IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of:	Gregory G. Raleigh, et al.	
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Filing Date:	April 16, 2015	
Title:	WIRELESS END-USER DEVICE WITH PER-APPLICATION DATA LIMIT AND TRAFFIC CONTROL POLICY LIST LIMITING BACKGROUND APPLICATION TRAFFIC	

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PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT NO. 9,271,184 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

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EXHIBITS

SAMSUNG-1001 U.S. Patent No. 9,271,184 to Raleigh, et al. ("the '184 Patent")

SAMSUNG-1002 Excerpts from the Prosecution History of the '184 Patent ("the Prosecution History")

SAMSUNG-1003 Declaration and Curriculum Vitae of Dr. Kevin Butler

SAMSUNG-1004 Complaint, Headwater Research LLC v. Samsung Electronics Co., Ltd. et al., 2:22-cv-00422, E.D. Tex., October 26, 2022

SAMSUNG-1005 U.S. Patent Publication No. 2006/0039354 A1 ("Rao")

SAMSUNG-1006 U.S. Patent Publication No. 2007/0038763 A1 ("Oestvall")

SAMSUNG-1007 U.S. Patent No. 5,987,611 ("Freund")

SAMSUNG-1008 U.S. Patent Publication No. 2009/0207817 A1 ("Montemurro")

SAMSUNG-1009 U.S. Patent Publication No. 2008/0080458 ("Cole")

SAMSUNG-1010 U.S. Patent No. 7,821,985 ("Van Megen")

SAMSUNG-1011 U.S. Patent Publication No. 2008/0101293 ("Woo")

SAMSUNG-1012 International Patent Publication No. WO 2006/012018 A1 ("Sadowsky")

SAMSUNG-1013 TO SAMSUNG-1014 RESERVED

SAMSUNG-1015 Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (USPTO June 21, 2022) ("Director's Guidance")

SAMSUNG-1016 Samsung Stipulation letter regarding IPR grounds in District court litigation

SAMSUNG-1017 First Amended Complaint, *Headwater Research LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00422, E.D. Tex., November 30, 2022

SAMSUNG-1018 Amended Docket Control Order, *Headwater Research LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00422, E.D. Tex., April 21, 2023

LISTING OF CHALLENGED CLAIMS

Claim 1	
[1pre]	A wireless end-user device, comprising:
[1a]	a wireless wide area network (WWAN) modem to communicate data for Internet service activities between the device and at least one WWAN, when configured for and connected to the at least one WWAN; and
[1b]	one or more processors configured to, for a time when data communication for Internet service activities is provided by the WWAN modem,
[1c]	classify whether a particular application associated with an Internet service access request, and capable of both interacting with a user in a user interface foreground of the device, and at least some Internet service activities when not interacting with a user in the device user interface foreground, is interacting with the user in the device user interface foreground,
[1d]	apply a differential traffic control policy to the Internet service access request, based on

	(i) whether the application is classified as interacting with the user, and (ii) a differential traffic control policy list distinguishing between a first one or more applications resident on the device and a second one or more applications resident on the device,
[1e]	such that, the one or more processors are operable to, in a first state wherein the particular application is one of the first one or more applications, and the particular application is not classified as interacting with a user in the device user interface foreground, block the Internet service access request, and
[1f]	the one or more processors are operable to allow the Internet service access request in at least one other state, and
[1g]	for at least one of the first or second one or more applications, disallow Internet data communication for that application based on an application-specific amount of Internet data usage reaching a limit.
Claim 7	
[7a]	The wireless end-user device of claim 1, further comprising a wireless local area network (WLAN) modem to communicate data for Internet service activities between the device and at least one

	WLAN, when configured for and connected to the at least one WLAN,
[7b]	wherein the one or more processors are further configured to, for a time when the WLAN modem is to provide data communication for Internet service activities, not apply the differential traffic control policy.
Claim 8	
[8]	The wireless end-user device of claim 7, wherein the one or more processors are further configured to, for a time when the WLAN modem is to provide data communication for Internet service activities, not count an application-specific amount of Internet data usage toward the limit.
Claim 9	
[9a]	The wireless end-user device of claim 1, wherein the at least one WWAN comprises a home WWAN and a roaming WWAN, and
[9b]	wherein the one or more processors are further configured to apply the differential traffic control policy for a time when data communication for Internet service activities is provided by the WWAN modem and the roaming WWAN, and to not apply the differential traffic control policy for a time when data communication for Internet

	service activities is provided by the WWAN modem and the home WWAN.

Samsung Electronics Co., Ltd. ("**Petitioner**" or "**Samsung**") petitions for *Inter Partes* Review ("**IPR**") of claims 1 and 7-9 ("**the Challenged Claims**") of U.S. Patent No. 9,271,184 ("**the '184 Patent**"). Compelling evidence presented in this Petition demonstrates at least a reasonable likelihood that Samsung will prevail with respect to at least one of the Challenged Claims.

I. REQUIREMENTS FOR IPR

A. Grounds for Standing

Petitioner certifies that the '184 Patent is available for IPR. This petition is being filed within one year of service of a complaint against Samsung. SAMSUNG-1004. Samsung is not barred or estopped from requesting review of the Challenged Claims on the below-identified grounds.

B. Challenge and Relief Requested

Samsung requests an IPR of the Challenged Claims on the below grounds. Dr. Kevin Butler provides supporting testimony in his Declaration. SAMSUNG-1003, ¶¶1-215.

Ground	Claim(s)	35 U.S.C. § 103
1	1	Rao in view of Oestvall, and Freund
2	7-9	Rao in view of Oestvall, Freund, and Montemurro

The '184 Patent claims priority to a number of provisional applications, the

earliest of which was filed 1/28/2009. SAMSUNG-1001, Cover. While Samsung does not concede that 1/28/2009 is the priority date that should be afforded to the '184 Patent, for the purposes of this proceeding, each of the references asserted in this Petition qualifies as prior art under 35 USC § 102(b) and/or § 102(e) (as shown in the table below) even if the 1/28/2009 date of the provisional application is used as the priority date of the '184 Patent.

Reference	Filing Date	Publication Date
Rao	7/22/2005	2/23/2006
Oestvall	7/2/2004	2/15/2007
Freund	5/6/1997	11/16/1999
Montemurro	2/15/2008	8/20/2009

C. Claim Construction

Petitioner submits that no formal claim constructions are necessary because "claim terms need only be construed to the extent necessary to resolve the controversy." *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); SAMSUNG-1003, ¶19. Petitioner reserves the right to respond to any constructions offered by Patent Owner or adopted by the Board. Petitioner is not conceding that each challenged claim satisfies all statutory requirements, nor is Petitioner waiving any arguments concerning claim scope or grounds that can only be

raised in district court. For this petition, Petitioner applies prior art in a manner consistent with Patent Owner's allegations of infringement before the district court.

D. Level of Ordinary Skill in the Art

A person of ordinary skill in the art ("POSITA") relating to the subject matter of the '184 Patent as of 1/28/2009 would have had (1) at least a bachelor's degree in computer science, electrical engineering, or a related field, and (2) three to five years of experience with networking, power consumption of networked computing devices, and/or wireless digital communications systems. SAMSUNG-1003, ¶15-17. Additional graduate education could substitute for professional experience, and *vice versa*. *Id*.

II. THE '184 PATENT

A. Brief Description

The '184 Patent is directed to selectively "apply[ing] a differential traffic control policy to an application requesting Internet service access" through a "system 2700 for application-specific differential network access control." SAMSUNG-1001, Abstract, 100:28-102:56, FIG. 27; SAMSUNG-1003, ¶¶32-34.

The system "analyzes traffic from [a] network service consuming application," and "uses one or more policies to "determine an appropriate prioritization for traffic to and/or from the network service consuming application." *Id.*, 100:45-101:57. For example, the system can selectively (i) "cause[] the network service consuming application ... traffic to be queued in [an] application traffic cache" for

transmission over a network (*id.*, 101:53-102:11), or (ii) "restrict network access of a particular service usage activity" (*id.*, 102:12-37).

B. Prosecution History

The '184 Patent was allowed on the first action. SAMSUNG-1002, 46-54. In allowing the claims, the Examiner noted that the references cited during prosecution do not render obvious the [1c]-[1g] limitations. *Id.* SAMSUNG-1003, ¶36.

During prosecution, the Examiner did not consider any of Rao, Oestvall, Freund, and Montemurro. *Id.* As discussed below, these references render obvious the Challenged Claims, including the [1c]-[1g] limitations. SAMSUNG-1003, ¶37.

III. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. [GROUND 1] – Claim 1 is rendered obvious by Rao, Oestvall, and Freund

1. Overview of Rao [1]

Rao describes a system for performing "intelligent and client centric prioritization of application network communications on a client based on the type and/or priority of an application." *Id.*, [0179], FIG. 5A; SAMSUNG-1003, ¶¶39-53.

[1] Descriptions of the references and combinations thereof are incorporated into each mapping that includes citations to these references. All emphasis is added unless otherwise indicated.

Rao's system is used to prioritize "data communications" of some applications over others, and "compliment Quality of Service (QOS) networks where network traffic prioritization occurs in intermediary network devices, such as switches and routers." SAMSUNG-1005, [0184].

An example of this system is shown in FIG. 5A (reproduced below).

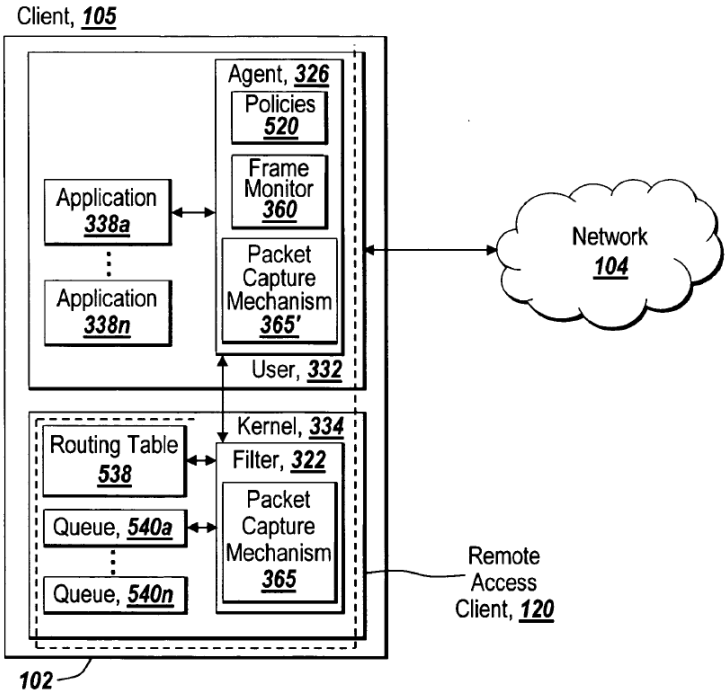


Fig. 5A

SAMSUNG-1005, FIG. 5A[2]

[2] Annotations to the figures throughout this Petition are shown in color.

A "remote access client 105 of computing device 102 is connected to network 104" through one or more "LAN or WAN links" and/or "wireless connections," and "may execute one or more applications 338 a-338 n, which access the network 104 via the agent 326 and filter 322 of the remote access client 120." *Id.* Rao's applications can communicate with one or more servers on the network 104, such as "an application server providing email services such as Microsoft Exchange," "a web or Internet server," "a desktop sharing server," or "a collaboration server." *Id.*, ¶[0090].

Further, Rao's system implements "one or more policies 520 for specifying client-side prioritization of network communications related to applications 338 a-338 n." *Id.*, [0182]. Rao deploys these policies by intercepting packets of network traffic by the applications (e.g., using a "packet capture mechanism 365, 365′"), determining the priority of the packets based on the application that is associated with each packet, and selectively communicating the packets to the network based on the determined priority. *Id.,* [0080], [0184]-[0190], FIGS. 5A-5B. For example, in applying these policies, "the remote access client 120 may determine whether the application 338 a-338 n associated with the network packet is running in the foreground or the background of the client 105," "any priorities ... assigned to the application 338 a-338 n," and/or "any other characteristics or statistics of the application 338 a-338 n." *Id.*

In some cases, Rao's system prioritizes the captured packets by allowing certain packets to be transmitted to the network. For example, Rao's system can use "[a] filter 322 [to] place, arrange, or coordinate network packets into queues 540 a-540 n in support of the priorities" (e.g., queues included on a network driver). *Id.*, [0143], [0180], [0191]. "[T]he network packets of the highest priority queue 540 a-540 n are communicated first, and then the next highest priority queue 540 a-540 n second, and so on." *Id.*, [0194].

In some cases, Rao's system prioritizes the captured packets by blocking network packets from being transmitted to the network, either permanently or temporarily. *Id*., [0102], [0207], [0040], [0194]; SAMSUNG-1003, ¶¶50-53.

As an example, based on the policies, Rao's system can block network packets from being transmitted to the network permanently, such as by "drop[ping] or accept[ing] the network packets depending on their content" (e.g., effectively deprioritizing those packets entirely). SAMSUNG-1005, [0102], [0207]. For instance, the "filter 322" can be used to "discard[] packets" having the lowest priority (e.g., "unwanted packets"), such that the packets are not transmitted to the network. *Id.*

As another example, Rao's system can block network packets from being transmitted to the network temporarily, by "preventing ... at least one network packet of the second application from being communicated via the network stack

ahead of the one or more network packets of the first application" (e.g., by "holding" a packet in a queue, "releasing" the packet upon communication of packets from higher priority applications). *Id.*, [0040], [0194].

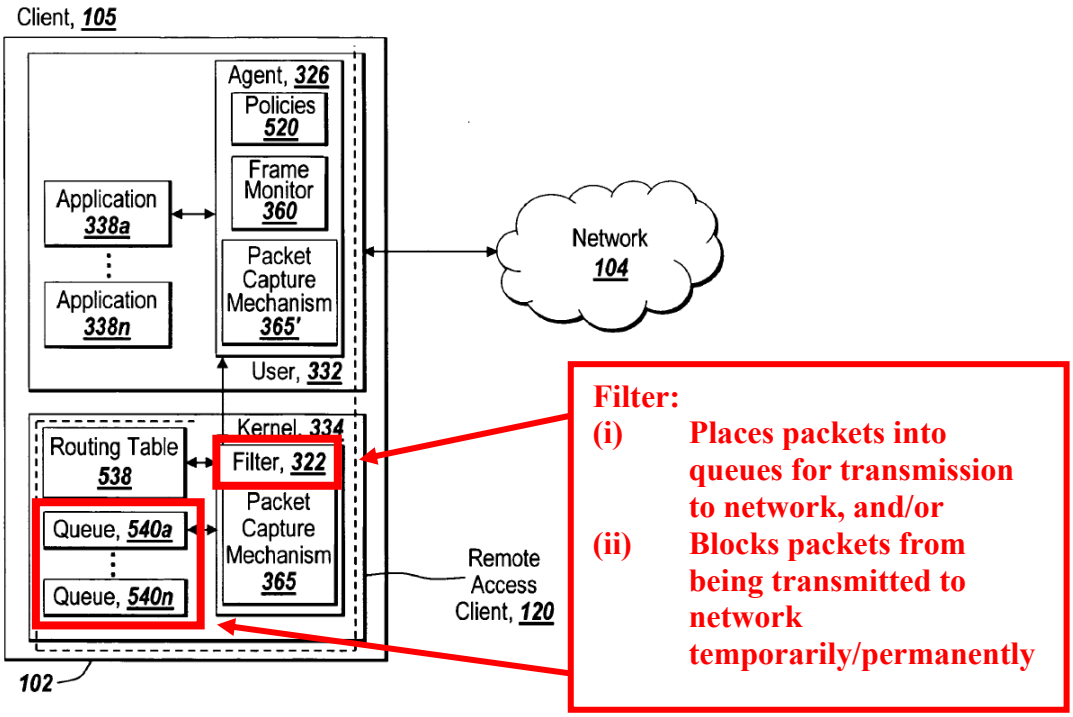


Fig. 5A

SAMSUNG-1005, FIG. 5A (annotated)

2. Overview of Oestvall

Oestvall describes "a method of enabling a multitasking computing device to preserve or conserve resources, such as battery power." SAMSUNG-1006, [0002]; SAMSUNG-1003, ¶¶54-61. According to Oestvall's method, a device classifies applications with respect to various criteria, and selectively provides resources to the applications based on their classifications. SAMSUNG-1006, [0008]-[0017],

[0019]-[0025].

As an example, applications can be classified with respect to "'trust' or certification criteria—i.e. criteria which define the level of trustworthiness of the application." *Id*., [0010]. Specifically, applications can be classified as (i) "untrusted" applications and (ii) "trusted" applications. *Id*., [0015], FIG. 1.

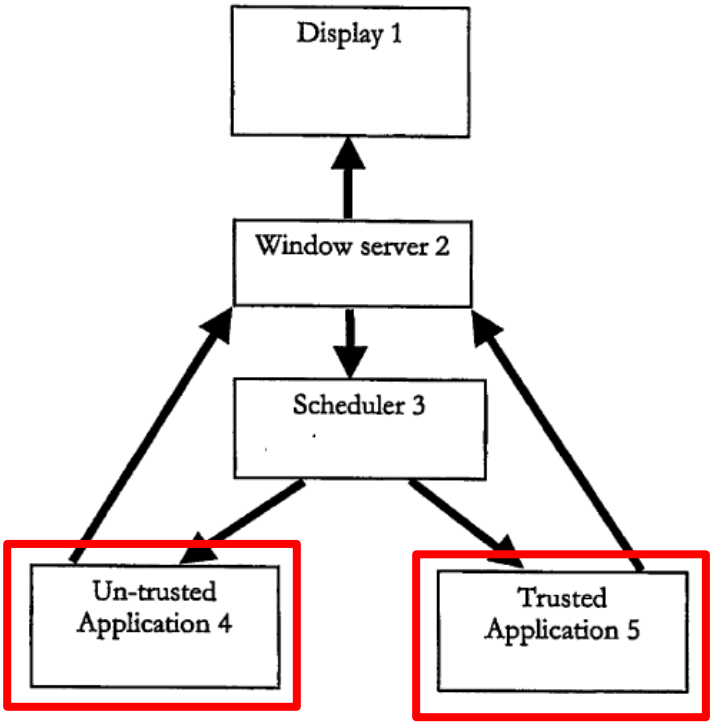


Figure 1

SAMSUNG-1006, FIG. 1 (annotated)

As another example, applications can be classified as "in the background or foreground on [a] display." *Id*., [0023]. Further, applications may switch between

being in the background or the foreground of the display. *Id.*, [0014], [0021], [0025].

Further, the device can provide resources to the applications differently, based on these classifications. *Id*., [0010]-[0017], [0021]-[0025]. For example, the device can selectively:

(i) Prevent an "untrusted" application in the background from running (*e.g.,* by preventing the application from "being given any services or consuming any resources") (*id*., [0023]),

(ii) Allow an "untrusted" application in the foreground to run (*id*., [0021], [0025]), and

(iii) Allow a "trusted" application to run, regardless of whether it is in the foreground or background (*id*., [0015]).

That is, Oestvall's device selectively provides resources to applications that it deems sufficiently important to consume resources (e.g., "trusted" applications and "untrusted" applications in the foreground), while selectively denying resources to applications that it deems not sufficiently important to consume resources (e.g., "untrusted" applications in the background). SAMSUNG-1003, ¶60.

As Oestvall describes, this method "is a valuable addition to power conservation strategies, especially (although without limitation) to battery operated devices." SAMSUNG-1006, [0024]. For example, the method can be performed to

"prevent background untrusted applications from 'polling' for data over a wireless network, an activity that can potentially drain a battery quickly." *Id.* Accordingly, the "battery life" of the device is "increased." *Id*., [0009].

3. Combination of Rao and Oestvall

A POSITA would have found it obvious to modify Rao's system of prioritizing network packets based on the specific application classification criteria taught by Oestvall. SAMSUNG-1003, ¶¶62-82; §III.A.1, §III.A.2. Combining Rao and Oestvall would have involved (1) combining prior art elements according to known methods to yield predictable results; and (2) use of a known technique to improve similar devices (methods, or products) in the same way. *See KSR Int'l Co. v. Teleflex Inc.,* 550 U.S. 398, 415-421, 82 USPQ2d 1385, 1395-97 (2007)*; MPEP 2143*; SAMSUNG-1003, ¶¶62-82.

Specifically, a POSITA would have recognized (i) that Rao and Oestvall are both directed to similar operations having similar purposes (e.g., controlling an application's access to a network in order to preserve limited system resources), and (ii) that Oestvall provides specific classification criteria for achieving a specific technical benefit (e.g., reducing battery consumption in a network-enabled device). SAMSUNG-1003, ¶¶62.

(a) Rao's system selectively allows and blocks network traffic from applications based on various criteria

Rao's system includes several applications configured to transmit network packets to a network (e.g., the Internet via one or more wireless connections). SAMSUNG-1005, [0095],[0125], [0179]; §III.A.1. Rao's system controls each of the applications' access to the network by intercepting packets of network traffic by the applications, determining the priority of the packets based on the application that is associated with each packet, and selectively communicating the packets to the network based on the determined priority. SAMSUNG-1005, [0184]-[0190], FIG. 5B; SAMSUNG-1003, ¶¶64-69.

Specifically, Rao's system prioritizes network packets by implementing one or more policies 520 for controlling network traffic. SAMSUNG-1005, [0182]. These policies can "define prioritization" based on various criteria, including:

(i) "the name of the application,"

(ii) "the type of application,"

(iii) "the type of one or more protocols used by the application[s],"

(iv) "the size of the payload of the network packet"

(v) "whether an application is running in the foreground or the background of the client," and/or

(vi) "the destination network address, such as host name or IP address, and/or destination port number." SAMSUNG-1005, [0182].

Based on these policies, Rao's system can selectively use a filter to (i) allow

network packets to be transmitted to the network or (ii) block the network packets from being transmitted to the network, either permanently or temporarily. SAMSUNG-1005, [0191], [0194], [0207]; SAMSUNG-1003, ¶¶65-68; §III.A.1. Although Rao's description regarding the use of "policies 520" in this context is set forth in the context of "a network disruption shielding technique" (*see, e.g.,* SAMSUNG-1005, [0199]), a POSITA would have found it obvious to also use "policies 520" to discard low priority packets in other circumstances where the network is not disrupted but there nevertheless exists a similar desire to reduce communications over the network (e.g., due to reductions in the network's bandwidth, or a surge in higher priority packets to be sent over the network). SAMSUNG-1003, ¶68. Doing so would have achieved the benefit of ensuring that communication or system resources (e.g., memory) are selectively freed up for higher priority packets/communications. SAMSUNG-1003, ¶68.

For instance, a POSITA would have understood or found it obvious to configure Rao's system to prioritize the captured packets by selectively "drop[ping] or accept[ing] the network packets depending on their content" (e.g., effectively deprioritizing those packets entirely). SAMSUNG-1005, [0102]; SAMSUNG-1003, ¶69. As an example, the "filter 322" can be used to "discard[] packets" having the lowest priority (e.g., "unwanted packets"), such that the packets are permanently blocked from being transmitted to the network. SAMSUNG-1005, [0102];

SAMSUNG-1003, ¶69.

(b) Like Rao, Oestvall's system selectively allows and blocks network traffic from applications based on various criteria, including whether the application is "trusted" or "untrusted"

Like Rao, Oestvall describes an application-based priority system for controlling access to resources. SAMSUNG-1006, [0008]-[0017], [0019]-[0025]; SAMSUNG-1003, ¶70. Further, Oestvall contemplates similar criteria as Rao, and teaches that specific combinations of these criteria can be selected to achieve a specific technical benefit. SAMSUNG-1006, [0008]-[0017], [0019]-[0025]; SAMSUNG-1003, ¶70.

Specifically, Oestvall teaches that certain types of applications (e.g., "untrusted" applications) that are running in the background of the client should be assigned a low priority, such that they cannot access a network. SAMSUNG-1006, [0008], [0014]-[0017], [0021], [0023], [0024]; SAMSUNG-1003, ¶71.
Further, Oestvall teaches that certain other types of applications (e.g., "trusted" applications) should be assigned a high priority, such that they can continue to access a network. SAMSUNG-1006, [0008], [0014]-[0017], [0021], [0023], [0024]; SAMSUNG-1003, ¶72.

As Oestvall describes, these combinations of criteria can be used to "prevent background untrusted applications from 'polling' for data over a wireless network, an activity that can potentially drain a battery quickly." SAMSUNG-1006, [0024];

SAMSUNG-1003, ¶73.

(c) A POSITA would have been led to modify Rao's system to allow/block an application's network traffic based on the application's "trusted/untrusted" status as taught by Oestvall to thereby reduce battery drain

A POSITA would have readily recognized that Rao's remote access client 120 could use a filter to discard packets from background untrusted applications (e.g., effectively deprioritizing those packets entirely) to thereby prevent them from being communicated over network 104. SAMSUNG-1003, ¶74. As a consequence, the battery life of a mobile device client 105 would be increased, as taught by Oestvall. SAMSUNG-1003, ¶74. Indeed, while Oestvall teaches increasing battery life by preventing such applications from running and thereby engaging in any network communications, a POSITA would have recognized that the power usage associated with using a wireless modem to transmit network packets to a network far exceeds the power usage associated with an application generating those network packets. SAMSUNG-1003, ¶74. *Also see, generally*, SAMSUNG-1009 and SAMSUNG-1010. Accordingly, a POSITA would have readily recognized that Rao's system could be used to enable a similar increase in battery life by specifically preventing the battery draining activity identified by Oestvall (i.e., preventing the network/packet communications that result in excessive battery drain). SAMSUNG-1003, ¶74.

That is, a POSITA would have recognized (i) that Rao's system is ready for improvement in this way based on Oestvall's teachings and (ii) that such an improvement would enable the system to not only provide the benefits identified by Rao but also provide the additional benefit taught by Oestvall of increased battery life when client 105 is a wireless mobile device. SAMSUNG-1003, ¶74. Moreover, this increase in battery life would be obtained without having to completely shut down the application as disclosed by Oestvall. SAMSUNG-1003, ¶75. In particular, a POSITA would have recognized that, based on Rao, a system can reduce battery drain while controlling the network activities of applications to a much greater degree of granularity than offered by Oestvall's relatively blunt approach of completely shutting down applications to achieve this benefit. SAMSUNG-1003, ¶75.

As an example of this modification, a POSITA would have configured Rao's "filter 322" to selectively block network packets and/or transmit network packets to the network, specifically based on the criteria specified by Oestvall. SAMSUNG-1003, ¶76. Specifically, the "filter 322" would selectively "discard[]" network packets from applications that are "untrusted" and running in the background (e.g., a classification of applications that should be assigned a low priority, as taught by Oestvall). SAMSUNG-1003, ¶76. Accordingly, these applications can no longer poll for data over a wireless network (i.e., an activity that Oestvall

teaches as being particularly burdensome on a battery). SAMSUNG-1003, ¶76.

Further, the "filter 322" would selectively allow the transmission of network packets from applications that are either (i) "untrusted" and running in the foreground or (ii) "trusted," regardless of whether they are running in the foreground or the background (e.g., classifications of applications that should be assigned a high priority, as taught by Oestvall). SAMSUNG-1003, ¶77. Accordingly, applications that are sufficiently important can continue to exchange data in accordance with one or more Internet services. SAMSUNG-1003, ¶77.

An example modification to Rao's system in view of Oestvall's teachings ("Rao-Oestvall system") is shown below.

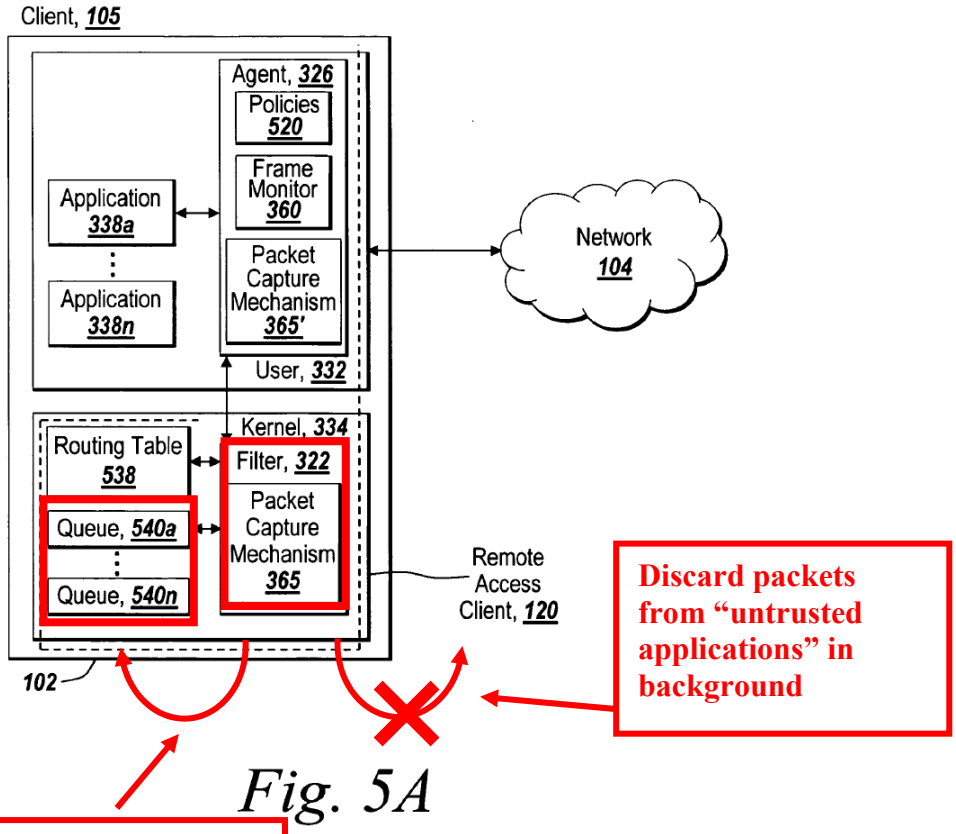


Fig. 5A

SAMSUNG-1005, FIG. 5A (annotated)

While the Rao-Oestvall system reduces battery drain by blocking an application's transmission of network packets permanently as taught by Rao (as distinguished from shutting down the application entirely to reduce battery drain as taught by Oestvall), a POSITA also would have found it obvious to configure the Rao-Oestvall system to additionally or alternatively selectively block network packets temporarily as also taught by Rao, in at least some situations where more granular control of battery draining activities is desired. SAMSUNG-1003, ¶79.

For example, Rao describes that its system can block network packets from being transmitted to the network temporarily, by "preventing ... at least one network packet of the second application from being communicated via the network stack ahead of the one or more network packets of the first application" (e.g., by "holding" a packet in a queue, "releasing" the packet upon communication of packets from higher priority applications). SAMSUNG-1005, [0040], [0149]; §III.A.1; SAMSUNG-1003, ¶80. As Rao explains, this "holding" technique can be beneficial in "provid[ing] a packet by packet prioritization across all applications ... and intercepted network packets" and to implement prioritization according to different levels of "granularity." SAMSUNG-1005, [0191].

A POSITA would have recognized that "holding" of network packets of lower priority applications until the packets of higher priority applications have been transmitted would increase the likelihood that the battery will have sufficient remaining energy to successfully transmit the packets of the higher priority applications, thereby preferentially allocating the limited battery energy resource to those higher priority applications over the lower priority applications. This enables lower priority applications (e.g., "untrusted" applications in the background) to still be able to communicate over the network but to do so in accordance with their lower level of priority and without interfering with the activities of other applications having higher priorities (e.g., "untrusted" applications in the foreground or "trusted" applications). SAMSUNG-1003, ¶81.

Accordingly, consistent with Rao's teachings, the Rao-Oestvall system can control the battery draining activities of applications according to a greater degree of granularity than offered by Oestvall alone and, in doing so, achieve a similar reduction in battery drain while also minimizing disruption to the operation of the applications. SAMSUNG-1003, ¶82.

4. Overview of Freund

Freund describes "[a] computing environment with methods for monitoring access to an open network, such as WAN or the Internet." SAMSUNG-1007, Ab-

stract; SAMSUNG-1003, ¶¶83-87. In an exemplary configuration, Freund's system includes several client devices, each having "a client-side monitoring component for monitoring Internet access" by that client device. SAMSUNG-1007, 14: 51-62; FIG. 3A, 310a-310c. Further, Freund's system includes "a server 321 (or another client) having a "supervisor 323 [that] directs runtime monitoring operations" by "maintain[ing] the access rules for the client based filter and verif[ying] the existence and proper operation of the client-based filter application"). *Id.*, 3:50-4:4, 14:62-67.

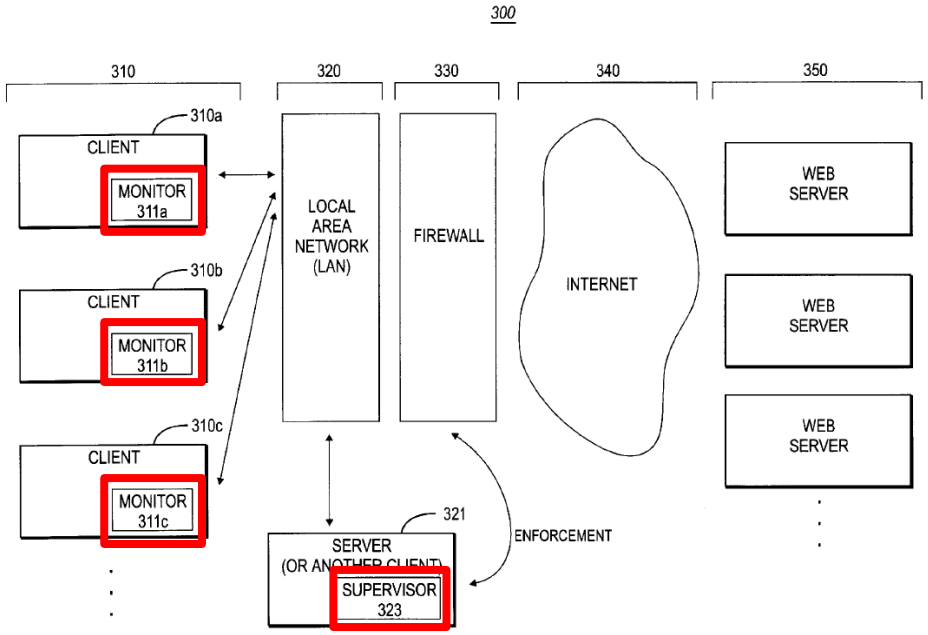


FIG. 3A

SAMSUNG-1007, FIG. 3A (annotated)

Freund's system "monitor[s] and regulate[s] Internet access on a per applica-

tion basis," and "specif[ies] which applications can (and cannot) access the Internet." *Id.,* 10:44-50. For instance, Freund's system can "monitor[] access to the Internet by individual applications ... to not only track Internet traffic but also [to] determine in many cases data exchanged on a per application basis." *Id.,* 11:10-15. As Freund teaches, "per application monitoring simplifies the task of tracking bandwidth utilization for a network, including providing detailed review on how the Internet access is being used," and can "greatly ease[] planning of hardware and connection requirements." Further, this system can "avert ... [i]nadvertent disruptions of the network by individual users, such as bandwidth hording [sic] by a user using RealAudio for listening to a Web audio 'broadcast.'" *Id.,* 11:21-28.

In an exemplary monitoring process, Freund's system performs "bandwidth and interactive use monitoring" in which a "Client Monitor maintains a list of active Applications (processes) with various fields to track activities and a global activity record." *Id.,* 30:10-29, FIGS. 13A-13B. For each of the applications' on a device, Freund's "Client Monitor" intercepts the application's requests to access the Internet (e.g., "Winsock ... calls" to a "communications driver," such as "Winsock send() or recv() calls" to send data and receive data, respectively). *Id.,* 29:17-30:9, FIG. 13A (1301). Further Freund's "Client Monitor" determines the amount of Internet data that is transmitted and/or received by the application (e.g., "data lengths"), and tracks the amount of data (e.g., by "[a]dd[ing] the data lengths

to a DataIn or DataOut accumulator or counter of the Application's list entry and global activity record"). *Id.*, 30:24-29; FIG. 13A (1302(D)).

Further, Freund's system selectively allows or prevents the application from accessing the Internet based on the amount of data used by that application. *Id.* For example, "[i]f [an] application is not allowed to access the Internet ... then [the] client monitor can stop [that] application from accessing the Internet and/or warn user." *Id.,* 5:61-64. In particular, with respect to bandwidth monitoring, "[i]f the DataIn or DataOut fields exceed rule-based quantity either for the specific Application or the user/workstation, the Client Monitor disables future Internet access and/or warns the user." *Id.*, 30:24-29; FIG. 13A, 1302(E).

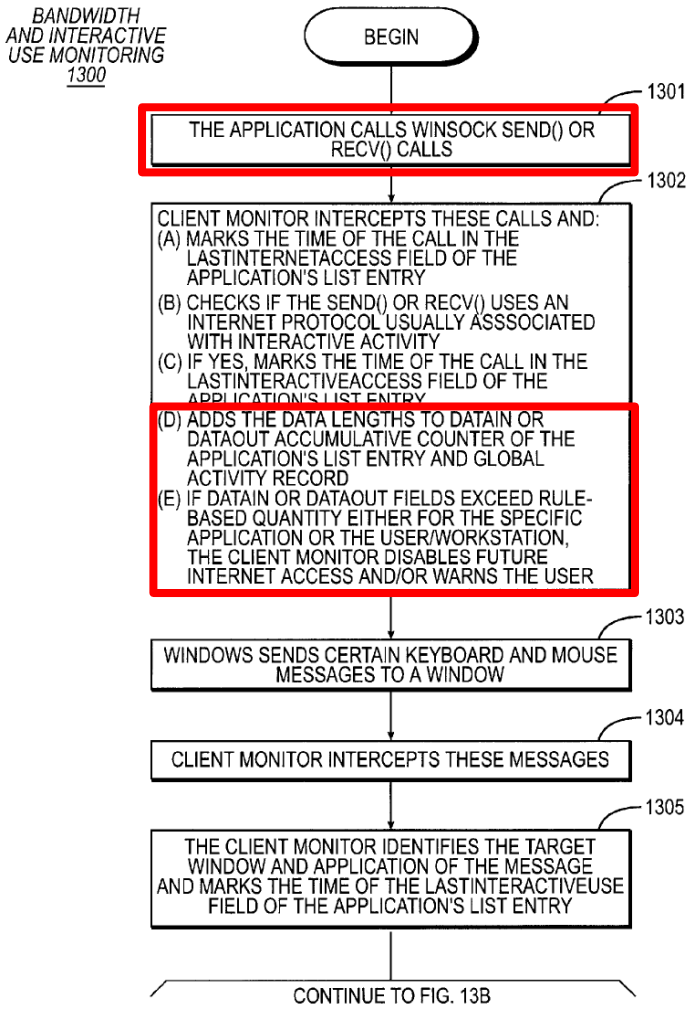


FIG. 13A

SAMSUNG-1007, FIG. 3A (annotated)

5. Combination of Rao-Oestvall and Freund

In view of Freund, a POSITA would have found it obvious to modify the Rao-Oestvall system to selectively enable an application to access a network (e.g., the Internet) based on the amount of network data that has been used by that application. SAMSUNG-1003, ¶¶88-93; §III.A.3, §III.A.4. Combining Rao-Oestvall with Freund would have involved (1) combining prior art elements according to

known methods to yield predictable results; and (2) use of a known technique to improve similar devices (methods, or products) in the same way. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-421, 82 USPQ2d 1385, 1395-97 (2007); MPEP 2143; SAMSUNG-1003, ¶¶88-93.

In particular, a POSITA would have recognized that, like the Rao-Oestvall system, Freund's system is configured to control an application's access to a network in order to preserve limited system resources. SAMSUNG-1007, 11:19-28; SAMSUNG-1003, ¶89. Further, a POSITA would have recognized that Freund provides a specific "bandwidth and interactive use monitoring" technique for selectively blocking an application's request to access a network in order to achieve a specific technical benefit (e.g., to "avert ... [i]nadvertent disruptions of the network by individual users, such as bandwidth hording [sic] by a user using RealAudio for listening to a Web audio 'broadcast'"). SAMSUNG-1007, 11:19-28; SAMSUNG-1003, ¶¶88-90.

In view of Freund, a POSITA would have found it obvious to modify the Rao-Oestvall system to additionally include Freund's "bandwidth and interactive use monitoring" in order to prevent an application from hoarding the bandwidth of a network (e.g., to avert "[i]nadvertent disruptions of the network by individual users"). SAMSUNG-1007, 11:19-28; SAMSUNG-1003, ¶91. Further, a POSITA would have recognized that Freund's "bandwidth and interactive use monitoring"

enhances the Rao-Oestvall system's ability to control an application's access to a network and to preserve limited system resources by accounting for the aggregate amount of data transmitted by an application over the network. SAMSUNG-1003, ¶91.

As an example of this modification, a POSITA would have modified the Rao-Oestvall system to additionally include (i) Freund's "Client Monitor" in Rao's client device, and (ii) Freund's "Supervisor" on a server remote from Rao's client device. SAMSUNG-1003, ¶¶91-93. Specifically, a POSITA would have configured the "Supervisor" to instruct the "Client Monitor" to perform Freund's "bandwidth and interactive use monitoring" in accordance with a set of filter rules. SAMSUNG-1003, ¶91. According to these rules, the "Client Monitor" would (i) intercept an application's requests to access the Internet, (ii) determine and track the amount of Internet data that is transmitted and/or received by that application, and (iii) disable future Internet access by that application if the amount of data exceeds a particular application-specific data limitation (see step 1b below). SAMSUNG-1003, ¶91.

If an application is permitted to access the Internet (e.g., the amount of data used by the application does not yet exceed the application-specific data limitation), the network packets generated by that application would be filtered in accordance with the Rao-Oestvall combination, as described above (see steps 1a, 2a,

and 2b below). SAMSUNG-1003, ¶92.

An example modification to the Rao-Oestvall system in view of Freund's teachings ("Rao-Oestvall-Freund combination" or "ROFC") is shown below.

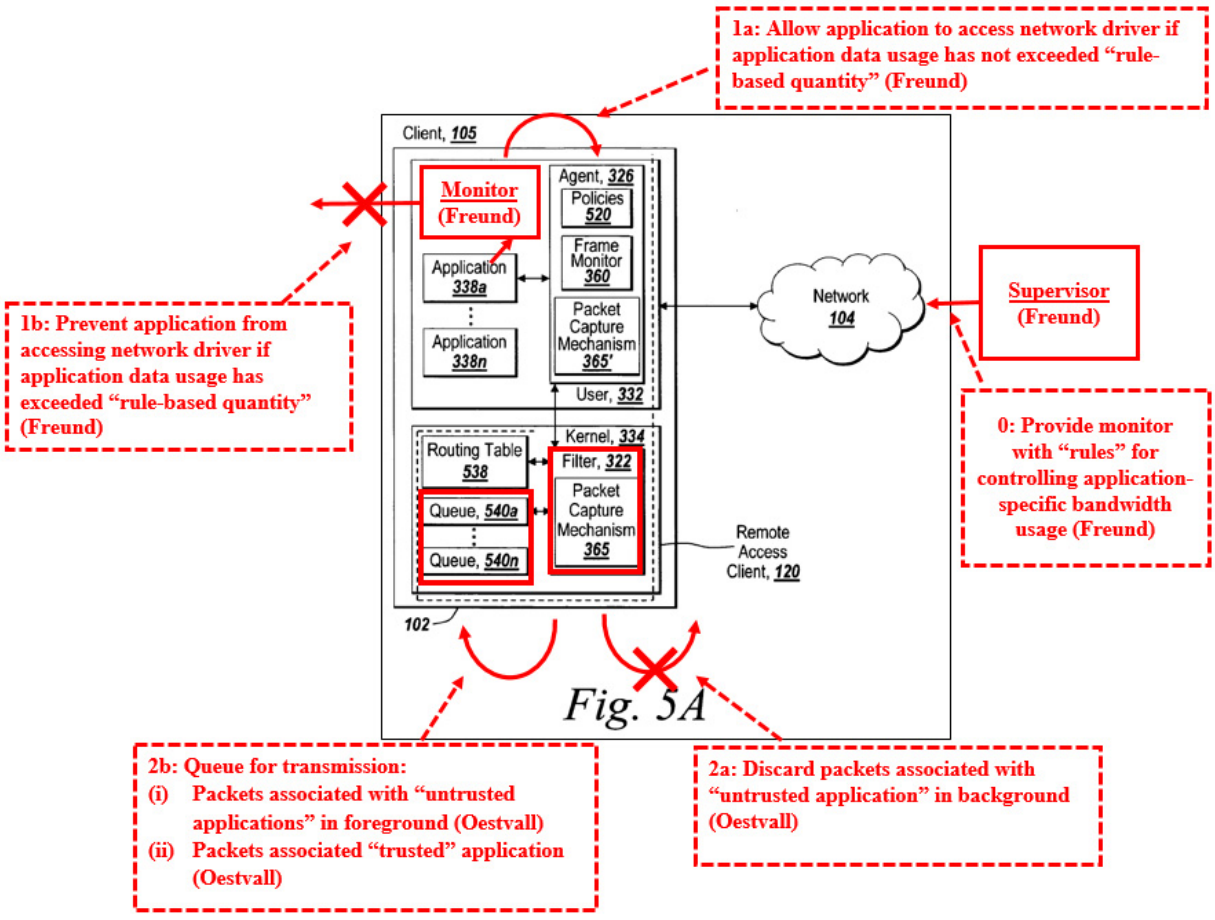


Fig. 5A

Rao's FIG. 5A (revised and annotated)

6. Analysis

[1pre]

ROFC renders obvious [1pre]. SAMSUNG-1003, ¶¶94-95.

Rao describes a device that is configured to communicate data wirelessly

with a WAN and the Internet, such as to obtain email services, access a web or Internet service, access a desktop sharing server, and/or access a collaboration server (***wireless end-user device***). SAMSUNG-1005, [0090], [0125]; §III.A.1.

[1a]

ROFC renders obvious [1a]. SAMSUNG-1003, ¶¶96-99.

Rao describes a device that is configured to communicate data wirelessly with a WAN and the Internet (e.g., using a "wireless network adapter" and/or a "modem") (***WWAN modem***). SAMSUNG-1005, [0125].

Further, Rao describes that the device is configured to communicate data for Internet service activities, such as to obtain email services, access a web or Internet service, access a desktop sharing server, and/or access a collaboration server **(*communicate data for Internet service activities between the device and at least one WWAN, when configured for and connected to the at least one WWAN*).** SAMSUNG-1005, [0090].

To the extent that Rao does not expressly describe a "WWAN modem," a POSITA would have understood or found it obvious to implement a WWAN modem in Rao's system in view of Rao's teaching that (i) a device can access a WAN or the Internet wirelessly, and (ii) a "modem" can be used to interface the device with "any type of network." SAMSUNG-1005, [0125]. SAMSUNG-1003, ¶99.

Further, network configurations for mobile devices that enabled WWAN connectivity via modems were conventional by the Critical Date. SAMSUNG-1003, ¶99; SAMSUNG-1009, [0035], FIG. 2.

[1b]

ROFC renders obvious [1b]. SAMSUNG-1003, ¶¶100-104.

Rao describes "a computing device useful for practicing an embodiment of the [subject matter described by Rao]." SAMSUNG-1005, [0118], FIG. 1D.

As Rao describes, "[e]ach computing device 102 includes a central processing unit [121]"[3] (***one or more processors***) that includes "any logic circuitry that responds to and processes instructions fetched from the main memory unit 104." SAMSUNG-1005, [0118]. *See also* SAMSUNG-1005, [0121] ("main processor 100"); FIG. 1E.

[3] Rao's [0118] erroneously refers to the "central processing unit" as "102," rather than "121" as depicted in FIG. 1D.

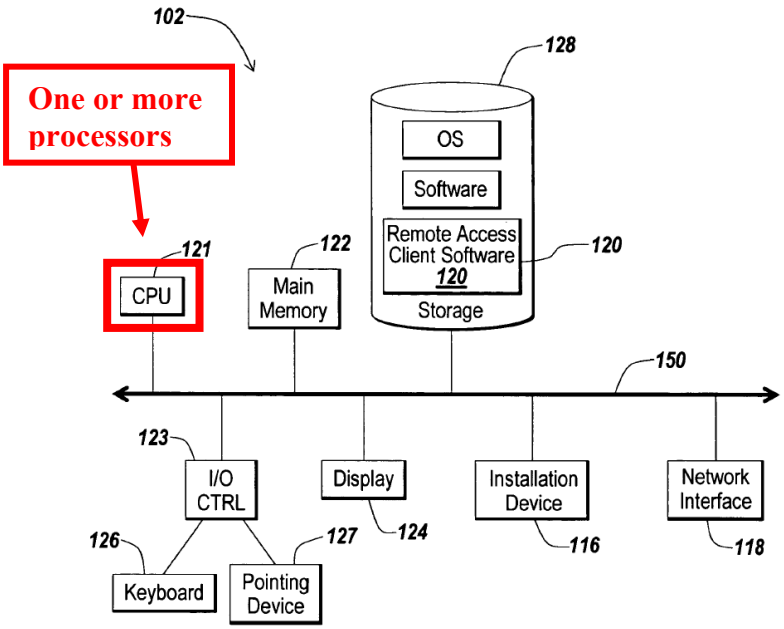


Fig. 1D

SAMSUNG-1005, FIG. 1D (annotated)

Further, as described in more detail below, Rao describes performing various operations using the processors for a time ***when data communication for Internet service activities is provided by the WWAN modem.*** *See* [1c]-[1g].

[1c]

ROFC renders obvious [1c], which includes features [1c(i)], [1c(ii)] and [1c(iii)]. SAMSUNG-1003, ¶¶105-118.

Regarding [1c(i)], Rao describes that an application can communicate with one or more servers on the network 104, an example of which is the Internet.

SAMSUNG-1005, [0090], [0095], [0125]. Further, Rao describes that an application can access services provided by a server 102e connected to the network 104 (i.e., the Internet), such as those provided by "an application server providing email services such as Microsoft Exchange," "a web or Internet server," "a desktop sharing server," or "a collaboration server" (***a particular application associated with an Internet service access request***). SAMSUNG-1005, [0090]; FIG. 1A.

In particular, in Rao, an application may attempt to access an Internet service by transmitting packets to that Internet service (***Internet service access request***). *See, e.g.,* SAMSUNG-1005, [0179], [0184]. SAMSUNG-1003, ¶107.

A POSITA would have understood or found it obvious that Rao contemplates its applications being "associated with an Internet service access request" based on Rao's teachings of its applications communicating over the Internet and receiving service from servers. SAMSUNG-1005, [0090]; SAMSUNG-1003, ¶108. That is, based on these teachings, a POSITA would have understood or found it obvious that Rao's applications would be configured to send packetized communications over the Internet to such servers requesting access to their corresponding services ***(an Internet service access request***) to enable such applications to receive mail, Web, and/or other data content. SAMSUNG-1005, [0090]; SAMSUNG-1003, ¶108.

Regarding [1c(ii)], as discussed above, Rao describes that applications can

request access to Internet services." SAMSUNG-1005, [0090]. Further, Rao describes that an application may be "running in the foreground or the background of the client." SAMSUNG-1005, [0182]. *See also* SAMSUNG-1005, [0188]-[0189]. A POSITA would have understood or found it obvious that Rao's applications envision interactions with users in the foreground (e.g., such that the user can engage in email, web, desktop sharing, and/or collaboration activities) ***(interacting with a user in a user interface foreground of the device***). SAMSUNG-1003, ¶109.

Further, Rao contemplates that applications that are running in the background may perform at least some Internet service activities, such as by generating network packets (***capable of ... at least some Internet service activities when not interacting with a user in the device user interface foreground*).** SAMSUNG-1005, [0003]. For example, a POSITA would have understood or found it obvious that Rao's email application can perform Internet service activities in the background (e.g., polling an email server for updates and/or retrieving emails in the background). SAMSUNG-1005, [0003], [0090]; SAMSUNG-1003, ¶110.

To the extent that Rao does not expressly describe that an application would be capable of both (i) interacting with a user in a user interface foreground of the device, and (ii) at least some Internet service activities when not interacting with a user in the device user interface foreground, this feature would have been obvious in view of Oestvall. SAMSUNG-1003, ¶111. For example, Oestvall describes that

a device includes applications that are capable of both:

(i) Running the "foreground" and "present[ing] a user interface with which a user can interact" (***interacting with a user in a user interface foreground of the device***), and

(ii) Running in the "background" and "not being interacted with by an end-user and ... present[ing] no user interface with which a user could interact (but it could for example present an icon indicating its presence and the fact that it was still active)" (***not interacting with a user in the device user interface foreground)***. SAMSUNG-1006, [0006], [0015].

Further, Oestvall describes that an application can perform network activities, and that applications may be capable of consuming "resources" (e.g., by performing network service activities such as "'polling' for data over a wireless network") when in the background (***capable of ... at least some ... activities when not interacting with a user in the device user interface foreground***). SAMSUNG-1006, [0023]-[0024].

In view of Oestvall, a POSITA would have understood or found it obvious that Rao's applications can interact with users in the foreground by "present[ing] a user interface with which a user can interact" in order to allow users to engage in activities such as email, web, desktop sharing, and/or collaboration) ***("interacting***

with a user in a user interface foreground of the device"). SAMSUNG-1006, [0006]; SAMSUNG-1003, ¶¶114-115.

Further, in view of Oestvall, a POSITA would have understood or found it obvious that Rao's applications can perform Internet service activities (e.g., an email application polling an email server for updates and/or retrieving emails), even if the user is not interacting with the application and/or the application is not presenting a user interface with which a user could interact ***(capable of … at least some Internet service activities when not interacting with a user in the device user interface foreground)***. SAMSUNG-1006, [0024]; SAMSUNG-1003, ¶116.

Regarding [1c(iii)], Rao describes that the device classifies "whether an application is running in the foreground or the background of the client 105" (***classify whether a particular application ... is interacting with the user in the device user interface foreground***). SAMSUNG-1005, [0182], [0188]-[0189]; SAMSUNG-1003, ¶117.

Oestvall also describes that the device uses a "window server component 2 ... to determine if an application is in the background or foreground on display" (***classify whether a particular application ... is interacting with the user in the device user interface foreground***). SAMSUNG-1006, [0008], [0016]-[0017], [0022]-[0023]; SAMSUNG-1003, ¶118.

[1d]

ROFC renders obvious [1d]. SAMSUNG-1003, ¶¶119-139.

A discussed in [1c], Rao describes an application is associated with an ***Internet service access request***. [1c], SAMSUNG-1003, ¶120.

Rao's system controls each of the applications' Internet service access requests by intercepting packets of network traffic by the applications, determining the priority of the packets based on the application that is associated with each packet, and selectively communicating the packets to the network based on the determined priority. SAMSUNG-1005, [0184]-[0190], FIG. 5B. SAMSUNG-1003, ¶121.

Specifically, Rao's system includes "a packet capture mechanism 365, 365′ ... for intercepting network traffic of any of the applications 338 a-338 n of the client 105." SAMSUNG-1005, [0080], [0184]-[0186], FIG. 5A.

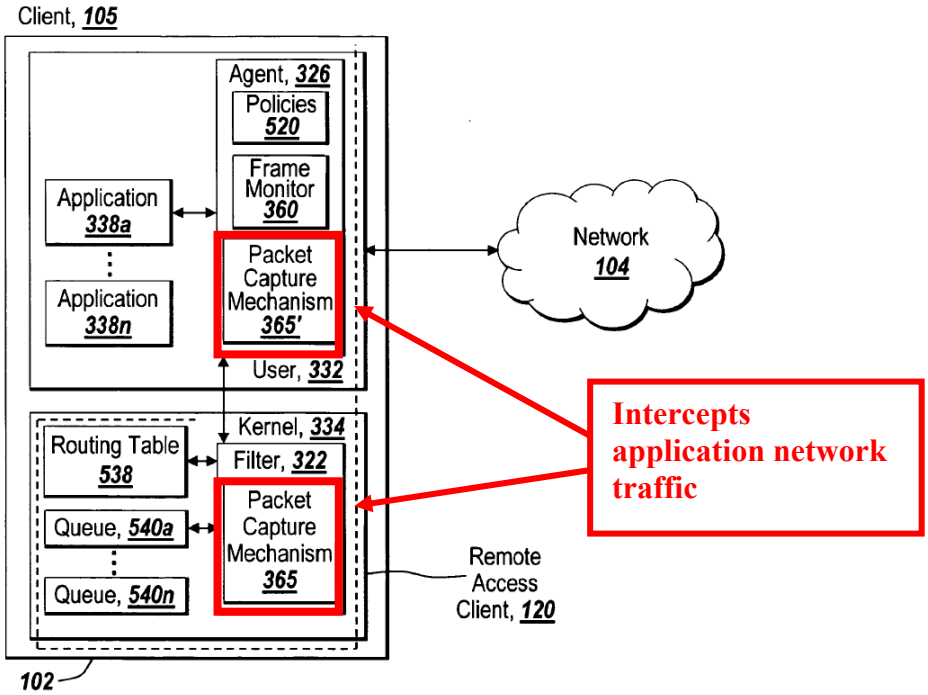


Fig. 5A

SAMSUNG-1005, FIG. 5A (annotated)

Further, Rao's system prioritizes the intercepted network packets by implementing one or more policies for controlling network traffic (***applying a differential traffic control policy to the Internet service access request***). SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶¶122-123. These policies can "define prioritization" based on various criteria, including:

(i) "the name of the application,"

(ii) "the type of application,"

(iii) "the type of one or more protocols used by the application[s],"

(iv) "the size of the payload of the network packet"

(v) "whether an application is running in the foreground or the background of the client," and/or

(vi) "the destination network address, such as host name or IP address, and/or destination port number." SAMSUNG-1005, [0182].

Specifically, in applying Rao's policies to differentially distinguish how the network traffic of distinct applications will be handled, Rao's system considers any one or more of the above criteria, including "whether an application is running in the foreground or the background of the client" (***applying … based on … whether the application is classified as interacting with the user)***. SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶124.

Further, by also considering the "type[s]" of applications and/or differently named applications, among other criteria, the application of Rao's policies for handling application traffic is further based on ***distinguishing between a first one or more applications resident on the device and a second one or more applications resident on the device.*** SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶125.

Rao describes that "[t]he policies ... may comprise any type and format of syntax and/or language for specifying a policy, and may be provided via any type and/or form of medium," which a POSITA would have understood would encompass one or more lists (***a differential traffic control policy list***). SAMSUNG-1005, [0183]; SAMSUNG-1003, ¶126.

However, to the extent that Rao does not expressly describe representing these applications in the form of a list, a POSITA nevertheless would have found it obvious to implement such a list, as they would have recognized that a list is a commonplace "format of syntax and/or language" for enumerating data. SAMSUNG-1003, ¶127.

Further, in accordance with its policies, Rao's system selectively uses a filter to (i) allow network packets to be transmitted to the network or (ii) block the network packets from being transmitted to the network, either permanently or temporarily, thereby applying the polices to the Internet service access request embodied by those network packets. SAMSUNG-1005, [0191], [0194], [0207]; SAMSUNG-1003, ¶128. *See also* [1c]; §III.A.3. In at least some implementations, the filter also selectively determines which "types of packets to filter" based on "configuration settings" provided by the "agent 326." SAMSUNG-1004, [0104]; SAMSUNG-1003, ¶128.

To the extent that Rao does not expressly describe one or more of the features of [1d], these features nevertheless would have been obvious in view of Oestvall. SAMSUNG-1003, ¶129.

Like Rao, Oestvall describes an application-based priority system for controlling access to resources. SAMSUNG-1006, [0008]-[0017], [0019]-[0025]; SAMSUNG-1003, ¶130. Further, Oestvall contemplates at least some of the same

criteria as Rao, and teaches that specific combinations of these criteria can be selected to achieve a specific technical benefit. SAMSUNG-1006, [0008]-[0017], [0019]-[0025]; SAMSUNG-1003, ¶130.

Specifically, like Rao, Oestvall describes classifying applications into different types. SAMSUNG-1003, ¶131. In particular, Oestvall describes that applications can be classified with respect to "'trust' or certification criteria—i.e. criteria which define the level of trustworthiness of the application" (***a differential traffic control policy list***). SAMSUNG-1006, [0010]. For instance, applications can be classified as (i) "untrusted" applications (***distinguishing between a first one or more applications resident on the device***) and (ii) "trusted" applications (***... and a second one or more applications resident on the device***). SAMSUNG-1006, [0015], FIG. 1.

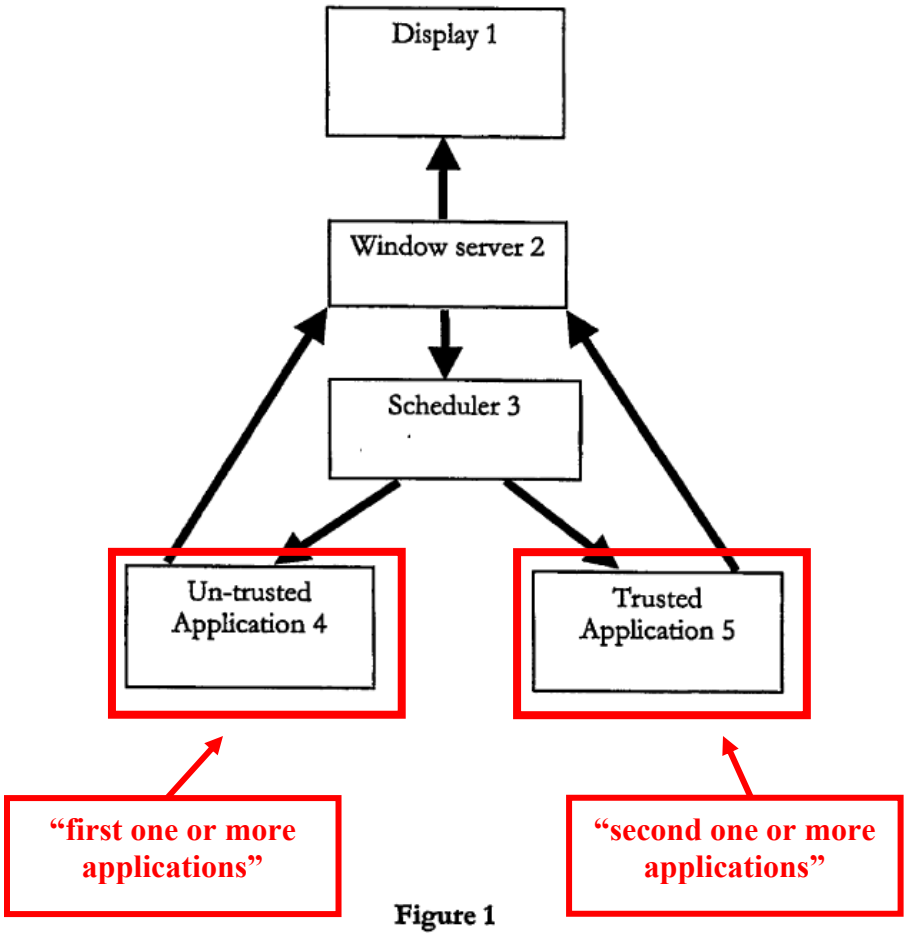


Figure 1

SAMSUNG-1006, FIG. 1 (annotated)

To the extent that Oestvall does not expressly describe representing these applications in the form of a list, a POSITA nevertheless would have found it obvious to implement such a list, as they would have recognized that a list is a commonplace format of syntax and/or language for enumerating data. SAMSUNG-1003, ¶132.

Further, like Rao, Oestvall describes that applications can be classified as "in

the background or foreground on [a] display" (***whether the application is classified as interacting with the user***). SAMSUNG-1006, [0023]; SAMSUNG-1003, ¶133. *See also* [1c].

In addition, Oestvall describes applying a traffic control policy to an application differently, depending on these classifications. SAMSUNG-1003, ¶¶134. Specifically, Oestvall teaches selectively denying resources to applications based on these classifications ***(apply a differential traffic control policy to the Internet service access request***). SAMSUNG-1003, ¶134. For example, Oestvall's system denies resources to applications that are <u>not</u> sufficiently important to consume resources (e.g., such that those applications cannot "'poll[]' for data over a wireless network"), and provides resources to applications that <u>are</u> sufficiently important to consume resources (e.g., such that those applications can "'poll[]' for data over a wireless network"). SAMSUNG-1006, [0008], [0010], [0015]-[0017], [0022]-[0025].

As discussed in §III.A.3, a POSITA would have found it obvious to modify Rao's system of prioritizing network packets based on the specific application classification criteria taught by Oestvall, in order to achieve the specific technical benefit taught by Oestvall (e.g., reducing battery consumption in a network-enabled device). SAMSUNG-1003, ¶135.

As discussed in §III.A.3, according to this combination, Rao's "filter 322"

would selectively "discard" network packets from applications that are "untrusted" and running in the background (e.g., a classification of applications that should be assigned a low priority, as taught by Oestvall) (***apply a differential traffic control policy to the Internet service access request based on (i) the application being classified as not interacting with the user, and (ii) the application being a first one or more applications resident on the device).*** SAMSUNG-1003, ¶¶136-137. Thus, the network packets—and its corresponding Internet service access request—would be blocked permanently. SAMSUNG-1003, ¶¶136-137; §III.A.3 Accordingly, these applications can no longer poll for data over a wireless network (i.e., an activity that Oestvall teaches as being particularly burdensome on a battery). SAMSUNG-1006, [0024]; SAMSUNG-1003, ¶137.

Further, the "filter 322" would selectively allow the transmission of network packets from applications that are "trusted" (e.g., a classification of applications that should be assigned a high priority, as taught by Oestvall) (***apply a differential traffic control policy to the Internet service access request based on the application being a second one or more applications resident on the device***). SAMSUNG-1003, ¶138. Specifically, these network packets would be placed into a "highest priority queue," such that the network packets are immediately transmitted to the network (e.g., prior to the transmission of network packets placed into lower priority queues). SAMSUNG-1005, [0194]; SAMSUNG-1003, ¶138;

§III.A.3. Accordingly, applications that are sufficiently important can continue to exchange data in accordance with one or more Internet services. SAMSUNG-1003, ¶138.

An example implementation of the Rao-Oestvall system is shown in §III.A.3.c.

[1e]

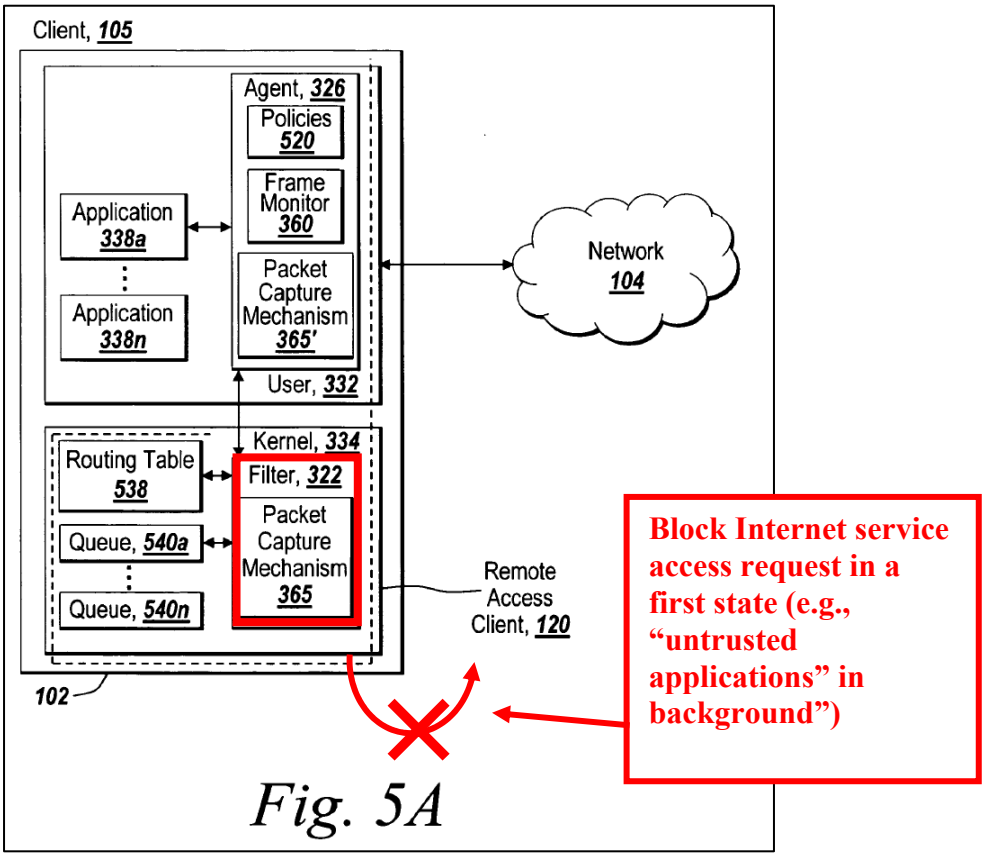
ROFC renders obvious [1e]. SAMSUNG-1003, ¶¶140-143.

As discussed in §III.A.3 and [1d], a POSITA would have found it obvious to modify Rao's system of prioritizing network packets based on the specific application classification criteria taught by Oestvall.

In particular, the "filter 322" would selectively "discard" network packets (***block the Internet service access request***) from applications that are "untrusted" (***in a first state wherein the particular application is one of the first one or more applications)*** and running in the background (***the particular application is not classified as interacting with a user in the device user interface foreground***) (e.g., a classification of applications that should be assigned a low priority, as taught by Oestvall). *See* §III.A.3; [1d]; SAMSUNG-1003, ¶142.

Thus, the network packets—and its corresponding Internet service access request—would be blocked permanently. SAMSUNG-1003, ¶143; §III.A.3. Accordingly, these applications can no longer poll for data over a wireless network

(i.e., an activity that Oestvall teaches as being particularly burdensome on a battery). *See* §III.A.3; [1d]; SAMSUNG-1006, [0024]; SAMSUNG-1003, ¶143.



SAMSUNG-1005, FIG. 5A (annotated)

[1f]

ROFC renders obvious [1f]. SAMSUNG-1003, ¶¶144-147.

As discussed with in §III.A.3 and [1d], a POSITA would have found it obvious to modify Rao's system of prioritizing network packets based on the specific application classification criteria taught by Oestvall. SAMSUNG-1003, ¶¶145.

Specifically, the "filter 322" would selectively allow the transmission of network packets from applications that are "untrusted" and running the foreground (***at***

least one other state in which the application is classified as interacting with the user in the device user interface foreground) (e.g., a classification of applications that should be assigned a high priority, as taught by Oestvall). *See* §III.A.3; [1d]; SAMSUNG-1003, ¶146.

In particular, by virtue of the application now being in the foreground, these network packets would be placed into a "highest priority queue," thereby having their communication be unfettered as taught by Oestvall such that the network packets are immediately transmitted to the network (e.g., prior to the transmission of network packets placed into lower priority queues). SAMSUNG-1005, ¶[0194]; SAMSUNG-1003, ¶147; §III.A.3. Indeed, in view of Oestvall, a POSITA would have found it obvious to treat untrusted application that are running in the back-ground identically as trusted application (regardless if they are running in the fore-ground or the back-ground), and would have treated network packets from each of these applications similarly. SAMSUNG-1003, ¶147. Accordingly, applications that are sufficiently important can continue to exchange data in accordance with one or more Internet services. *See* §III.A.3; [1d]; SAMSUNG-1003, ¶147.

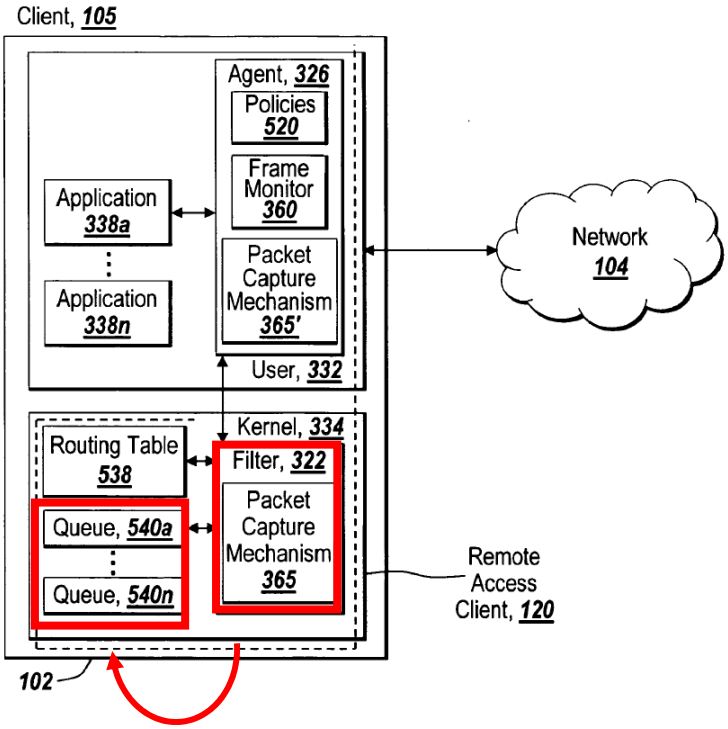


Fig. 5A

SAMSUNG-1005, FIG. 5A (annotated)

[1g]

ROFC renders obvious [1g]. SAMSUNG-1003, ¶¶148-152.

As discussed in §III.A.5, in view of Freund, a POSITA would have found it obvious to modify the Rao-Oestvall system to selectively enable an application to access a network (e.g., the Internet) based on the amount of network data that has been used by that application. §III.A.5; SAMSUNG-1003, ¶149.

An example implementation of the Rao-Oestvall-Freund system is shown in

§III.A.5.

As discussed in §III.A.5, according to this combination, a POSITA would have configured the "Supervisor" to instruct the "Client Monitor" to perform Freund's "bandwidth and interactive use monitoring" in accordance with a set of filter rules. SAMSUNG-1003, ¶¶150-152. According to these rules, the "Client Monitor" would:

(i) Intercept an application's requests to access the Internet (e.g., "Winsock ... calls" to a "communications driver," such as "Winsock send() or recv() calls" to send data and receive data, respectively) (SAMSUNG-1007, 29:17-30:9, FIG. 13A (1301)),

(ii) Determine the amount of Internet data that is transmitted and/or received by that application (e.g., "data lengths"), and tracks that amount of data (e.g., by "[a]dd[ing] the data lengths to a DataIn or DataOut accumulator or counter of the Application's list entry and global activity record") (***application-specific amount of Internet data usage***) (SAMSUNG-1007, 30:24-29, FIG. 13A(1302(D))), and

(iii) "[D]isable[] future Internet access" by that application if the amount of data exceeds a particular application-specific limitation (e.g., "[i]f the DataIn or DataOut fields exceed rule-based quantity either for the specific Application") (***disallow Internet data communication for***

that application based on an application-specific amount of Internet data usage reaching a limit) (SAMSUNG-1007, 30:24-29, FIG. 13A).

B. [GROUND 2] – Claims 7-9 are rendered obvious by Rao, Oestvall, Freund, and Montemurro

1. Overview of Montemurro

Montemurro describes "a policy-based mechanism to configure connections and routes" for "[c]ommunication devices capable of at least two communication modes (e.g. WLAN, WMAN and WWAN and/or wired modes)." SAMSUNG-1008, Abstract; SAMSUNG-1003, ¶¶153-159.

In particular, Montemurro's system includes a "TCP/IP network stack 206A" having a "routing table 210" that specifies "which network interface 208 will be used for transmission of [a] packet" (e.g., WLAN 208A, WMAN 208B, and/or WWAN 208C managed by the connection table 206C). *Id.*, [0030], FIG. 2. For example, "[w]hen an IP packet is destined for transmission, the TCP/IP network stack software 206B matches the IP header of the packet to an entry in the routing table 210. That match will determine which network interface 208 will be used for transmission of the packet." *Id.*, [0031].

Further, Montemurro's system includes "a rules engine 206A (sometimes called an inference engine) as a policy-based mechanism using rules to configure

TCP/IP network stack 206B and connection table 206C to coordinate communications for applications 204 using communications interfaces (also referenced as network interfaces) 208." *Id.,* [0027]. In particular, the "rules engine 206A configures (i.e. modifies, periodically in response to changes of state and the evaluation of its rules) connection table 206C and routing table 210 to optimize the flow of communications over multiple communications modes (e.g. interfaces 208 and respective networks 104 and 106)." *Id.*, [0034]. For example, "[o]n a state change (for example, based on a time of day, or the connecting/disconnecting of device 102 with a specific network 104 and 106), rules engine 206A executes and modifies, as applicable, the routing table 210 to ensure that data goes out the most appropriate network (via respective interface 208)." *Id.*, [0035].

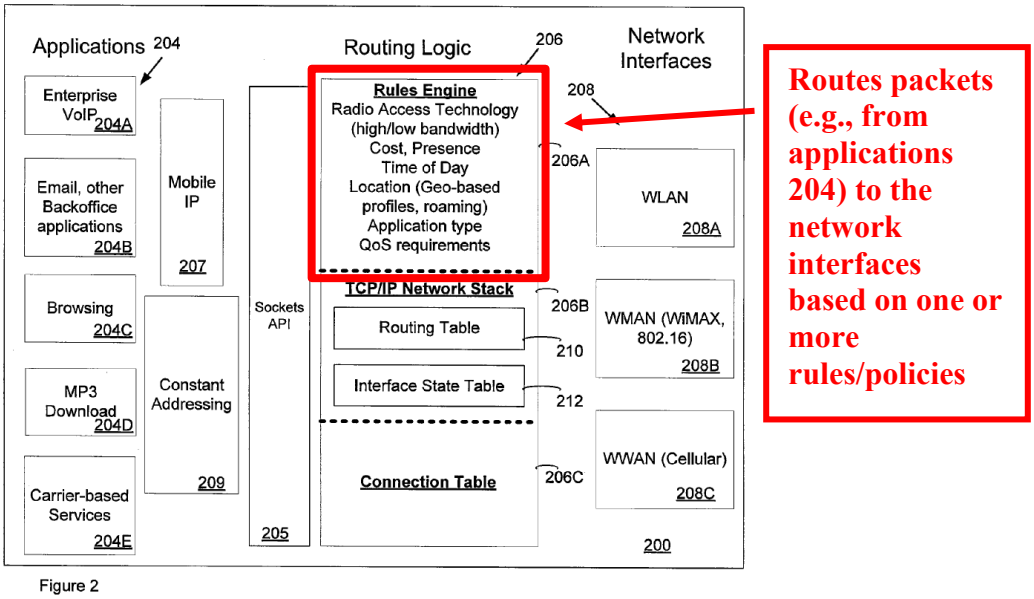


Figure 2

SAMSUNG-1008, FIG. 2 (annotated)

In general, the "[r]ules engine 206A configures the communication operations with a set of rules/policies." *Id.,* [0029]. Example "rules/policies ... include various factors such as radio access technology (e.g. for high/low bandwidth properties), cost, presence, time of day, location (e.g. geo-based policies, network roaming), destination IP address, application type, and Quality of Service (QoS) requirements, among others." *Id.*

Further, these "rules/policies" can specify that certain applications use certain types of networks under certain conditions. For example, a "rule/policy" can specify that "[an] MP3 download application 204D runs on the lowest cost network 104 and 106 available". *Id.,* [0029]. As another example, a "rule/policy" can specify that "the CRM application (i.e. one of 204B) only synchronizes the sales contact database (e.g. 120B) over a WLAN network 106." *Id.*

As Montemurro describes, these "rules/policies" can be used "to optimize communications for multi-mode capable devices" by accounting for "different radio access technologies," each of which may have "different properties ... such as bandwidth, range, cost, and power consumption, among other considerations." *Id.*, ¶[0030].

2. Combination of Rao-Oestvall-Freund and Montemurro

In view of Montemurro, a POSITA would have found it obvious to modify

the ROFC system to apply different network traffic control policies to an application's network traffic based on the type of network(s) to which a device is connected to thereby optimize a device's communications over different types of networks. SAMSUNG-1003, ¶¶160-172; §III.B.1. This modification would have involved (1) combining prior art elements according to known methods to yield predictable results; and (2) use of a known technique to improve similar devices (methods, or products) in the same way. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-421, 82 USPQ2d 1385, 1395-97 (2007); MPEP 2143; SAMSUNG-1003, ¶¶160-172.

Specifically, a POSITA would have recognized that Montemurro teaches considering at least some of the same factors as Rao when determining how to prioritize an application's network traffic (e.g., the "application type," the "destination IP address" of the traffic, and the protocol for transmitting data). SAMSUNG-1008, [0029]; SAMSUNG-1003, ¶161. Further, a POSITA would have recognized based on Montemurro's teachings that using these factors (among others) to select an appropriate type of network for transmitting the data would optimize "multi-mode capable devices" (e.g., by accounting for "different radio access technologies," each of which may have "different properties ... such as bandwidth, range, cost, and power consumption, among other considerations"). SAMSUNG-1008, [0030]; SAMSUNG-1003, ¶161.

In particular, in Rao's system, a remote access client 120 includes a "routing table 538 compris[ing] information about a source computing device and a destination computing device to identify a communication path or connection between a source and destination communication points" on the network. SAMSUNG-1005, [0181]. To the extent that Rao does not expressly describe using the "routing table 538" to select between different types of networks (e.g., a WWAN vs a WLAN), a POSITA nevertheless would have found it obvious to modify the "routing table 538" to make such a selection in view of Montemurro. SAMSUNG-1003, ¶162.

As an example of this modification, in at least some implementations, a POSITA would have configured Rao's system to include multiple sets of queues, where each set corresponds to a different network interface (e.g., network interfaces for accessing a WWAN, WLAN, etc.). SAMSUNG-1003, ¶163. This is because a POSITA would have understood or recognized that Rao's single set of queues is used to prioritize network traffic for a ***single*** network at a time (e.g., the "network 104" which is described as being one of "a local-area network (LAN), such as a company Intranet, a metropolitan area network (MAN), or a wide area network (WAN), such as the Internet or the World Wide Web," *id.,* [0095]), and that in situations in which the device is connected to ***multiple*** networks concurrently (e.g., WWAN, WLAN, etc., as described by Montemurro), a different respective set of queues could be used to prioritize network traffic for each network

specifically. SAMSUNG-1003, ¶163. For instance, a POSITA would have recognized that this would allow the system to prioritize data in a manner that is specifically tailored to the properties of each network and/or the usage conditions of each network (e.g., the degree to which each network is congested). SAMSUNG-1003, ¶163. Indeed, a POSITA would have recognized that the purpose of prioritizing network packets relative to one another is to optimize the transmission of the network packets over a specific network (e.g., taking in account the properties and/or usage conditions of that network), and that it would not have made sense to commingle network packets intended for transmission using different networks in a common set of queues, as this would have resulted in least some network packets being prioritized according to the properties and/or usage conditions of networks to which they are not intended to be transmitted. SAMSUNG-1003, ¶164. As an alternative, a POSITA would have recognized that network packets can be prioritized using sets of queues that are specific to each network, such that network packets can be prioritized relative to only other network packets that are intended for transmission over the same network, in order to better account for the properties and/or usage conditions of each network individually. SAMSUNG-1003, ¶164.

Further, in view of Montemurro, a POSITA would have configured Rao's routing table 538 in at least some implementation such that a given communication

generated by an application (e.g., one or more packets) would be selectively routed by the remote access client 120 to a certain network (e.g., WWAN, WLAN, etc.) based on criteria such as (i) the "application type," (ii) the "destination IP address" of the traffic, and (iii) the protocol for transmitting data. SAMSUNG-1003, ¶¶165. According to this configuration, upon selecting a particular network that is appropriate for one or more packets (step 1.5 below), those packets would be provided to the set of queues corresponding to the selected network for prioritization and transmission or discarded (e.g., in accordance with policies specific to the selected network) (see steps 2a, and 2b below). SAMSUNG-1003, ¶165. Conversely, upon determining that a particular network is not appropriate for the one or more packets, the packets would not be provided to the set of queues corresponding to that network and that network's policies would not be applied. SAMSUNG-1003, ¶165.

An example modification to the Rao-Oestvall-Freund system in view of Montemurro's teachings ("Rao-Oestvall-Freund-Montemurro combination" or "ROFMC") is shown below.

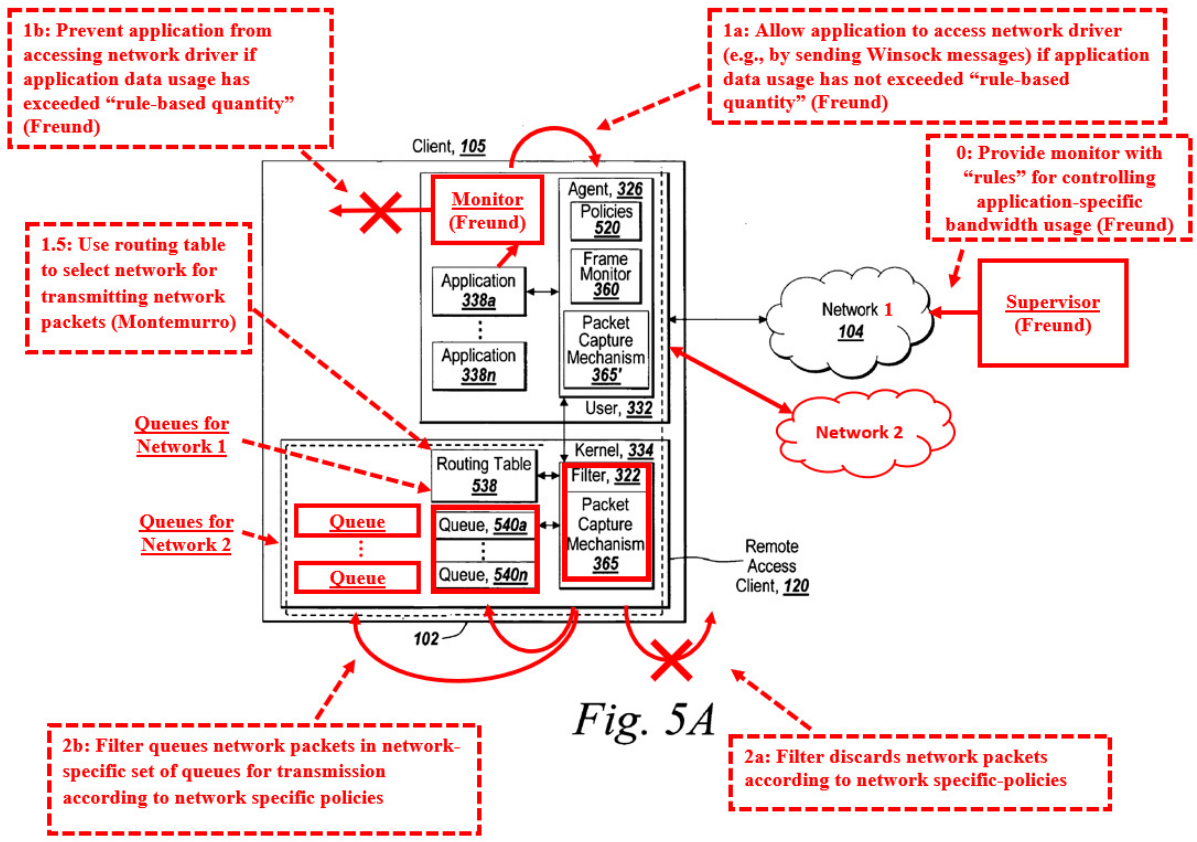


Fig. 5A

SAMSUNG-1005 (revised and annotated)

In doing so, a POSITA would have been led to apply Montemurro's techniques to thereby enable Rao's system to intelligently select among the various networks to optimize "multi-mode capable devices," such as by accounting for "different radio access technologies," each of which may have "different properties … such as bandwidth, range, cost, and power consumption, among other considerations." SAMSUNG-1008, [0030]; SAMSUNG-1003, ¶167. Further, by modifying Rao's system to first perform Montemurro's network selection prior to prioritizing network traffic according to the Rao-Oestvall combination, the combined

system would enjoy both the "multi-mode" optimization benefits taught by Montemurro and the application-specific network prioritization benefits taught by Rao and Oestvall. SAMSUNG-1003, ¶167.

For instance, in view of Montemurro, if a first network (e.g., WWAN) is selected from among multiple networks to transmit an application's network traffic, a POSITA would have found it obvious to apply a first policy specific to the first network to the network traffic. SAMSUNG-1003, ¶168. As an example first policy, the device would selectively place network packets in a set of queues that are ***specific to the first network*** in order to selectively allow or block an application's network traffic with respect to the first network. SAMSUNG-1003, ¶168. For instance, a POSITA would have found it obvious to allow or block network traffic from applications based on the application's "trusted/untrusted" status (e.g., as taught by Oestvall) and whether the application is running in the foreground or the background) (e.g., as taught by both Oestvall and Rao). *See* §III.A.3. SAMSUNG-1003, ¶168.

Further, if a second network (e.g., a WLAN) is selected from among multiple networks to transmit an application's network traffic instead, a POSITA would have found it obvious to apply a second ***different*** policy ***specific to the second network*** in order to selectively allow or block an application's network traffic with re-

spect to the second network. SAMSUNG-1003, ¶169. As an example second policy, the device would selectively place network packets in a set of queues that are ***specific to the second network*** in order to selectively allow or block an application's network traffic with respect to the second network. SAMSUNG-1003, ¶169. That is, the first and second policies would differ at least because the first and second policies selectively place network packets in different respective sets of queues. SAMSUNG-1003, ¶169.

A POSITA would have found it obvious, in some cases, to configure the second policy in a similar manner as the first policy (i.e., with the exception that the policies selectively place network packets in different respective sets of queues). SAMSUNG-1003, ¶170. For example, a POSITA would have recognized or understood that if the characteristics of the first and second networks are similar to another, the second policy could likewise be configured to allow or block network traffic from applications based on the application's "trusted/untrusted" status (e.g., as taught by Oestvall) and whether the application is in running in the foreground or the background) (e.g., as taught by both Oestvall and Rao) as with the first policy. See §III.A.3. SAMSUNG-1003, ¶170.

A POSITA also would have found it obvious, in some cases, to configure the second policy in a different manner as the first policy. For example, a POSITA would have found it obvious to modify the second policy (e.g., relative to the first

policy) to account for any differences in the bandwidth and/or cost between using the first and second networks to transmit data (e.g., as taught by Montemurro). SAMSUNG-1003, ¶171. As an example, a POSITA would have found it obvious to make the second policy more restrictive (e.g., if the second network were more expensive and/or has a smaller bandwidth than the first network), or make the second policy less restrictive (e.g., if the second network were less expensive and/or has a larger bandwidth than the first network). SAMSUNG-1003, ¶171. This is because a POSITA would have understood or recognized that policies for prioritizing network traffic are used to make better use of limited resources, and that if those resource limitations were lessened, the policies could be modified to adapt the device's network usage to those changes. SAMSUNG-1003, ¶171.

Accordingly, a POSITA would have found using such a combination of classifications as a basis for prioritizing network communications of applications as one obvious way to balance the well-known, market-based desire to improve a user's experience with an application, with the similarly well-known desire to adapt to the different performance characteristics of different types of networks. SAMSUNG-1003, ¶172.

3. Analysis

[7a]

ROFMC renders obvious [7a]. SAMSUNG-1003, ¶¶173-178.

Rao describes a device that is configured to communicate data wirelessly with a LAN and the Internet (e.g., using a "wireless network adapter" and/or a "modem") (***WLAN modem***). SAMSUNG-1005, [0125].

Further, as discussed in [1a], Rao describes that the device is configured to communicate data for Internet service activities, such as to obtain email services, access a web or Internet service, access a desktop sharing server, and/or access a collaboration server **(*communicate data for Internet service activities between the device and at least one WLAN, when configured for and connected to the at least one WLAN*).** SAMSUNG-1005, [0090]; [1a].

To the extent that Rao does not expressly describe a "WLAN modem," a POSITA would have understood or found it obvious to implement a WLAN modem in Rao's system in view of Rao's teaching that (i) a device can access a LAN wirelessly, and (ii) a "modem" can be used to interface the device with "any type of network." SAMSUNG-1005, [0125]; SAMSUNG-1003, ¶176. Further, a POSITA would have understood that connections provided by the WLAN modem can be used to access the Internet. SAMSUNG-1005, ¶ [0125] ("the computing device 102 may include a network interface 118 to interface to ... the Internet through a variety of connections including, but not limited to, ... LAN or WAN links (e.g., 802.11, T1, T3, 56 kb, X.25), ... wireless connections, or some combination of any or all of the above"); SAMSUNG-1003, ¶177.

Further, Montemurro also describes that "[c]ommunication devices [are] capable of at least two communication modes (e.g. WLAN, WMAN and WWAN and/or wired modes)." SAMSUNG-1008, Abstract. To the extent that Rao does not expressly describe a "WLAN modem," a POSITA would have found it obvious to modify Rao's system to include a "WLAN modem" in order to provide the device with multiple communications modes (e.g., to allow the device to connect to multiple types of networks), as taught by Montemurro. SAMSUNG-1003, ¶178.

[7b]

ROFMC renders obvious [7b]. SAMSUNG-1003, ¶¶179-186.

As discussed in [1b], [1d], and §III.A.3, the ROFMC system includes ***one or more processors configured to apply <u>the</u> differential traffic control policy*** to an Internet service access request ***for a time when data communication for Internet service activities is provided by the <u>WWAN</u> modem***. Further, as modified by Montemurro, the ROFMC system would selectively not apply ***the*** differential traffic control policy for a time when a ***WLAN*** modem is to provide data communication for Internet Service activities, as it would apply a ***different*** differential traffic control policy instead (e.g., a differential traffic control policy specific to a WLAN rather than a WWAN). SAMSUNG-1003, ¶180.

In particular, as discussed in §III.B.2, a POSITA would have found it obvi-

ous to modify Rao-Oestvall-Freund system to further consider the type of network(s) to which a device is connected and available for use by the device, as taught by Montemurro, in order to improve the prioritization of network traffic by the device, while also accounting for the characteristics of a network. SAMSUNG-1003, ¶181. For example, as Montemurro teaches, several factors can be considered in determining whether a network is appropriate for application's network traffic, including the "bandwidth" of that network and/or the "cost" that is associated with using that network. SAMSUNG-1008, [0030]; SAMSUNG-1003, ¶181.

In view of Montemurro, a POSITA would have applied different differential traffic control policies, depending on which network is selected to transmit an application's network traffic. SAMSUNG-1003, ¶182. For instance, if a WWAN were selected from among multiple networks to transmit an application's network traffic, a POSITA would have found it obvious to apply a first policy specific to the WWAN (***the differential traffic control policy,*** as introduced in [1d])**.** SAMSUNG-1003, ¶183. As an example first policy, in at least some implementations, the device would selectively place network packets in a set of queues that are specific to the WWAN in order to selectively allow or block an application's network traffic with respect to the WWAN. SAMSUNG-1003, ¶183. For instance, a

POSITA would have found it obvious to allow or block network traffic from applications based on the application's "trusted/untrusted" status (e.g., as taught by Oestvall) and whether the application is in running in the foreground or the background) (e.g., as taught by both Oestvall and Rao) (***for a time when the WWAN modem is to provide data communication for Internet service activities apply the differential traffic control policy***). *See* §III.A.3; [1d]-[1e]. SAMSUNG-1003, ¶183.

Further, if a WLAN is selected from among multiple networks to transmit an application's network traffic instead, a POSITA would have found it obvious to apply a second ***different*** policy specific to the WLAN network (***for a time when the WLAN modem is to provide data communication for Internet service activities, not apply the differential traffic control policy,*** and instead apply a ***different*** differential traffic control policy). SAMSUNG-1003, ¶184. As an example second policy, in at least some implementations, the device would selectively place network packets in a set of queues that are specific to the WLAN in order to selectively allow or block an application's network traffic with respect to the WLAN. SAMSUNG-1003, ¶184. That is, a second and ***different*** policy would be applied at least because the second policy selectively places network packets in a different set of queues compared to the first policy. SAMSUNG-1003, ¶184.

A POSITA also would have found it obvious, in some cases, to configure the

second policy in a different manner as the first policy (i.e., ***the*** differential traffic control policy). SAMSUNG-1003, ¶185. For instance, a POSITA would have found it obvious to modify the second policy (e.g., relative to the first policy) to account for any differences in the bandwidth and/or cost between using the WWAN and WLAN to transmit data (e.g., as taught by Montemurro). SAMSUNG-1003, ¶185. As an example, a POSITA would have found it obvious to make the second policy more restrictive (e.g., if the WLAN were more expensive and/or has a smaller bandwidth than the WWAN), or make the second policy less restrictive (e.g., if the WLAN were less expensive and/or has a larger bandwidth than the WWAN). SAMSUNG-1003, ¶186. This is because a POSITA would have understood or recognized that policies for prioritizing network traffic are used to make better use of limited resources, and that if those resource limitations were lessened, the policies could be modified to adapt the device's network usage to those changes. SAMSUNG-1003, ¶186.

[8]

ROFMC renders obvious [8]. SAMSUNG-1003, ¶¶187-199.

As discussed in [1g], the ROFMC device would disallow Internet data communication for an application based on an application-specific amount of Internet data usage reaching a limit. Further, in view of Montemurro, a POSITA would have found it obvious to ***not count an application-specific amount of Internet***

data usage toward the limit for a time when the WLAN modem is to provide data communication for Internet service activities. SAMSUNG-1003, ¶188.

As an initial matter, Rao describes a device that is configured to communicate data wirelessly with a LAN and the Internet (e.g., using a "wireless network adapter" and/or a "modem") (***WLAN modem***). SAMSUNG-1005, [0125].

Further, as discussed in [1a], Rao describes that the device is configured to communicate data for Internet service activities, such as to obtain email services, access a web or Internet service, access a desktop sharing server, and/or access a collaboration server **(*provide data communication for Internet service activities*).** SAMSUNG-1005, [0090]; [1a].

To the extent that Rao does not expressly describe a "WLAN modem," a POSITA would have understood or found it obvious to implement a WLAN modem in Rao's system in view of Rao's teaching that (i) a device can access a LAN or the Internet wirelessly, and (ii) a "modem" can be used to interface the device with "any type of network." SAMSUNG-1005, [0125]. SAMSUNG-1003, ¶191.

Further, Montemurro also describes that "[c]ommunication devices [are] capable of at least two communication modes (e.g. WLAN, WMAN and WWAN and/or wired modes)." SAMSUNG-1008, Abstract. To the extent that Rao does not expressly describe a "WLAN modem," a POSITA would have found it obvious

to modify Rao's system to include a "WLAN modem" in order to provide the device with multiple communications modes (e.g., to allow the device to connect to multiple types of networks), as taught by Montemurro. SAMSUNG-1003, ¶192.

Further, a POSITA would have understood that connections provided by the WLAN modem can be used to access the Internet. SAMSUNG-1005, ¶ [0125] ("the computing device 102 may include a network interface 118 to interface to ... the Internet through a variety of connections including, but not limited to, ... LAN or WAN links (e.g., 802.11, T1, T3, 56 kb, X.25), ... wireless connections, or some combination of any or all of the above"); SAMSUNG-1003, ¶193.

Further, as discussed in [1g], the ROFMC device would determine the amount of Internet data that is transmitted and/or received by an application, track that amount of data, and "disable[] future Internet access" by that application if the amount of data exceeds a particular application-specific limitation, as taught by Freund. A taught by Freund, this "bandwidth and interactive use monitoring" technique allows a device to make better use of limited network resources, such as to "avert ... [i]nadvertent disruptions of the network by individual users, such as bandwidth hording [sic] by a user using RealAudio for listening to a Web audio 'broadcast'"). SAMSUNG-1007, 11:19-28; SAMSUNG-1003, ¶194.

In view of Montemurro, a POSITA would have found to obvious to selectively deploy Freund's "bandwidth and interactive use monitoring" technique

based on the particular performance and/or cost characteristics of a network. SAMSUNG-1003, ¶195. For example, as Montemurro teaches, the properties of a network can vary according to several different factors, such as "radio access technology (e.g. for high/low bandwidth properties), cost, presence, … location (e.g. geo-based policies, network roaming)," among others. SAMSUNG-1008, [0029]. In view of Montemurro, a POSITA would have recognized that some networks may have differences in bandwidth and/or cost (among other factors), and that Freund's "bandwidth and interactive use monitoring" technique can be selectively deployed to account for these differences. SAMSUNG-1003, ¶195.

In particular, it was well-known by the Critical Date that WWAN communications are more expensive than WLAN communications. SAMSUNG-1003, ¶196. SAMSUNG-1012, 2:30-33 ("the cost to transfer data over a Wi-Fi connection is generally negligible compared to the cost per data unit (e.g., per megabyte (MB)) transferred over a GPRS connection); SAMSUNG-1013, [0008] ("a dual-mode terminal that is capable of restricting utilization of a service in the cellular network domain, which is costly in a cellular network domain, by using a cost-free IP network domain, thereby resulting in significant cost savings").

In fact, logic would suggest that this is the case given that WWAN communications rely on much more telecommunications equipment from origin to desti-

nation than WLAN communications. SAMSUNG-1003, ¶197. A WLAN communication often involves only a single, relatively inexpensive wireless router or only a few wireless routers in a very small localized place (e.g., a home or office). SAMSUNG-1003, ¶197. In contrast, WWAN communications can involve dozens or even hundreds of wireless routers and/or cellular base stations extended across dozens, hundreds or even thousands of miles. SAMSUNG-1003, ¶197. It is quite clear that communications over WWAN leverage far more expensive infrastructure than communications over WLAN and, therefore, are typically more expensive than communications over WLAN. SAMSUNG-1003, ¶197. This means that there is reason to want to be more selective in what communications would be allowed over the WWAN relative to a WLAN in order to save costs. SAMSUNG-1003, ¶197.

Accordingly, a POSITA would have been motivated to deploy Freund's "bandwidth and interactive use monitoring" technique for WWAN communications in order to prevent individual applications from transmitting data in excess (e.g., to mitigate the heightened cost of transmitting packets over a WWAN modem). SAMSUNG-1003, ¶198. Further, in view of the comparatively lower cost of WLAN communications, a POSITA would have not applied Freund's "bandwidth and interactive use monitoring" technique during a time when the WLAN modem is to provide data communication for Internet service activities (***for a time***

when the WLAN modem is to provide data communication for Internet service activities, not count an application-specific amount of Internet data usage toward the limit), as the cost of transmitting data is lessened. SAMSUNG-1003, ¶198.

As another example, a POSITA would have recognized that a WLAN can typically transmit data according to a higher bandwidth compared to a WWAN. SAMSUNG-1003, ¶199; SAMSUNG-1012, [0011]-[0012]. Accordingly, a POSITA would have been motivated to deploy Freund's "bandwidth and interactive use monitoring" technique for WWAN communications in order to prevent individual applications from hoarding the bandwidth in a bandwidth-constrained environment. SAMSUNG-1003, ¶199. Further, in view of the comparatively higher bandwidth of WLAN communications, a POSITA would have not applied Freund's "bandwidth and interactive use monitoring" technique during a time when the WLAN modem is to provide data communication for Internet service activities (***for a time when the WLAN modem is to provide data communication for Internet service activities, not count an application-specific amount of Internet data usage toward the limit***), as the risk of bandwidth hoarding is lessened. SAMSUNG-1003, ¶199.

[9a]

ROFMC renders obvious [9a]. SAMSUNG-1003, ¶¶200-203.

As discussed in [1a], Rao discloses a WAN.

Similarly, Montemurro also discloses a WWAN. SAMSUNG-1008, [0011], [0013], [0028]. Further, Montemurro discloses that, depending on the location, a network can be a "roaming" network. SAMSUNG-1008, [0029].

In view of Montemurro, a POSITA would have understood that a WWAN network can include a portion that is a ***home WWAN*** (e.g., not "roaming") and a portion that is a ***roaming WWAN***, depending on the location. SAMSUNG-1003, ¶203.

[9b]

ROFMC renders obvious [9b]. SAMSUNG-1003, ¶¶204-211.

As discussed in [1b], [1d], and §III.A.3, the ROFMC system includes ***one or more processors configured to apply <u>the</u> differential traffic control policy*** to an Internet service access request ***for a time when data communication for Internet service activities is provided by the <u>WWAN</u> modem***. Further, as modified by Montemurro, the ROFMC system would selectively apply ***<u>the</u>*** differential traffic control policy depending on whether data communication for Internet service activities is provided by a roaming WWAN or a home WWAN. SAMSUNG-1003, ¶205.

In particular, as discussed in §III.B.2, a POSITA would have found it obvious to modify Rao-Oestvall-Freund system to further consider the type of network(s) to which a device is connected and available for use by the device, as

taught by Montemurro, in order to improve the prioritization of network traffic by the device, while also accounting for the characteristics of a network. SAMSUNG-1003, ¶206. For example, as Montemurro teaches, several factors can be considered in determining whether a network is appropriate for application's network traffic, including "bandwidth" of that network and/or the "cost" that is associated with using that network. SAMSUNG-1008, [0030]; SAMSUNG-1003, ¶206.

In view of Montemurro, a POSITA would have applied different differential traffic control policies, depending on which network is selected to transmit an application's network traffic. SAMSUNG-1003, ¶207. For instance, if a roaming WWAN were selected from among multiple networks to transmit an application's network traffic, a POSITA would have found it obvious to apply a first policy specific to the roaming WWAN (***the differential traffic control policy***, as introduced in [1d]). SAMSUNG-1003, ¶208. As an example first policy, in at least some implementations, the device would selectively place network packets in a set of queues that are specific to the roaming WWAN in order to selectively allow or block an application's network traffic with respect to the roaming WWAN. SAMSUNG-1003, ¶208. For instance, a POSITA would have found it obvious to allow or block network traffic from applications based on the application's "trusted/un-

trusted" status (e.g., as taught by Oestvall) and whether the application is in running in the foreground or the background) (e.g., as taught by both Oestvall and Rao) (***apply <u>the</u> differential traffic control policy for a time when data communication for Internet service activities is provided by the WWAN modem and the <u>roaming</u> WWAN***). *See* §III.A.3, [1d]-[1e]. SAMSUNG-1003, ¶208.

Further, if a home WWAN is selected from among multiple networks to transmit an application's network traffic instead, a POSITA would have found it obvious to apply a second ***different*** policy specific to the roaming WAN network (***<u>not</u> apply the differential traffic control policy for a time when data communication for Internet service activities is provided by the WWAN modem and the <u>home</u> WWAN****, and instead apply* a ***different*** differential traffic control policy). SAMSUNG-1003, ¶209. As an example second policy, in at least some implementations, the device would selectively place network packets in a set of queues that are specific to the home WWAN in order to selectively allow or block an application's network traffic with respect to the home WWAN. SAMSUNG-1003, ¶209. That is, a second and ***different*** policy would be applied at least because the second policy selectively places network packets in a different set of queues compared to the first policy. SAMSUNG-1003, ¶209.

A POSITA also would have found it obvious, in some cases, to configure the second policy in a different manner as the first policy (i.e., ***the*** differential traffic

control policy). SAMSUNG-1003, ¶210. For example, a POSITA would have found it obvious to modify the second policy (e.g., relative to the first policy) to account for any differences in the bandwidth and/or cost between using the roaming WWAN and home WWAN to transmit data (e.g., as taught by Montemurro). SAMSUNG-1003, ¶210. As an example, a POSITA would have found it obvious to make the second policy more restrictive (e.g., if the home WWAN were more expensive and/or has a smaller bandwidth than the roaming WWAN), or make the second policy less restrictive (e.g., if the home WWAN were less expensive and/or has a larger bandwidth than the roaming WWAN). SAMSUNG-1003, ¶211. This is because a POSITA would have understood or recognized that policies for prioritizing network traffic are used to make better use of limited resources, and that if those resource limitations were lessened, the policies could be modified to adapt the device's network usage to those changes. SAMSUNG-1003, ¶211.

IV. PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION

A. 35 U.S.C. §325(d) – *Discretionary Denial under 325(d) is not warranted*

Discretionary denial under the Board's §325(d) *Advanced Bionics* analysis is not warranted. *See Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6, 8-9 (PTAB Feb. 13, 2020) (precedential) ("*Advanced Bionics"*).

None of the prior art references advanced in this Petition was previously before the Office. While a relative of Rao (PCT application WO 2006/012610A2 ("Rao-2") was cited on the face of the '184 Patent, there is no evidence that the Office substantively considered this reference among the references listed on the first 11 pages of the '184 Patent. *See, generally,* SAMSUNG-1002. Moreover, the same or substantially the same arguments were not previously presented to the Office. *Id.* Indeed, there could be no overlap between the arguments made before the Office because the Examiner issued no prior art rejections during prosecution.

To the extent it is argued that the same or substantially the same art or arguments were previously presented to the Office, the second prong is not met. *Advanced Bionics*, 8-10. The Examiner issued no prior art rejections and included no substantive discussion of any prior art reference. *See, generally,* SAMSUNG-1002. Therefore, although Rao-2 was cited on the face of the '184 Patent, neither Rao nor Rao-2 nor the obviousness of the Challenged Claims in view of those references was ever addressed during prosecution. As highlighted in Grounds 1 and 2, the Examiner clearly did not appreciate Rao's disclosures and how those references in combination and in combination with other prior art references not previously before the Office (Oestvall, Freund, and Montemurro) render the Challenged Claims obvious. Moreover, Petitioner has shown a reasonable likelihood that it would prevail that at least one of the Challenged Claims is

unpatentable over the applied art based on the current record. *Supra* §IIIA-E; *see Tokyo Ohka Kogyo Co., Ltd. v. Fujifilm Elec. Materials U.S.A., Inc.*, PGR2022-00010, Paper 9, 8-9 (PTAB June 6, 2022). As such, Petitioner has demonstrated material error by the Office, and discretionary denial is not warranted.

B. 35 U.S.C. §314(a) – Discretionary Denial is not Merited in view of Petitioner's *Sotera* Stipulation

In *Apple Inc. v. Fintiv, Inc.*, the Board enumerated six factors to determine whether a petition should be discretionarily denied institution under §314(a). IPR2020-00019, Paper 11 at 2-3 (PTAB "precedential" Mar. 20, 2020) ("*Fintiv*"). In June 2022, the USPTO issued updated discretionary denial guidance in view of the *Fintiv* factors and expressly noted that ***the PTAB will not discretionarily deny institution if Petitioner presents a Sotera stipulation***. SAMSUNG-1015, 3, 7-8. Here, Petitioner has eliminated any risk of duplicated effort by voluntarily presenting a *Sotera* stipulation to Patent Owner. SAMSUNG-1016; *Sotera Wireless, Inc. v. Masimo Corp.,* Case IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020). For at least this reason, the Board should not discretionarily deny this petition.

Although the Board need not address additional *Fintiv* factor considerations in light of Samsung's *Sotera* stipulation, indeed, the *Fintiv* factors do not favor denial.

Factor 1 is neutral because neither party has requested a stay in co-pending litigation.

Factor 2 is neutral because the Court's trial date is speculative at this point and subject to change. The Board will likely issue its Final Written Decision around March 2025, approximately five months after the currently scheduled trial date (August 5, 2024). SAMSUNG-1017, 1. However, as the Board and Director have previously recognized, "scheduled trial dates are unreliable and often [subject to] change." SAMSUNG-1015, 8.

Factor 3 also favors institution because Petitioner has diligently filed this Petition months ahead of the one-year time bar, while the EDTX Litigation is still in its early stages. Beyond exchanging preliminary infringement/invalidity contentions, the parties and the District Court have yet to expend significant resources on invalidity. SAMSUNG-1017, 5.

Factor 4 also favors institution because Petitioner has provided a *Sotera* stipulation. SAMSUNG-1016.

Factor 5: The parties in the parallel EDTX litigation are the same.

Factor 6 favors institution because the merits of this Petition are compelling.

V. CONCLUSION AND FEES

The Challenged Claims are unpatentable. Petitioner authorizes charge of fees to Deposit Account 06-1050.

VI. MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1)

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

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Samsung") are the real parties-in-interest.

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

The '184 Patent is the subject of a civil action, *Headwater Research LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00422, E.D. Tex., filed October 26, 2022 (SAMSUNG-1004). Petitioner and Headwater are also involved in case nos. 2:22-cv-00467 and 2:23-cv-00103, also in E.D. Tex.

Petitioner is not aware of any other disclaimers, reexamination certificates, or IPR petitions addressing the '184 Patent.

C. Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Petitioner provides the following designation of counsel.

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D. Service Information

Please address all correspondence and service to the address listed above. Petitioner consents to electronic service by email at IPR39843-0156IP2@fr.com (referencing No. 39843-0156IP2 and cc'ing PTABInbound@fr.com, axf-ptab@fr.com, jjm@fr.com, and devoto@fr.com).

Respectfully submitted,

Dated 9-8-23

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CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 13,521 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated 9-8-23

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on September 8, 2023, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided by Federal Express, to the Patent Owner, by serving the correspondence address of record as follows:

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