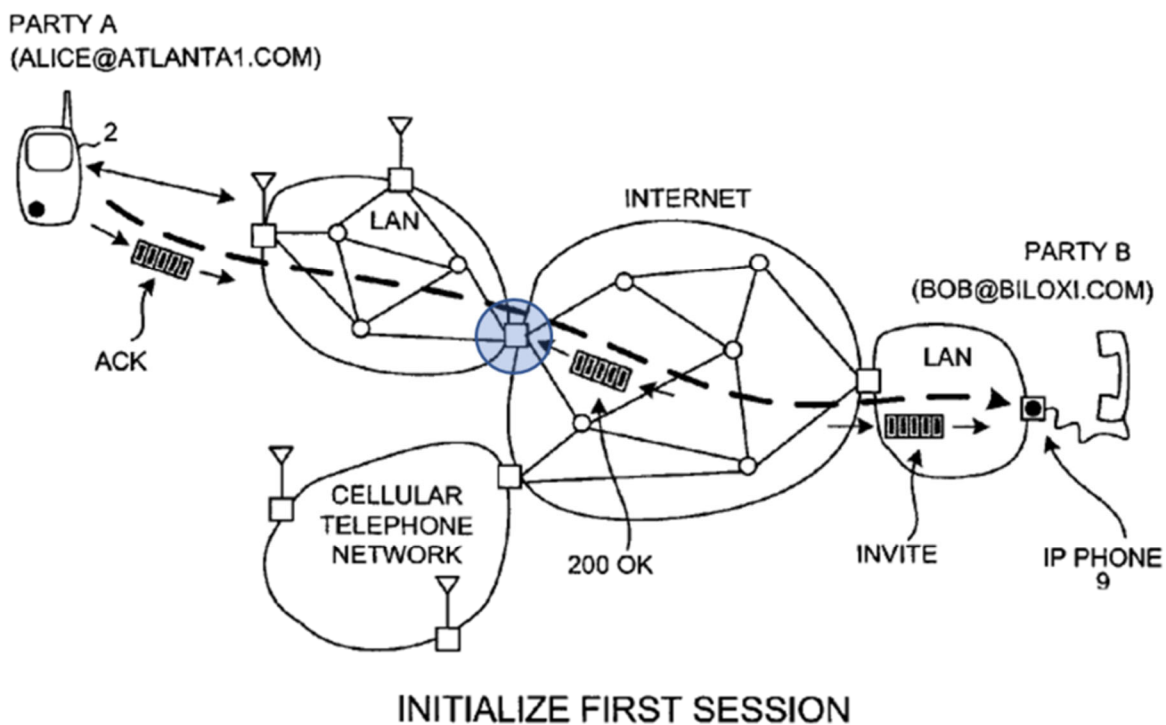
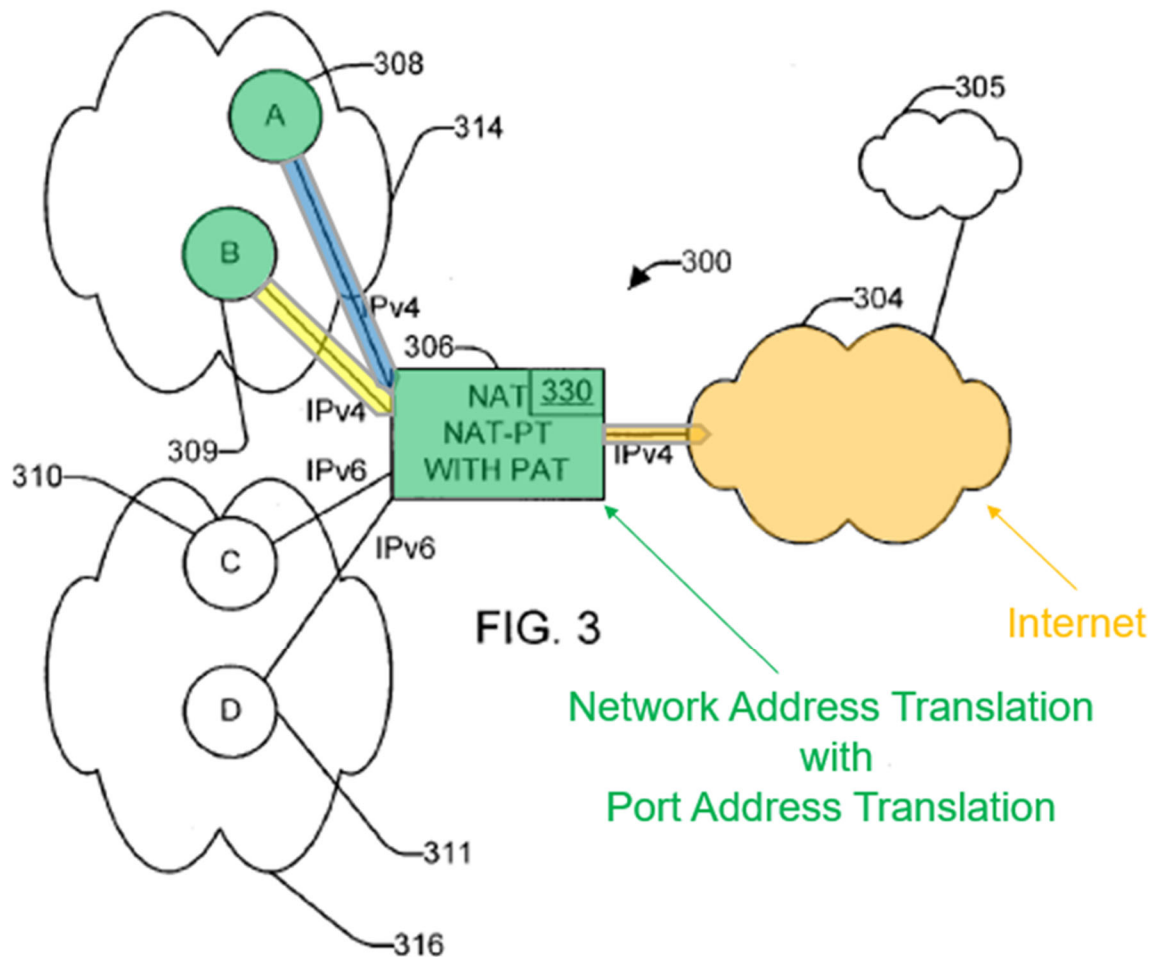


FIG. 5

Kottilingal, Fig. 5 (annotated). *VDW Decl.*, ¶236.

As seen above, Kottilingal Figure 5 discloses network switching in the context of a multi-node LAN with a single connection (circled in blue) to the internet. A POSITA would have recognized such a network configuration practices PAT to

enable the various nodes of the LAN to receive data transmissions from the rest of the internet via a single public-facing IP address as was known in the prior art, also showing a singular connection (green) to connect many local users to the Internet (orange):



Satapati (EX-1013), Fig. 3 (annotated). Thus, POSITAs would have recognized Kottilingal's network address translation includes port address translation because Kottilingal's system would have replicated the same NAT-with-PAT structure as

that known in the prior art to achieve the same result in the same way: improved private network connection to the public internet. *Satapati*, Fig. 3, [0002]-[0004], [0019]; *VDW Decl.*, ¶¶237-39.

Furthermore, POSITAs would have recognized Kottilingal's single connection requires IP address and port address processing as a well-known architecture and technique commonly employed in prior art IPv4 systems that "have more devices than available Internet IPv4 addresses allocated" because including port addresses allows the system to multiplex a single IP address across, e.g., 65,536 devices, thereby allowing many more private network devices to connect to a public network. *Satapati*, [0002]-[0004], [0019]. Thus, Kottilingal discloses 15.3.3. *VDW Decl.*, ¶240.

k. Claim 15.5: "said transmission contains data used in the control of the audio or video transmission;"

Kottilingal discloses or suggests 15.5. *VDW Decl.*, ¶241. As explained in Ground 1 for this claim element, the '554 patent discloses moving RTP streams through a series of SIP INVITEs managed by a SIP server. '554 patent, Fig. 4, 4:37-5:36. Kottilingal similarly moves RTP streams using a SIP SPAWN message and multiple SIP INVITE requests. *Kottilingal*, Fig. 7, 8:18-9:32; *see also* limitation 1.2 above. *VDW Decl.*, ¶¶242-43.

6. Independent Claims 8, 22

Kottilingal alone and in combination with Politis discloses or suggests system claims 8 and 22 with components executing steps that are substantially identical, other than 8.1-8.4 and 22.1-22.4, to the method steps recited in claims 1 and 15, as shown in the table above. *See* Ground 1, claims 8, 22; *VDW Decl.*, ¶244.

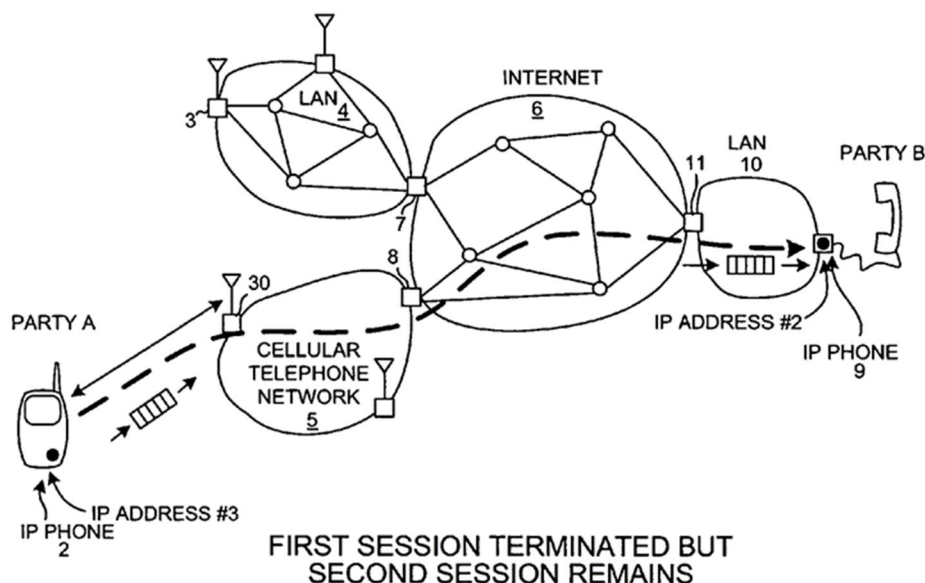
a. Claim limitations 8.1-4/22.1-4: “a transmitting device”; “a receiving device”; “a first network device”; and “a second network device”

Kottilingal discloses or suggests 8.1-8.4/22.1-22.4. *VDW Decl.*, ¶245. For example, Kottilingal discloses “a mobile communication device (for example, a cellular telephone)” (“a transmitting device”). *Kottilingal*, 1:53-54. As another example, Kottilingal also discloses “a target communication device (for example, to another IP telephone that is coupled to the Internet at a remote location)” (“a receiving device”). *Id.*, 1:64-66. Further, Kottilingal discloses a SIP proxy 11 that “relays SIP requests and SIP responses from/to other SIP proxies and SIP session end points” (“a first network device”). *Id.*, 6:4-6. And Kottilingal discloses a SIP proxy 7 that also “relays SIP requests and SIP responses from/to other SIP proxies and SIP session end points” (“a second network device”) *Id.*, 5:45-46; *VDW Decl.*, ¶¶246-49.

7. **Claims 2, 9, 16, 23: “The method[/system] of claim 1[/8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of a stream quality event.”**

Kottilingal alone and in combination with Politis discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶250.

Additionally, Kottilingal discloses or suggests claims 2, 9, 16, and 23’s additional limitations. *VDW Decl.*, ¶251. Kottilingal discloses that the switch from the first network path occurs as a result of a stream quality event. *Kottilingal*, 8:35-41. As Party A’s IP phone 2 moves away from access point 3, the detected signal strength of the 802.11 wireless link between IP phone 2 and access point 3 degrades until a threshold is reached. *Id.* Once the threshold is reached, IP Phone 2 determines it should initialize a second SIP session using its long range cellular telephone transceiver. *Id.*



Id., Fig. 17; *VDW Decl.*, ¶¶252-53.

- 8. Claims 3, 10, 17, 24: “The method of claim 1[8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of stream load balancing.**

Kottilingal alone and in combination with Politis discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶254.

Additionally, Kottilingal discloses or suggests claims 3, 10, 17, and 24’s additional limitations. *VDW Decl.*, ¶255. Kottilingal discloses switching from a first session on a first network to another session on another network when a VoIP/VIP call falls to an unacceptable/undesirable quality (decreasing quality of service). *Id.*, 3:19-31. Further, Kottilingal discloses that “[a]s long as the two sessions remain active, the flow of data payload VoIP packets can be switched from one session to the other and back as desired.” *Id.*, 3:4-6. Specifically, Kottilingal “change[s] the ratio of VoIP/VIP packets transmitted” between a first and second session to “share the communication load” and “achieve to quality of service characteristics not available using either session by itself.” *Id.*, 13:58-14:18; *VDW Decl.*, ¶256.

- 9. Claims 4, 11, 18, 25: “The method[/system] of claim 1[8/15/22] wherein the[/said] switch[ing] from the first network path to the one of a plurality of alternative network paths occurs as a result of an administrator move.”**

Kottilingal alone and in combination with Politis discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶257.

Additionally, Kottilingal discloses or suggests claims 4, 11, 18, and 25's additional limitations. *VDW Decl.*, ¶258. The '554 patent describes switching networks to "achieve...desired load balancing results" and because "[t]he administrator may want to move specific RTP streams to a different WAN link." '554 patent, table at column 4, items 120 ("Stream load balancing"), 130 ("Admin move"). Kottilingal's system switches between interfaces—i.e., networks—depending on a variety of reasons: "[t]he decision of how many air interfaces to use and in what proportion may be a simple or involved function of...variables" including "quality of service and cost information." *Kottilingal*, 15:16-27. As described in claims 3, 10, 17, and 24, one such variable may be to share a communication load between two sessions. And Kottilingal teaches that different sessions carry different costs (e.g., "Party A's cellular telephone provider charges to carry a voice conversation on its cellular telephone network" but a "less expensive wireless LAN air interface" can do the same). *Id.*, 2:19-24. *VDW Decl.*, ¶259.

Therefore, a POSITA would have therefore recognized that an administrator may switch networks to save cost by load balancing. *VDW Decl.*, ¶260. Specifically, because a "cellular telephone provider charges to carry a voice conversation on its cellular telephone network," a POSITA would have understood that provider as the type of administrator the '554 patent discloses because the provider has reason to switch users when call quality degrades to meet customer expectations for a service

the provider offers, and can do so using Kottilingal's load balancing mechanisms to avoid dissatisfied customers that can otherwise achieve the same result using a "less expensive wireless LAN air interface." *Kottilingal*, 2:19-24, *see also* 3:4-6; ("[a]s long as the two sessions remain active, the flow of data payload VoIP packets can be switched from one session to the other and back as desired"); *VDW Decl.*, ¶260.

10. Claims 5, 12, 19, 26: "The method[/system] of claim 1[/8/15/22] wherein a[/the] SIP server associated with the one of a plurality alternative network paths may authenticate the transmission before it is switched."

Kottilingal alone and in combination with Politis discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶261.

Additionally, Kottilingal discloses or suggests claims 5, 12, 19, and 26's additional limitations. *VDW Decl.*, ¶262.

Kottilingal discloses that "[t]he SIP protocol processing layer of SIP proxy 7 examines the addressee information...then uses a set of policies to determine where to send the SIP INVITE request...The SIP protocol processing layer within SIP proxy 7 then resolves the identified SIP proxy #2 to determine the Internet side IP address of SIP proxy #2." *Kottilingal*, 7:19-29; *VDW Decl.*, ¶263.

Furthermore, POSITAs would have recognized that a SIP-supported data transmission is authenticated by a SIP server in the network path. *VDW Decl.*, ¶264. As discussed in ground 1, claims 5, 12, 19, and 26, Salsano's seamless VoIP call

handover solution includes a mobile terminal with SIP client that “relies” on the ability “to authenticate and get an IP address on the different visited networks.” *Salsano*, p.2, 8. Additionally, the IETF multimedia data and control architecture incorporated a SIP protocol disclosing that SIP servers may issue authentication requests and responses. *RFC2543*, 113-14. Thus, POSITAs would have understood that Kottilingal’s disclosure of a SIP-supported data transmission included the situation where a SIP server authenticates the transmission before switching. *VDW Decl.*, ¶¶265-67.

11. Claims 6, 13, 20, 27: “The method[/system] of claim 1[/8/15/22] wherein the source[/transmitting] device is a mobile device.”

Kottilingal alone and in combination with Politis discloses or suggests independent claims 1, 8, 15, 22. *VDW Decl.*, ¶268.

Additionally, Kottilingal discloses or suggests claims 6, 13, 20, and 27’s additional limitations. *VDW Decl.*, ¶269. Kottilingal discloses a source device, which is a mobile device, using its first interface to transmit VoIP/VIP packets. *Kottilingal*, Abstract; *VDW Decl.*, ¶270.

- 12. Claims 7, 14, 21, 28: “The method[/system] of claim 6[/13/20/27] wherein one or more of said plurality of alternative network paths become available to the mobile device during roaming.”**

Kottilingal alone and in combination with Politis discloses or suggests independent claims 6, 13, 20, and 27. *VDW Decl.*, ¶271.

Additionally, Kottilingal discloses or suggests claims 7, 14, 21, and 28’s additional limitations. *VDW Decl.*, ¶272. Kottilingal discloses that a plurality of alternative networks paths become available to the mobile device.

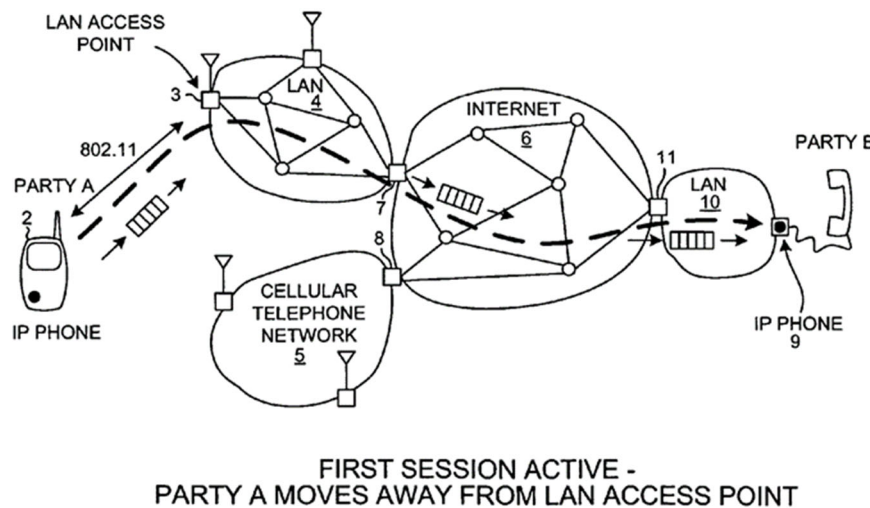


FIG. 6

Kottilingal, Fig. 6. Kottilingal discloses that as a source, Party A’s Phone moves farther from LAN access point 3, the detected signal strength of the 802.11 wireless link between Party A’s IP phone and LAN access point 3 degrades until a threshold is reached. Once the threshold is reached, Party A’s IP phone determines that it should initialize a second SIP session. *Kottilingal*, 8:35-41; *VDW Decl.*, ¶¶273-74.

VII. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION AND DENY INSTITUTION

A. The Board Should Not Deny Institution Under 35 U.S.C. §325

The Examiner did not cite or apply any of Tagg, Kottilingal, or Politis. Thus, the Board should not discretionarily deny institution because neither the prior art nor arguments Petitioners rely upon are “the same or substantially the same” as those “previously...presented to the Office.” 35 U.S.C. § 325(d).

B. The Board Should Not Deny Institution Under 35 U.S.C. §314(a)

The Board has discretion to deny institution under 35 U.S.C. § 314(a). Related to the Director’s June 2022 interim guidance regarding application of the *Fintiv* factors¹³, the Petition presents compelling merits. Thus, under the Interim Guidance, the Board should not deny institution.

Nevertheless, the Board’s decision in *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (Dec. 1, 2020) instructs that a holistic view of the remaining *Fintiv* factors also weighs in favor of institution.

Factor 1 is neutral because no request for stay has been filed in the district court. *Aspen Networks, Inc. v. AT&T Inc., et al.*, case no. 2:23-cv-00476 (E.D. Tex.

¹³ Interim Procedure For Discretionary Denials In AIA Post Grant Proceedings With Parallel District Court Litigation, PTO Director’s Memorandum (June 21, 2022).

Mar. 8, 2024), Dkt. 25; EX-1017 (consolidating cases and designating case no. 2:23-cv-00476 as lead), 1-2.

Under factor 2, trial date has been set for October 20, 2025. *Aspen Networks*, (E.D. Tex. Apr. 19, 2024), Dkt. 34; EX-1018 (Docket Control Order), 1. A Final Written Decision is expected in the present matter in April 2026. Considering the uncertainties of litigation scheduling, particularly where multiple trials are scheduled for the same date, this factor weighs against discretionary denial. EX-1017; EX-1018 (trials for three defendants all scheduled on the date of the lead case).

Factor 3 favors institution. The co-pending litigation is in its early stages, and the investment in it to date has been minimal. Thus, it is premature to evaluate the investment at the time of institution. For example, the parties have not exchanged proposed claim terms or constructions and will not complete claim construction briefing until March 2025. EX-1018, 3. Under the current schedule, the Markman hearing is not until April 2025. *Id.* Fact discovery is not set to close until June 2025, and expert discovery is not set to close until July 2025. *Id.*; *see also* *PEAG LLC v. Varta Microbattery GMBH*, IPR2020-01214, Paper 8 at 17 (Jan. 6, 2021) (finding that since no claim construction hearing had yet been held and discovery was not completed, the little investment in the parallel proceeding weighed against discretionary denial). Thus, this factor weighs against discretionary denial.

Under factor 4, Petitioners have challenged more claims of the '554 patent (1-28) than are asserted (1, 2, 6, 7). EX-1016 (Complaint). Therefore, it is premature to know the extent of overlap in the district court invalidity grounds.

Under factor 5, Petitioners are defendants in the Related Litigations. This factor is neutral as it is “far from an unusual circumstance that a petitioner in inter partes review and a defendant in a parallel district court proceeding are the same.” *See Sand Revolution II, LLC v. Continental Intermodal Grp.-Trucking LLC*, IPR2019-01393, Paper 24 at 12-13 (June 16, 2020).

Under factor 6, other circumstances weigh in favor of institution. Here, the merits of the Petition are strong and supported by compelling evidence of unpatentability. When viewed holistically, the timing of the present Petition is reasonable, there has been relatively limited investment in the Related Litigation. Further, coupling these *Fintiv* considerations with compelling evidence of unpatentability presented in the Petition, the efficiency and integrity of the IPR process is best served by instituting review.

VIII. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

A. Real Party-in-Interest (37 C.F.R. § 42.8(b)(1))

The real party-in-interest in this Petition is Cellco Partnership d/b/a Verizon Wireless, T-Mobile USA, Inc., T-Mobile US, Inc., and AT&T Mobility LLC.¹⁴

B. Related Matters (37 C.F.R. § 42.8(b)(2))

1. Judicial Matters

As of the filing date of this Petition and to the best knowledge of Petitioners, the '554 Patent is involved in the following litigations (the "Related Litigations")

¹⁴ Out of an abundance of caution, Petitioners identify all current defendants in the below identified cases as potential real parties in interest only for the purpose of this proceeding and only to the extent that Patent Owner contends that these separate legal entities should be named real parties in interest in this IPR. Petitioners do so to avoid the potential expenditure of resources to resolve such a challenge. Petitioners also acknowledge that each petitioner has a number of affiliates. No unnamed entity is funding, controlling, or otherwise has an opportunity to control or direct this Petition or Petitioners' participation in any resulting IPR. Petitioners are also not aware of any affiliate that would be barred from filing this Petition under 35 U.S.C. §315(e).

- *Aspen Networks, Inc. v AT&T Inc., et al*, Case No. 2:23-cv-00476 (E.D. Tex.)
- *Aspen Networks, Inc. v Cellco Partnership d/b/a Verizon Wireless*, Case No. 2:23-cv-00557 (E.D. Tex.)
- *Aspen Networks, Inc. v T-Mobile, US, Inc. et al.*, Case No. 2:23-cv-00476 (E.D. Tex.)

These litigations have been consolidated into one lead Case No. 2:23-cv-00476 (above). EX-1017.

2. Administrative Matters:

As of the filing date of this Petition and to the best knowledge of Petitioners, the '554 Patent has not been subject to any Petitions for *inter partes* reviews.

C. Lead/Back-up Counsel (37 C.F.R. § 42.8(b)(3))¹⁵:

Lead Counsel: Jessica Kaiser, Reg. No. 58,937 kaiser-ptab@perkinscoie.com PERKINS COIE LLP 1900 Sixteenth Street, Suite 1400 Denver, CO 80202-5255	Back-up Counsel: Tyler Knox, Reg. No. 79,948 knox-ptab@perkinscoie.com PERKINS COIE LLP 1900 Sixteenth Street, Suite 1400 Denver, CO 80202-5255
--	---

¹⁵ For purposes of this IPR, the Petitioner parties have designated a lead counsel as a commitment to act as a single entity in the proceeding. Counsel for each party will coordinate and act through the designated lead counsel. This designation is not a representation of an attorney-client relationship.

Telephone: (303) 291-2300	Telephone: (303) 291-2300
	Back-up Counsel: Yuanfeng Gao, Reg. No. 79,573 gao-ptab@perkinscoie.com PERKINS COIE LLP 700 Thirteenth Street, N.W. Suite 800 Washington, DC 20005-3960 Telephone: (202) 654-6200
	Back-up Counsel: Kevin Anderson, Reg. No. 43,471 KPAnderson@duanemorris.com Duane Morris LLP 901 New York Avenue, NW, Ste. 700 East Washington, D.C. 20001 Telephone: (202) 776-5213
	Back-up Counsel: Glenn D. Richeson, Reg. No. 73,780 GDRicheson@duanemorris.com DUANE MORRIS LLP, 1075 Peachtree Street NE, Suite 1700 Atlanta, GA 30309-3929
	Back-up Counsel: Scott W. Hejny, Reg. No. 45,882 shejny@McKoolSmith.com McKool Smith, P.C. 300 Crescent Court, Suite 1200 Dallas, TX 75201 Telephone: (214) 978-4000

	Back-up Counsel: Nicholas Mathews, Reg. No. 66,067 nmathews@McKoolSmith.com McKool Smith, P.C. 300 Crescent Court, Suite 1500 Dallas, TX 75201 Telephone: (214) 978-4000
--	---

D. Notice of Service Information (37 C.F.R. § 42.8(b)(4)):

Please direct all correspondence to lead and back-up counsel at the above addresses. Petitioners consent to electronic service at the email addresses above.

IX. CONCLUSION

Petitioners request the Board institute IPR and cancel all Challenged Claims as unpatentable.

Respectfully submitted,

BY: / Jessica Kaiser /
Jessica Kaiser
Reg. No. 58937
Attorney for Petitioner

Date: October 10, 2024
PERKINS COIE LLP
1900 Sixteenth Street, Suite 1400
Denver, CO 80202-5255

CERTIFICATE OF WORD COUNT UNDER 37 CFR §42.24(D)

Pursuant to 37 C.F.R. §42.24(a), Petitioner hereby certifies that portions of the above-captioned Petition for Inter Partes Review of U.S. Patent 8,009,554, in accordance with and reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in this paper is 13,619. Pursuant to 37 C.F.R. §42.24(a), this word count is in compliance and excludes the table of contents, table of authorities, mandatory notices under §42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing. This word count was prepared using Microsoft Word.

Respectfully submitted,

BY: / Jessica Kaiser /
Jessica Kaiser
Reg. No. 58937
Attorney for Petitioner

Date: October 10, 2024
PERKINS COIE LLP
1900 Sixteenth Street, Suite 1400
Denver, CO 80202-5255

CERTIFICATION OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e), 42.8(b)(4) and 42.105, the undersigned certifies that on the October 10, 2024, a complete and entire copy of this Petition for *Inter Partes* Review of U.S. Patent No. 8,009,554 and all supporting exhibits were served via overnight delivery on the Patent Owner at the correspondence address of record as listed on Patent Center:

Polsinelli PC
PO Box 140310
Kansas City, MO 64114-0310
UNITED STATES

A courtesy copy was also sent via electronic mail to Patent Owner's litigation counsel listed below:

FINDLAY CRAFT, P.C.
efindlay@findlaycraft.com
WOMBLE BOND DICKINSON (US) LLP
fabio.marino@wbd-us.com
steve.levitan@wbd-us.com
andrew.beverina@wbd-us.com
jace.williams@wbd-us.com

Respectfully submitted,

BY: / Jessica Kaiser /
Jessica Kaiser
Reg. No. 58937
Attorney for Petitioner

Date: October 10, 2024