

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Title: WIRELESS END-USER DEVICE WITH POLICY-BASED AG-
GREGATION OF NETWORK ACTIVITY REQUESTED BY AP-
PLICATIONS

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PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES
PATENT NO. 9,277,433 PURSUANT TO 35 U.S.C. §§ 311–319,
37 C.F.R. § 42

TABLE OF CONTENTS

I.	REQUIREMENTS FOR IPR	1
A.	Grounds for Standing.....	1
B.	Challenge and Relief Requested.....	1
C.	Claim Construction	2
II.	THE '433 PATENT	3
A.	Brief Description.....	3
B.	Prosecution History.....	5
III.	THE CHALLENGED CLAIMS ARE UNPATENTABLE.....	5
A.	GROUND 1A: Rao-Cole renders claims 1-3, 6, 10-11, 13-14 and 17 obvious.....	5
1.	Rao-Cole.....	5
(a)	Rao.....	5
(b)	Cole.....	9
(c)	Combination	14
2.	Analysis	20
B.	GROUND 1B: Rao-Cole-Freund renders claims 2-3, 5, 7-9 and 16 obvious.....	46
1.	Rao-Cole-Freund	46
(a)	Freund.....	46
(b)	Combination	48
2.	Analysis	51
C.	GROUND 1C: Rao-Cole-Singh renders claims 2 and 4 obvious.....	57
1.	Rao-Cole-Singh.....	57
(a)	Singh.....	57
(b)	Combination	58
2.	Analysis	60
D.	GROUND 1D: Rao-Cole-Montemurro renders claims 12 and 20 obvious.....	61
1.	Rao-Cole-Montemurro	61
(a)	Montemurro	61
(b)	Combination	63
2.	Analysis	65
E.	GROUND 1E: Rao-Cole-Gandhi renders claims 15 and 18-19 obvious.....	67
1.	Rao-Cole-Gandhi.....	67
(a)	Gandhi	67
(b)	Combination	68
2.	Analysis	70
IV.	PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION.....	74

A.	Discretionary denial under 325(d) is not warranted	74
B.	Discretionary denial under §314(a) is not merited	76
V.	CONCLUSION AND FEES	77
VI.	MANDATORY NOTICES UNDER 37 C.F.R. § 42.8(a)(1).....	77
A.	Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1).....	77
B.	Related Matters Under 37 C.F.R. § 42.8(b)(2)	78
C.	Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3).....	78
D.	Service Information	78

EXHIBITS

- SAMSUNG-1001 U.S. Patent No. 9,277,433 to Raleigh, et al. (“the ’433 Patent”)
- SAMSUNG-1002 Excerpts from the Prosecution History of the ’433 Patent (“the Prosecution History”)
- SAMSUNG-1003 Declaration and Curriculum Vitae of Dr. Patrick McDaniel
- SAMSUNG-1004 Complaint for Patent Infringement in *Headwater Research LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00467 (E.D. Tex. Dec. 6, 2022)
- SAMSUNG-1005 U.S. Pat. App. Pub. No. 2006/0039354 (“Rao”)
- SAMSUNG-1006 U.S. Pat. App. Pub. No. 2008/0080458 (“Cole”)
- SAMSUNG-1007 U.S. Pat. No. 5,987,611 (“Freund”)
- SAMSUNG-1008 U.S. Pat. No. 8,381,127 (“Singh”)
- SAMSUNG-1009 U.S. Pat. App. Pub. No. 2009/0207817 (“Montemurro”)
- SAMSUNG-1010 U.S. Pat. App. Pub. No. 2008/0146268 (“Gandhi”)
- SAMSUNG-1011 Excerpts, Stevens “TCP/IP Illustrated”, Volume 1, Addison-Wesley Publishing Company, 1994
- SAMSUNG-1012 U.S. Pat. No. 8,886,261 (“Aerrabotu”)
- SAMSUNG-1013 Excerpts, Computer Networks, Fourth Edition, by Andrew Tanenbaum, Prentice Hall, 2003
- SAMSUNG-1014 Excerpts from the Prosecution History of U.S. Patent No. 9,277,445 to Raleigh, et al. (“the Prosecution History of the ’445 Patent”)
- 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 First Amended Docket Control Order, *Headwater Research LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00422, E.D. Tex., April 21, 2023
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CLAIMS

Claim	Identifier	Claim Language
1	[1.1]	A wireless end-user device, comprising:
	[1.2.a]	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,
	[1.2.b]	the at least one WWAN having a corresponding network type of a plurality of wireless network types supported by the device for data communication;
	[1.3]	a non-transitory memory to store a network service activity control policy set, the policy set including at least a first differential traffic control policy element associating one or more Internet activity access controls with at least a first end-user application; and
	[1.4]	one or more processors configured to
	[1.5]	access the network service activity control policy set,
	[1.6]	determine whether to apply the one or more Internet activity access controls with respect to a first Internet access request by or on behalf of the first end-user application, based at least on which of the plurality of wireless network types is to provide data communication for Internet access requests, and
	[1.7]	when the one or more Internet activity access controls are to be applied, apply the one or more Internet activity access controls to aggregate network activity for the first Internet access request with network activity for one or more other data communication requests, which are otherwise not associated with the first end-user application, before allowing network activity in association with the first Internet access request.
2	[2.1]	The wireless end-user device of claim 1, wherein the first end-user application is 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

Claim	Identifier	Claim Language
		interface foreground,
	[2.2]	the one or more processors further configured to classify whether the first end-user application is interacting with the user in the device user interface foreground, and determine whether to apply the one or more Internet activity access controls based also on the classification of whether the first end-user application is interacting with the user.
3	[3]	The wireless end-user device of claim 2, wherein the one or more processors are configured to classify that the first end-user application is interacting with the user in the device user interface foreground when the user of the device is directly interacting with that application or perceiving any benefit from that application.
4	[4]	The wireless end-user device of claim 2, wherein the one or more processors are configured to classify that the first end-user application is interacting with the user in the device user interface foreground based on a state of user interface priority for the application.
5	[5]	The wireless end-user device of claim 2, wherein the one or more processors are configured to classify that the first end-user application is not interacting with the user in the device user interface foreground when the application is providing or utilizing a background data service.
6	[6.1]	The wireless end-user device of claim 2, wherein the one or more processors are configured to apply the one or more Internet activity access controls such that, when the one or more Internet activity access controls are to be applied based on a classification that the first end-user application is not interacting with the user,
	[6.2]	network activity in association with the first Internet access request is delayed until a second Internet access request is received from or on behalf of an application that is classified as interacting with the user.
7	[7]	The wireless end-user device of claim 1, wherein the

Claim	Identifier	Claim Language
		first differential traffic control policy element comprises an application list, and the one or more Internet activity access controls are associated with the first end-user application based on a determination as to whether the first end-user application is identified by the application list.
8	[8]	The wireless end-user device of claim 7, wherein the one or more Internet activity access controls are further associated with a second end-user application based on a determination as to whether the second end-user application is identified by the application list.
9	[9]	The wireless end-user device of claim 1, further comprising a user interface, wherein the user interface is to inform the user of the device when there are options to set, control, override, or modify the one or more Internet activity access controls and/or the association of those access controls with the first end-user application.
10	[10]	The wireless end-user device of claim 1, wherein the one or more processors are further configured to select the first differential traffic control policy element from the network service activity control policy set based at least in part on which of the plurality of wireless network types is to provide data communication for Internet access requests.
11	[11.1]	The wireless end-user device of claim 10, 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,
	[11.2]	wherein the one or more processors are further configured to, when the at least one WLAN is to provide data communication for Internet access requests, not apply the one or more Internet activity access controls.
12	[12]	The wireless end-user device of claim 1, wherein the plurality of network types include a home WWAN

Claim	Identifier	Claim Language
		type and a roaming WWAN type, the one or more processors configured to determine to apply the one or more Internet activity access controls to the roaming WWAN type and not to the home WWAN type.
13	[13]	The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the determination of whether to apply the one or more Internet activity access controls based on a power state of the device.
14	[14]	The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the determination of whether to apply the one or more Internet activity access controls based on a device usage state.
15	[15]	The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the determination of whether to apply the one or more Internet activity access controls based on power control state changes for the WWAN modem.
16	[16]	The wireless end-user device of claim 1, wherein the one or more Internet activity access controls further limit the allowed network activity to particular time windows.
17	[17]	The wireless end-user device of claim 1, wherein the one or more processors are further configured to update at least a portion of the network service activity control policy set based on information received from a network element.
18	[18]	The wireless end-user device of claim 1, wherein the one or more Internet activity access controls further prevent the first Internet access request from causing a change to a power state of the modem.
19	[19]	The wireless end-user device of claim 18, wherein when the power state of the modem is idle or sleeping, the one or more Internet activity access controls prevent power state changes to the modem until a data communication request is received from a second end-

Claim	Identifier	Claim Language
		user application for which the one or more Internet activity access controls do not apply.
20	[20]	The wireless end-user device of claim 1, wherein when the one or more Internet activity access controls are to be applied, the one or more processors are configured to instruct the first end-user application to transition to a different state.

Samsung Electronics Co., Ltd. (“Petitioner” or “Samsung”) petitions for *Inter Partes* Review (“IPR”) of claims 1-20 (“the Challenged Claims”) of U.S. Patent No. 9,277,433 (“the ’433 Patent”).

I. REQUIREMENTS FOR IPR

A. Grounds for Standing

Petitioner certifies that the ’433 Patent is available for IPR. Petitioner is not barred or estopped from requesting this review. Petitioner was served with a complaint of infringement of the ’433 Patent less than one year ago. SAMSUNG-1004; SAMSUNG-1017.

B. Challenge and Relief Requested

Samsung requests IPR of the Challenged Claims on the grounds noted below. Dr. Patrick McDaniel provides supporting testimony in his Declaration. SAMSUNG-1003, ¶¶[1]-[205].

Ground	Claim(s)	35 U.S.C. §103
1A	1-3, 6, 10-11, 13-14, 17	Rao-Cole
1B	2-3, 5, 7-9, 16	Rao-Cole-Freund
1C	2, 4	Rao-Cole-Singh
1D	12, 20	Rao-Cole-Montemurro
1E	15, 18-19	Rao-Cole-Gandhi

The ’433 Patent claims priority to several provisional applications as

early as 1/28/2009 (“Critical Date”). SAMSUNG-1002, Cover. Petitioner does not concede that the Critical Date is the priority date of the ’433 Patent. The references are prior art under §§102(a), 102(b), and/or 102(e).

Reference	Filing Date	Publication Date
Rao	7/22/2005	6/23/2006
Cole	9/29/2006	4/3/2008
Freund	5/6/1997	11/16/1999
Singh	2/2/2006	8/2/2007
Montemurro	2/15/2008	9/2/2014
Gandhi	12/14/2006	6/3/2014

C. Claim Construction

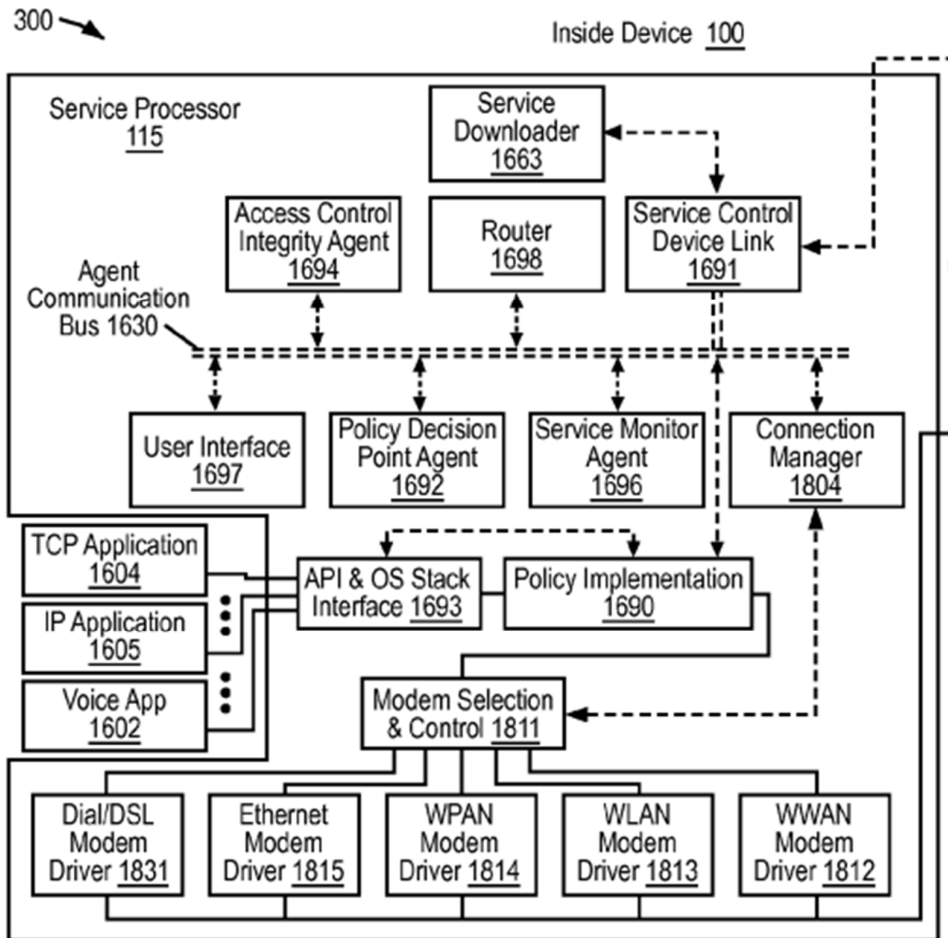
Petitioner submits that no formal claim constructions are necessary because “claim terms need only be construed to the extent necessary to resolve the controversy.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); SAMSUNG-1003, ¶[20]. Petitioner reserves the right to respond 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.

II. THE '433 PATENT

A. Brief Description

The '433 Patent is directed to “a wireless end-user device” with a wireless wide-area network (WWAN) modem and a wireless local area network (WLAN) modem that “supports multiple wireless network types,” illustrated below. SAMSUNG-1001, Abstract, FIG. 3. “[I]n wireless networks, managing ... network access connection resources is important to maintain network performance as network resources/capacity demand increases.” *Id.*, 3:44-47.



SAMSUNG-1001, FIG. 3 (excerpted).

To manage capacity, the device can “apply a service usage control policy for the network service usage activities to protect network capacity (e.g., reduce network capacity demand).” *Id.*, 11:47-49. A policy element (service usage control policy) in the device “associates one or more Internet activity access controls with [an] end-user application.” *Id.*, Abstract. The device “determine[s] whether to apply the Internet activity access controls to an Internet access request by ... the end-user application” based on various factors. *Id.*, Abstract, 76:41-45.

When a policy applies to an access request, the device can take various actions including having network activity for the request “delayed until it can be associated with network activity for one or more other requests not associated with the application” and preventing “changing the power state of the modem.” *Id.*, Abstract, 93:53-54.

B. Prosecution History

The Patent Office issued one rejection (double patenting) during prosecution. SAMSUNG-1002, 227-250. Applicant filed a terminal disclaimer, and all claims were allowed. *Id.*, 838, 960-962. The Office never considered Rao, Cole, Freund, Singh, or Montemurro. *See* §IV.A. These references render the Challenged Claims obvious, as discussed below. SAMSUNG-1003, ¶[47].

III. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. GROUND 1A: Rao-Cole renders claims 1-3, 6, 10-11, 13-14 and 17 obvious

1. Rao-Cole

(a) Rao¹

Rao discloses a “remote access architecture” that provides “peer-to-peer communications and remote access connectivity.” SAMSUNG-1005, Abstract. Rao’s system (Figure 1A, below, for example) includes clients 105 (instances of computing devices 102) that communicate over a network. *Id.*, [0086]-[0096];

¹ Descriptions of the references and prior art combinations are incorporated into each mapping. All emphasis is added unless otherwise indicated.

SAMSUNG-1003, ¶[49].

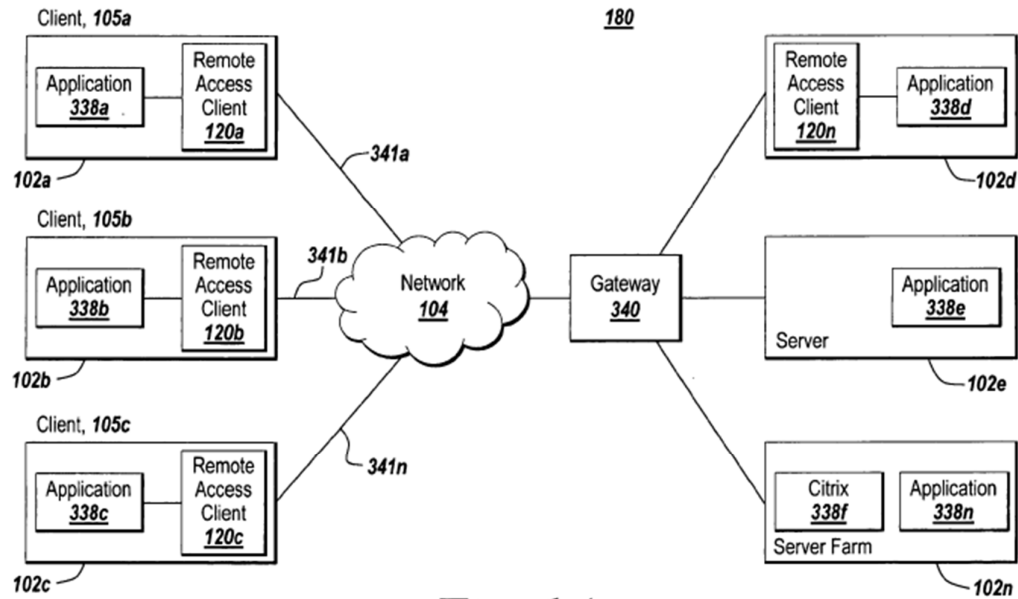


Fig. 1A

SAMSUNG-1005, FIG. 1A

Rao addresses inefficient use of network resources when communications between devices are “processed in the order generated by the activity of a user and applications of the client,” which is not “always desirable” because a network packet for a background application may be processed before a network packet for a foreground application, resulting in applications suffering from increased latency and reduced quality of voice communication. SAMSUNG-1005, [0031]; SAMSUNG-1003, ¶[51].

Rao addresses these inefficiencies by augmenting its client with a remote access client that interacts with applications and a network stack to “provide application-aware, client-specific prioritization of packet traffic.” SAMSUNG-

1005, [0003], [0099]-[0100]; SAMSUNG-1003, ¶[52].

Figure 1C shows an example of a system with a remote access client for routing network packets from client to network:

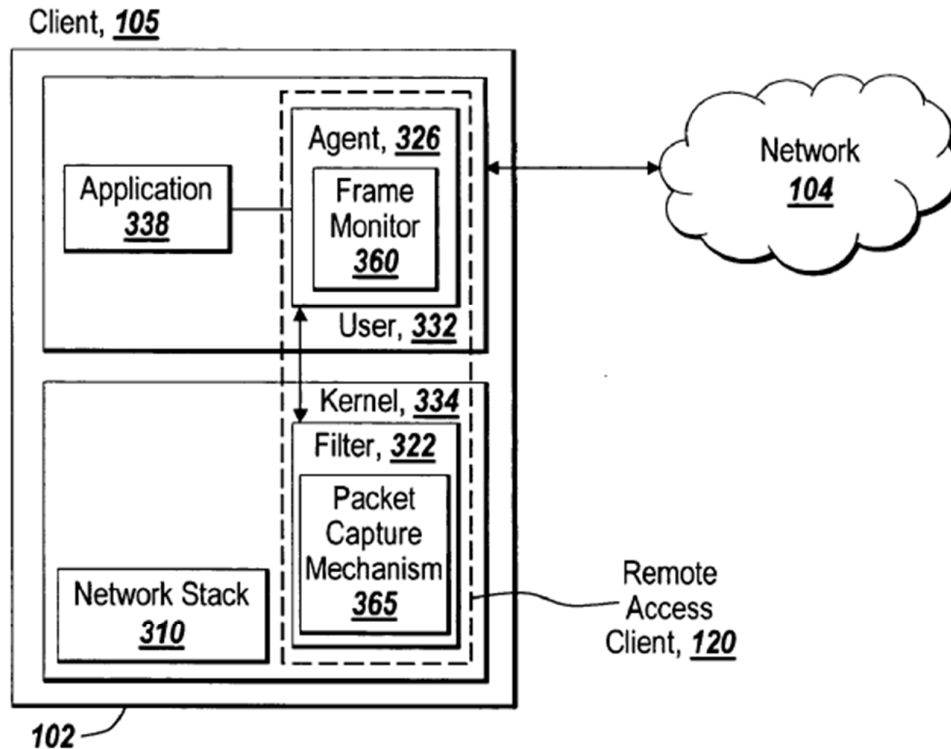


Fig. 1C

SAMSUNG-1005, FIG. 1C

The remote access client includes a filter that uses a “filtering table ... to determine what action to take against packets,” including “ensur[ing] that unwanted packets are discarded” and “deny[ing] access to particular protocols.” SAMSUNG-1005, [0102]. The remote access client includes an agent with

frame monitor that “include[s] policies and logic for applying a policy to a received packet.” *Id.*, [0108]. The frame monitor “transmit[s] a packet to a gateway 340 responsive to a policy-based determination made by the frame monitor.” *Id.* These policies facilitate efficient use of network resources and enable Rao’s system to address the inefficiencies identified in Rao. SAMSUNG-1005, [0003], [0179]-[0195]; SAMSUNG-1003, ¶[54].

Rao’s system enables “intelligent and client centric prioritization of application network communications on a client based on the type and/or priority of an application.” SAMSUNG-1005, [0179], FIG. 5A. To perform this prioritization, Rao’s system “appl[ies] a policy to determine a condition of the client 105 ... at the time of transmission of the packet.” Further, the frame monitor can “identify an application 338 that generated the packet.” SAMSUNG-1005, [0109]; SAMSUNG-1003, ¶[55].

Figure 5A shows an environment of a client for providing client-side application-aware network communication:

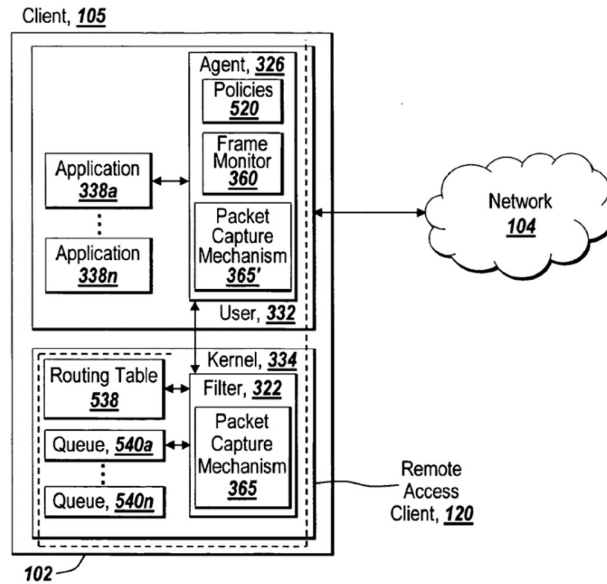


Fig. 5A

SAMSUNG-1005, FIG. 5A

Rao's policies can be specified by name of, type of, or type of protocol used by the applications, or any suitable means. SAMSUNG-1005, [0182]. Policies offer several approaches for prioritization, e.g., based on whether an application is in the foreground or background. *Id.* Thus, policies can "apply a priority to network packets of applications 338a-338n in accordance with the prioritization rules specified or indicated by the policies." *Id.*; SAMSUNG-1003, ¶[57].

(b) Cole

Cole is directed to providing network connectivity for a mobile device with multiple "communication interfaces." SAMSUNG-1006, Abstract. Figure 1 (below) shows mobile device 110 connected to communication networks 120 (e.g., WWAN 130, WLAN 140). SAMSUNG-1003, ¶[58]; SAMSUNG-1006,

[0031].

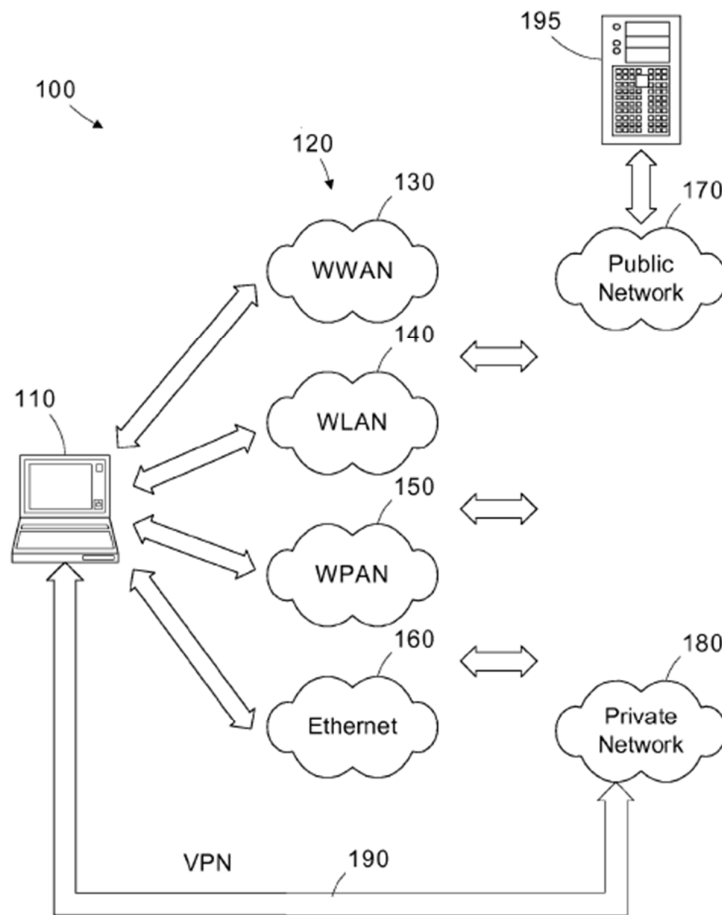


Figure 1

SAMSUNG-1006, FIG. 1

Figure 2 (below) shows mobile device elements, including a processor, non-transitory memory, WWAN modem, WLAN modem, and other elements that improve network connectivity of the device, such as a communication manager. SAMSUNG-1006, [0034]-[0036], FIG. 2.

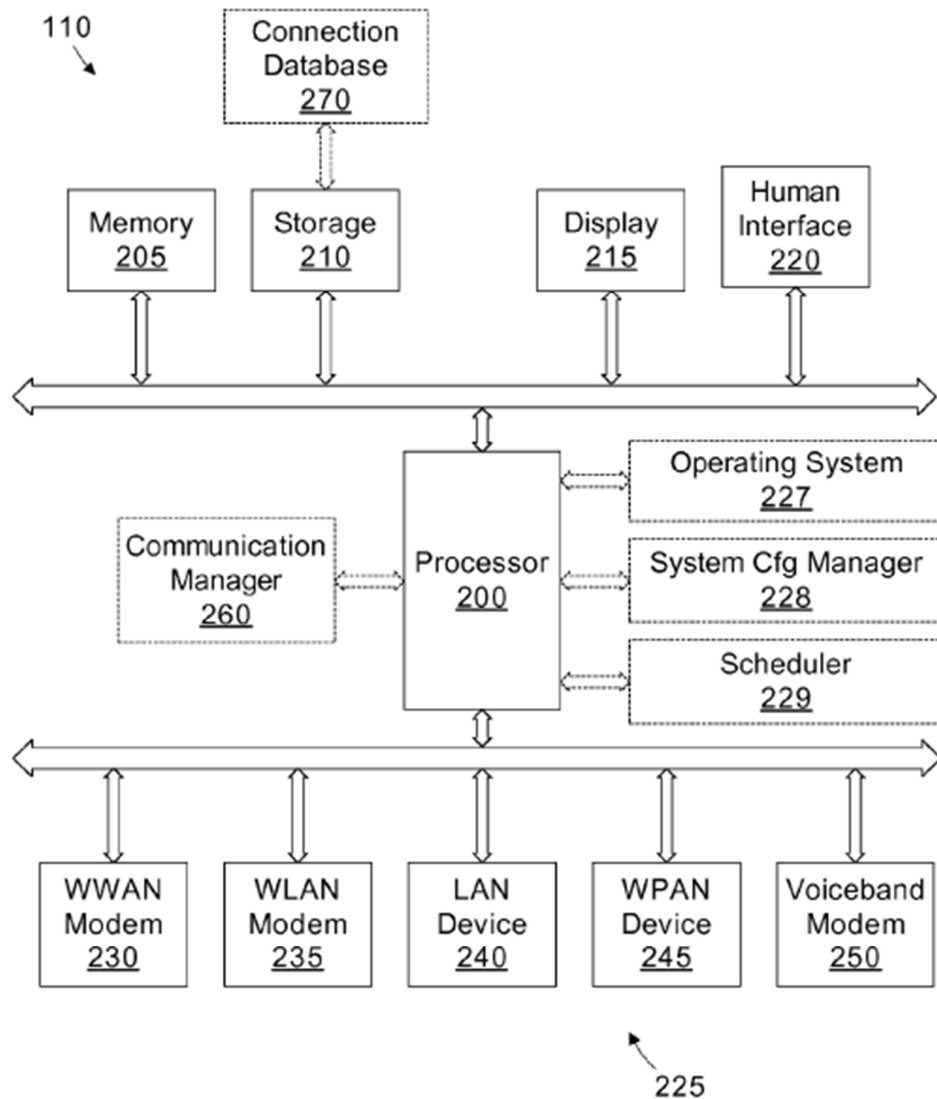


Figure 2

SAMSUNG-1006, FIG. 2

The communication manager 260 (or “connection manager 260”) simplifies “the user experience by automatically managing connectivity and configuration” in environments “such as home, office, or public (trusted or untrusted),

each having separate configurations and communication networks 120 available.” *Id.*, [0039]. The connection manager uses various techniques for selecting a network that makes efficient use of computing resources. *Id.*, [0036], [0041]-[0042], [0047]-[0048], [0050]. For example, the connection manager can “monitor the user’s connection behaviors to identify patterns and attempt to automate such configuration changes.” *Id.*, [0047]. In another example, “connection manager 260 can seek to identify the best connection available (e.g., based on performance heuristics such as cost, bandwidth, signal strength, etc.).” *Id.*, [0062]. “The connection manager 260 employs information ... for each available connection as well as user preferences ... to determine the order in which connections should be tried to establish connectivity.” *Id.*; SAMSUNG-1003, ¶[60].

To simplify the user experience, Cole provides Internet access controls when performing network operations. SAMSUNG-1003, ¶[61]. Such controls are applied based on network and power considerations, including altering a network connection either automatically or in response to a user prompt. *Id.*; SAMSUNG-1006, [0077]-[0079], [0090]. Regarding network considerations, Cole explains, “[i]n response to a monitored load exceeding a capacity threshold,” the connection manager can “attempt to establish a connection with a higher bandwidth,” including using a “network 120 having higher capacity.” SAMSUNG-1006, [0077]. “If the connection manager 260 can identify a more appropriate connection ... the connection manager 260 switches to the larger

pipeline by enabling the proper communication interface.” SAMSUNG-1006,

[0078]. “The resulting larger pipeline increases the responsiveness of the mobile device 110 to user requests, helps applications complete their data transfer activities sooner, or reduces the mobile device 110 power consumption.” *Id.*

For example, if a “user is surfing a web site and selects a file for download” that is “taking a long time to transfer” and “the lengthy transfer is conducted using the WWAN modem 230 (e.g., a 3G channel), which consumes significant battery power,” “connection manager 260 identifies the load on the WWAN modem 230 and asks the user to find a better connection.” *Id.*, [0088]. Cole further teaches that Internet access controls can apply to applications. SAMSUNG-1006, [0088]; SAMSUNG-1003, ¶[62].

Regarding power, Cole teaches that an “issue related to using different connections is the power consumption associated with each connection type,” and as described above, a larger pipeline can reduce the mobile device power consumption. *Id.*, [0011], [0078]. However, “[w]hile a particular connection may have a desirably high bandwidth, the connection modality may require significant processing power from the mobile device, thereby greatly shortening battery life.” *Id.* Therefore, a person of ordinary skill in the art (POSITA)² would have recognized that, in various use cases, increasing bandwidth can both increase and decrease power use, making it beneficial to consider both power

² SAMSUNG-1003, ¶¶17-18 (defining a POSITA).

and bandwidth when applying Internet access controls, such as choosing an appropriate network connection. SAMSUNG-1006, [0011], [0078]; SAMSUNG-1003, ¶[63].

To address power considerations, Cole teaches that its connection manager “may change the configuration of the communication functions in direct response to the power state of the mobile device.” SAMSUNG-1006, [0090]. “The power state includes whether the mobile device 110 is connected to an external power supply, the level of charge remaining, if operating on battery power, and the remaining time to fully charge the battery.” *Id.* To perform power management, the communication manager “maintains data related to each of the communication interfaces 225,” such as “the connection name, connection technology type,” and “a power characteristic.” *Id.*, [0037]; SAMSUNG-1003, ¶[64].

(c) Combination

As described above, Rao describes using policies to prioritize certain higher-priority messages over lower-priority messages. SAMSUNG-1005, [0179]-[0195], FIG. 5A-5B. Policies are applied in a mobile client (e.g., smart phone), or any type of mobile computing device. SAMSUNG-1005, [0198]. By the Critical Date, a POSITA would have recognized that Rao’s techniques would be particularly applicable when a high rate of network transmissions occur, resulting in competition among applications for network resources. SAM-

SUNG-1005, [0198]; SAMSUNG-1003, ¶[75]. Given such resource competition, Rao teaches prioritization mechanisms that ensure higher priority network transmissions are not delayed, addressing one challenge. SAMSUNG-1005, [0179]-[0195]; SAMSUNG-1003, ¶[75].

While such prioritization techniques would have improved the efficient utilization of network resources, a POSITA would have understood that, in mobile devices, power management is also critical, at least because applications cannot execute without sufficient power. SAMSUNG-1003, ¶[76]. A POSITA would have also recognized that network transmissions from a mobile device can cause high power utilization, especially using some types of power-intensive network connections (e.g., WWAN). SAMSUNG-1003, ¶[77]; SAMSUNG-1006, [0011]. Thus, when a high rate of network transmission occurs, power demand can increase, highlighting the importance of power management. SAMSUNG-1003, ¶[77]; SAMSUNG-1006, [0011], [0078].

By the Critical Date, one well-known technique for mobile device power management was selectively adjusting between available network connections (e.g., WWAN, WLAN). SAMSUNG-1003, ¶[78] (citing SAMSUNG-1012). In addition to reducing power consumption, this technique could also increase available bandwidth, reducing network congestion. *Id.*; SAMSUNG-1006, [0078]. For example, WLANs typically provide more bandwidth than WWANs and use less power. SAMSUNG-1003, ¶[78]. Given these considerations, which Rao does not specifically address, a POSITA would have been motivated

to look to solutions beyond Rao to improve implementation of its techniques.

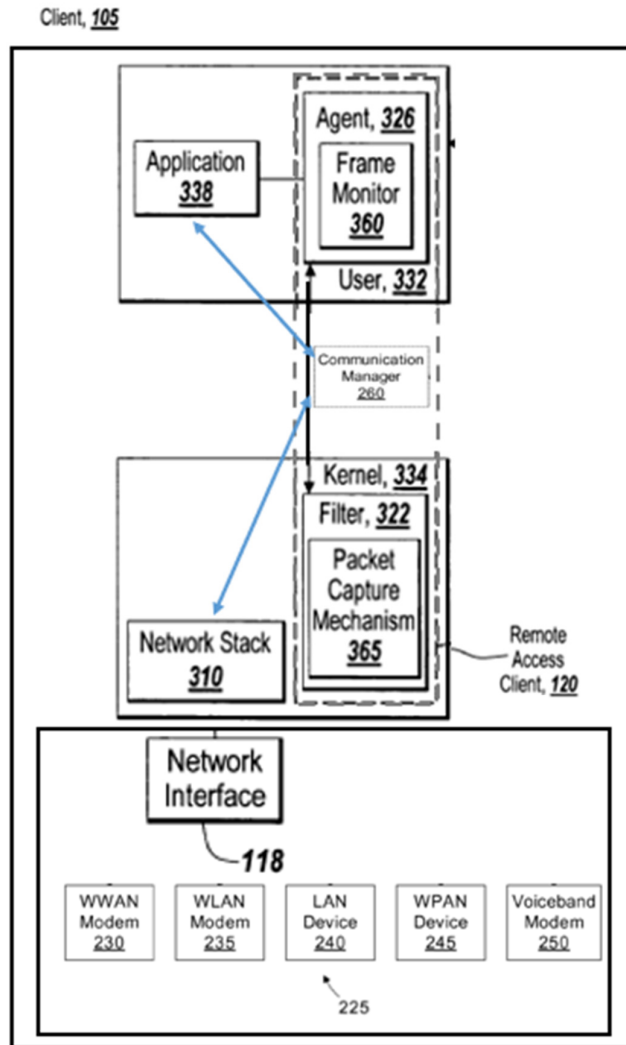
Id.

To address these concerns (e.g., power, network selection, and the relationship between them), a POSITA would have looked to references such as Cole, which, like Rao, are directed to providing network connectivity for mobile devices. SAMSUNG-1003, ¶[79]; SAMSUNG-1006, Abstract, [0014]-[0015]. As described above, Cole offers Internet access control techniques that address excess power consumption and selection of an appropriate network. SAMSUNG-1006, [0078], [0088]; SAMSUNG-1003, ¶[79]. For example, Cole describes an Internet access control where the connection manager “detects a power state change (e.g., alarm or mode change),” and “[i]f the mode change is associated with an increased power state (e.g., connection to AC power or change to high performance mode), the connection manager 260 establishes the connection normally using the ‘best’ connection technique.” SAMSUNG-1006, [0098]. In another example, Cole explains that the connection manager “detects a sustained high load on the current communication link over the active communication interface,” and if load management is enabled, the connection manager “determines if there is a [communication interface] with better connectivity present” and “determines the availability of the selected device ... and attempts to connect using the selected device.” *Id.*, [0083]. In both examples, Cole determines whether to apply an Internet access control (connecting using the “best” connection technique) based on a condition (power state change of the device

and high load on current communication link from device usage). SAMSUNG-1006, [0083], [0098]; SAMSUNG-1003, ¶[79].

A POSITA would have found obvious integration of Cole's techniques with Rao's techniques to promote more efficient communications and network access connectivity. SAMSUNG-1003, ¶[80]. In operation, the resulting Rao-Cole Device (RCD) first evaluates network and power conditions using Cole's techniques to determine whether to apply an Internet access control to connect to the network with the "best" connection type, then evaluates further conditions (e.g., whether an application is running in the foreground or background, which application is running, etc.) using Rao's techniques to determine the priority of the packets traveling over the network selected by RCD using Cole's techniques. *Id.*; SAMSUNG-1005, [0179]-[0195], [0198], FIG. 5A; SAMSUNG-1006, [0011], [0078], [0083], [0088], [0098].

In an example of combining Rao and Cole, illustrated below, a POSITA would have incorporated a communication manager (e.g., Cole's communication manager) into a remote access client (e.g., Rao's remote access client). SAMSUNG-1003, ¶[81]. RCD is shown as modified Figure 1C of Rao, with the network interface 118 containing WWAN Modem 230 (supporting 2G and 3G cellular technologies) and WLAN Modem 235 (supporting Wi-Fi) from Cole. *Id.*, SAMSUNG-1005, FIG 1C; SAMSUNG-1006, [0031]. Using such connections, RCD "can connect to one or more networks 104 through a variety of connections including ... wireless connections." SAMSUNG-1005, [0095].



SAMSUNG-1005, FIG. 1C (annotated, modified)

The RCD would have further included elements customarily found in a mobile device, such as a processor (e.g., Rao’s CPU 121, Cole’s processor 200), non-transitory memory (e.g., Rao’s main memory 122, Cole’s memory 205), and display (e.g., Rao’s display 124, Cole’s display 215). SAMSUNG-1005, Fig. 1D, [0188]; SAMSUNG-1006, Figure 2, [0034]; SAMSUNG-1003, ¶[82].

It would have been obvious to a POSITA that the RCD’s processor would be configured to perform the operations discussed in Ground 1A because “[t]he

central processing unit 102 is any logic circuitry that responds to and processes instructions fetched from the main memory unit 104.” SAMSUNG-1005, [0119]; SAMSUNG-1003, ¶[82]. A POSITA would have further known that the processor processes instructions fetched from the main memory unit. SAMSUNG-1003, ¶[82].

A POSITA would have expected success in incorporating a communication manager, as Cole teaches, into a remote access client, as Rao teaches. Such a combination would have required only routine programming knowledge well within the skill of a POSITA before the Critical Date. SAMSUNG-1003, ¶[83]. Indeed, the change would have amounted to nothing more than the use of a known technique to improve similar devices – in each instance a mobile device equipped with network interfaces – in a similar way and combining prior art elements according to known methods to yield the predictable results described above. *Id.*; *KSR v. Teleflex*, 550 U.S. 398, 417 (2007). For example, both Rao’s and Cole’s devices include interfaces between a processor that executes the described functions and network devices that provide communication functions. SAMSUNG-1005, FIGS. 1D-1E, [0118]-[0119], [0121]-[0122],[0125],[0128]-[0130]; SAMSUNG-1006, Figure 2, [0034]-[0035]. A POSITA would have known that such processors commonly run processes such as those run by Rao’s remote access client and Cole’s communications manager. SAMSUNG-1005, [0114]; SAMSUNG-1006, [0036]; SAMSUNG-1003, ¶[83]. Therefore, the combination of the techniques of Cole into Rao in RCD

would require only routine programming knowledge. SAMSUNG-1003, ¶[83].

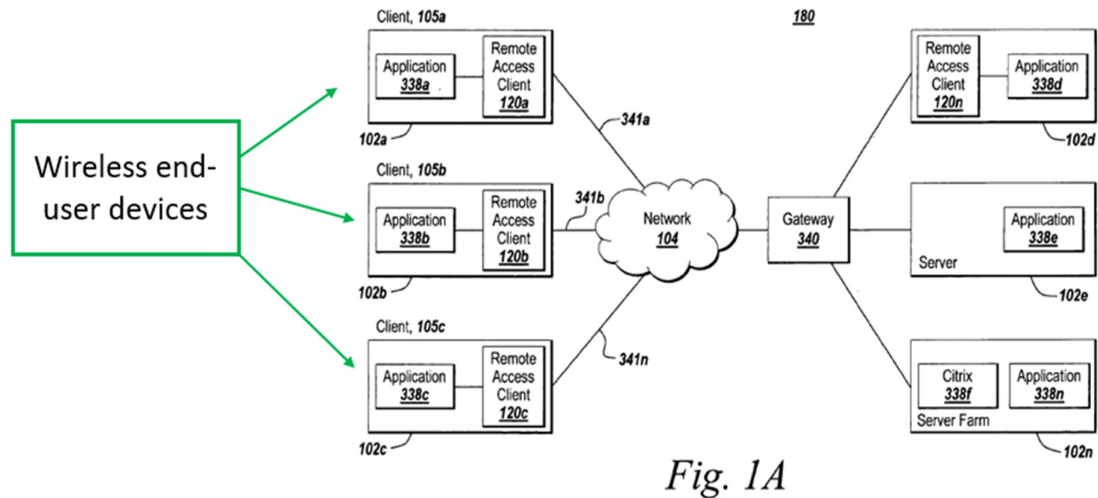
Finally, the elements of the resulting RCD would each perform functions they had been known to perform prior to the combination—client 105 would perform the same functions to prioritize higher-priority messages over lower-priority messages through the use of policies 520, as Rao teaches, leveraging functionality offered by Cole’s connection manager 260 policies, including policies associated with applications, to identify the best power consumption configuration and available connection for transmission. SAMSUNG-1003, ¶[84]. Accordingly, a POSITA would have naturally expected success when incorporating Cole’s teachings into Rao’s system, as described above. *Id.*

2. Analysis

[1.1]

To the extent the preamble is limiting, RCD renders it obvious. SAMSUNG-1003, ¶¶[85]-[88].

Rao teaches a client that is a “wireless end-user device,” shown in Figure 1A:



SAMSUNG-1005, FIG. 1A (annotated), [0086]-[0093]

Rao discloses an environment that “includes multiple computing devices 102a-102c (also referred to as clients 105a-105c) connected to a network.” SAMSUNG-1005, [0086]. The computing device can be any number of devices, including a “**handheld computer**,” “**mobile telephone**,” “**smart phone**,” or “other form of computing or telecommunications device.” SAMSUNG-1003, ¶[87]; SAMSUNG-1005, [0130], [0198]; *see also* SAMSUNG-1006, [0031].

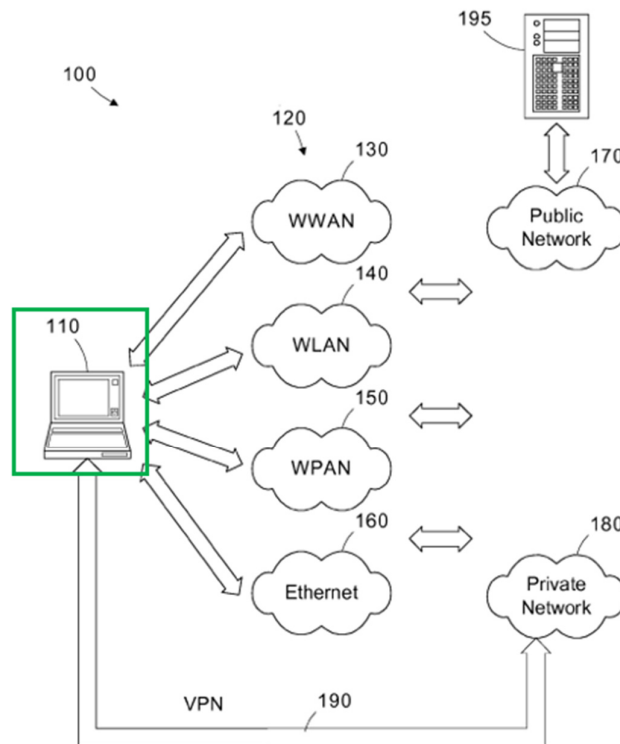


Figure 1

SAMSUNG-1006, FIG. 1

[1.2.a]

RCD renders [1.2.a] obvious. SAMSUNG-1005, [0095], [0125], [0172], [0198]; SAMSUNG-1006, [0035]; SAMSUNG-1003, ¶¶[89]-[92].

Rao explains that the client “may be ... a smart phone” and includes teachings regarding a WWAN modem to communicate data for Internet service activity, e.g., the computing device includes a network interface, which can comprise a “**modem**.” SAMSUNG-1005, [0125], [0198]; SAMSUNG-1003, ¶[90]. The network interfaces to a WAN or the Internet through connections, including WAN links, wireless connections, or a combination. SAMSUNG-

1005, [0125]. Therefore, a POSITA would have understood or found obvious that Rao's device includes a modem to communicate data with a WAN or a wireless connection, or a combination of those, i.e., a WWAN. SAMSUNG-1003, ¶[90].

Rao further explains that the modem communicates data for Internet service activities, describing mechanisms for data transfer for Internet services, including the maximum transmission unit parameter (MTU) "indicat[ing] the size of the largest unit of data that can be sent over a type of physical medium in a network," and indicating "the largest datagram ... than can be transmitted by an Internet Protocol (IP) layer interface." SAMSUNG-1005, [0172]; SAMSUNG-1003, ¶[91]. A POSITA would have known that IP is used by the Internet. SAMSUNG-1003, ¶[91] (citing SAMSUNG-1011). As such, a POSITA would have known or understood that Rao teaches a WWAN modem to communicate (e.g., transmit using the MTU parameter) data for Internet service activities. *Id.*

Additionally, Cole discloses a mobile device 110 that includes one or more "communication interfaces 225," including, e.g., "a **WWAN modem 230**, a WLAN modem 235." SAMSUNG-1006, [0035], FIG. 2. It would have been obvious to a POSITA to include a WWAN modem in the RCD, such as the WWAN modem of Cole, to provide a network interface to a WWAN, as Rao also contemplates. SAMSUNG-1003, ¶[92]; §III.A.1.c.

[1.2.b]

RCD renders [1.2.b] obvious. SAMSUNG-1003, ¶¶[93]-[94]; SAMSUNG-1006, [0031]; §III.A.1.c.

The '433 Patent provides network type examples like “2G, 3G, [and] WiFi.” SAMSUNG-1001, 95:9-10. Similarly, Cole teaches a “mobile device 110 interfacing with a plurality of communication networks 120, such as a wireless wide area network (WWAN) 130 (e.g., ... other third generation {3G} cellular technologies [and] other second generation {2G} cellular technologies, ..., etc.).” SAMSUNG-1006, [0031]. Therefore, as discussed in §III.A.1.C, the WWAN of the RCD has corresponding network types of 2G and 3G. SAMSUNG-1003, ¶[94]. Cole further teaches that “[e]ach of the communication networks 120 may interface directly or indirectly with a public network 170 (e.g., the Internet).” SAMSUNG-1006, [0031]. A POSITA would have known that the Internet and institutional networks are used for data communication. SAMSUNG-1003, ¶[94].

[1.3]

RCD renders [1.3] obvious. SAMSUNG-1005, [0102], [0105], [0124], [0128], [0179], [0182], [0192]; SAMSUNG-1003, ¶¶[95]-[100].

As described above, RCD includes non-transitory memory, and Rao teaches a non-transitory memory that stores a network service activity control policy set. §III.A.1.c; SAMSUNG-1003, ¶[96]. A POSITA would have understood or found obvious that Rao includes memory, which a POSITA would have understood as being non-transitory, that stores the network service activity

control policy set. *Id.*; SAMSUNG-1005, [0118] (“each computing device 102 includes ... a main memory unit 104”), [0128] (indicating that the storage device stores “other related software” including “any program related to the remote access client 120”). Rao provides as examples of memory as “DRDRAM” and examples of storage devices as “one or more hard disk drives or redundant arrays of independent disks.” *Id.*, [0120], [0124]; SAMSUNG-1003, ¶[96].

Rao further teaches a network service activity control policy set that includes a first differential traffic control policy element. SAMSUNG-1003, ¶[97]; SAMSUNG-1005, [0182]. For example, Rao teaches that “remote access client 120 may have ... **policies 520** for specifying client-side prioritization of network communications related to applications.” SAMSUNG-1005, [0182]. A POSITA would have known that the policies for specifying client-side prioritization of network communications, as Rao describes them, are network service activity control policies for differential traffic control (since the prioritization of network communications disclosed in Rao is an example of differential traffic control). SAMSUNG-1003, ¶[97].

Additionally, Rao teaches that “[t]he filtering table is used to determine what action to take against packets, such as packets intercepted by the packet capture mechanism.” SAMSUNG-1005, [0102]. Filtering occurs where a “packet satisfies a condition listed in the filtering table,” and the filter “transmit[s] the packet to the agent 326 and not to the original destination of the packet.” *Id.*, [0105]. A POSITA would have known that the conditions listed in

the filtering table are network service activity control policies for differential traffic control. SAMSUNG-1003, ¶[98].

As described above, Cole also teaches policies. SAMSUNG-1006, [0088]; SAMSUNG-1003, ¶[98]; §III.A.1.b. A POSITA would have found obvious to combine the policies of Rao and of Cole to form the policy set used to govern operation of RCD. SAMSUNG-1003, ¶[98].

Moreover, Rao's first differential traffic control policy element associates an Internet activity access control with a first end-user application. SAMSUNG-1003, ¶[99]. As stated above, the remote access client may have policies "for specifying client-side **prioritization of network communications related to applications**"; a POSITA would have thus recognized an association between the policies' Internet activity access controls and the applications to which they apply. SAMSUNG-1005, [0182], SAMSUNG-1003, ¶[99]. Filter policies can be associated with applications, and "the filter intercepts a packet generated by an application 338 executing in user-mode 332 for transmission by the client 105." *Id.*, [0105]. Policies are then applied such that packets that satisfy a condition of the filtering table are transmitted to the agent and not the original packet destination. *Id.*; SAMSUNG-1003, ¶[99].

For example, "online collaboration related applications 338a-338n may be placed and prioritized in a first queue" and a "second queue 540b may be used for email related applications 338a-338n." SAMSUNG-1005, [0192]. A POSITA would have recognized that other real-time applications, such as VoIP,

could be prioritized in the first queue and would have found it obvious to do so.

SAMSUNG-1003, ¶[100]; SAMSUNG-1005, [0179] (“the applications 338a-338n provide one or more real-time data communications, such as VoIP”).

Thus, Rao teaches email as a first application and VoIP as a second application.

SAMSUNG-1005, [0179], [0182]; SAMSUNG-1003, ¶[100].

[1.4]

RCD renders [1.4] obvious. SAMSUNG-1003, ¶¶[101]-[102]. RCD includes a processor (e.g., Rao’s “CPU 121”) to execute instructions. SAMSUNG-1005, Fig. 1D; §III.A.1.c.

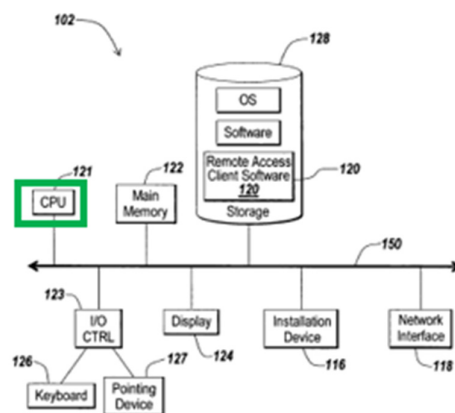


Fig. 1D

SAMSUNG-1005, FIG. 1D (annotated)

Moreover, processors were conventional features of mobile devices by the Critical Date. SAMSUNG-1003, ¶[102].

[1.5]

RCD renders [1.5] obvious. SAMSUNG-1005, [0099], [0119], [0183].

SAMSUNG-1003, ¶¶[103]-[104]. Rao teaches “[t]he policies 520 may be accessible by the agent 326, configured into the agent 326, or loaded by the agent 326.” SAMSUNG-1005, [0183], [0099].

[1.6]

RCD renders [1.6] obvious. SAMSUNG-1005, [0081], [0088], [0104], [0140], [0182]; SAMSUNG-1006, [0077]-[0078], [0088]; SAMSUNG-1003, ¶¶[105]-[109].

Rao renders obvious determining whether to apply Internet activity access controls based at least on which network protocol (e.g., wireless network type) is being used. SAMSUNG-1003, ¶[106]. For example, Rao describes that the policies “may be specified in accordance to the **type of one or more protocols used by the applications.**” SAMSUNG-1005, [0182]. Rao further teaches that “[t]he configuration settings may include information regarding which ... protocols ... to filter.” *Id.*, [0104]. A POSITA would have known that each network type can be implemented using one or more networking protocols (e.g., 3G can be implemented using Global System for Mobile Communications (GSM) or Code Division Multiple Access (CDMA); WiFi can be implemented using 802.11). SAMSUNG-1003, ¶[106]. Therefore, identifying the protocol (e.g., GSM) used by the network type also identifies the network type (e.g.,

3G),³ and because Rao teaches that policies can be applied based on network interface protocols, and network interface protocols indicate wireless network types, Rao teaches or renders obvious determining whether to apply Internet activity access controls based on network type. *Id.*

Rao further describes how the policies can be applied to access requests by end-user applications. SAMSUNG-1003, ¶[107]. For example, Rao's device can be "used for initiating any type and/or form of communication session, real-time or otherwise, such as an interactive user," and "[t]he policies 520 may be specified in accordance to the type of one or more protocols **used by the applications.**" SAMSUNG-1005, [0140], [0182]. Therefore, RCD renders obvious determining whether to apply Internet activity access control(s) with respect to an Internet access request by a first end-user application, based on which of the wireless network types is to provide data communication for Internet access request. SAMSUNG-1003, ¶¶[107]-[108] (discussing SAMSUNG-1005, [0081]).

To the extent that Rao alone does not render this element obvious, RCD does. SAMSUNG-1003, ¶[109]; SAMSUNG-1006, [0088]. Cole describes searching for a different network when performing a lengthy file transfer while

³ The converse is not necessarily true. SAMSUNG-1003, ¶[106].

on a 3G-type network, “which consumes significant battery power.” SAM-SUNG-1006, [0088]. Since the user is connected via 3G, Cole’s connection manager “identifies the load on the WWAN modem 230 and asks the user to find a better connection.” *Id.* Thus, Cole teaches applying Internet access controls (asking the user to find a better connection) on behalf of the first end-user application (file download) based on being connected to the 3G wireless network type that is to provide data communication for the request. *Id.*; SAM-SUNG-1003, ¶[109] (discussing SAMSUNG-1006, [0077]-[0078]).

[1.7]

RCD renders [1.7] obvious. SAMSUNG-1005, claims 1, 5, [0080], [0182]-[0184]; SAMSUNG-1003, ¶¶[110]-[115].

As described above, RCD renders obvious determining whether to apply Internet access controls based on which wireless network type is providing data communication. SAMSUNG-1003, ¶[111]; see discussion of Element [1.6]. When such access controls are applied, RCD renders obvious aggregating network activity for the first Internet access request with network activity for one or more other data communication requests from a second, unrelated application. SAMSUNG-1003, ¶[111].

Rao teaches access controls that aggregate network activity from applications. SAMSUNG-1005, claims 1, 5, [0182]-[0184]; SAMSUNG-1003, ¶[112]. To apply access controls, Rao teaches storing network packets to a queue and determining the queued network packets are “associated with a first application

of the client.” SAMSUNG-1005, claim 1. To perform queuing, the client “intercepts ... networks[sic] packets associated with an application,” which “are stored to a queue.” SAMSUNG-1005, [0184]. A “priority for the intercepted and queued network packet is determined based on the type and/or priority of the application.” *Id.* Thus, Rao teaches queuing packets based on the priority of an application. SAMSUNG-1003, ¶[112].

Rao further teaches that priority-based queuing applies to multiple applications: “the **queues** 540a-540n may be associated with ... network packets related to **applications** 338a-338n of the client 105.” SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶[113]. Rao provides examples of real-time data communications, such as VoIP, and “non-real-time data communications ... from other applications.” SAMSUNG-1005, [0080]. A POSITA would have recognized that Rao teaches communication from real-time applications, such as VoIP, and from unrelated non-real-time applications. SAMSUNG-1003, ¶[113].

After packets are queued, Rao teaches aggregating network activity from unrelated applications. SAMSUNG-1003, ¶[114]; SAMSUNG-1005, claims 1, 5, [0184]. For example, the client holds “in the queue a network packet associated with the second application” and “releas[es] the held network packet [of the second application] upon communication of the one or more network packets associated with the first application prioritized ahead of the held network packet [of the second application].” SAMSUNG-1005, claim 5. Rao explains the benefits of such an approach: the client “may prioritize the real-time data

communications of application 338a ahead of other applications, such as non-real-time data communication applications.” SAMSUNG-1003, ¶[114]; SAMSUNG-1005, [0184].

Rao further teaches that the queues “may be organized by levels of priority, such as high, medium, low, or numerically such as priority 1 . . . 10,” which enables prioritization of real-time data communications applications ahead of non-real-time data communications applications. SAMSUNG-1005, [0180], [0184]. Packets in a higher priority queue “are communicated from the queues” before packets in a lower priority queue, and the remote access client “will communicate the network packets from the queues in a manner according to **or consistent with the determined priorities.**” *Id.*, [0194]. A POSITA would have known that it was common to allocate *some* bandwidth to lower-priority queues, allowing them to transmit some packets, even if at a lower rate compared to higher-priority queues, a property commonly called “non-starvation,” which can be implemented using Weighted Fair Queuing (WFQ). SAMSUNG-1003, ¶115 (citing SAMSUNG-1013, SAMSUNG-1026, SAMSUNG-1037). Since higher-priority traffic is allocated a larger share of the bandwidth, the packets are communicated consistent with the priorities, while still allocating some bandwidth to lower-priority packets, avoiding starvation. SAMSUNG-1003, ¶[115]. Therefore, a POSITA would have found it desirable to implement RCD with non-starvation—thereby aggregating packets associated with higher priority and lower priority queues/applications—which was common by the Critical Date.

Id. In such non-starvation techniques, network packets from lower-priority queues are aggregated with packets from higher priority queues before allowing packets from the lower-priority queue to flow, e.g., by sending a set of higher priority packets, followed by a smaller set of lower priority packets, followed by more higher priority packets, and so on. *Id.* Thus, by teaching that network packets from a second, lower-priority application (e.g., email) are held and released after packets from a first, higher-priority application (e.g., VoIP), Rao teaches applying Internet activity access controls to aggregate network activity for the first Internet access request (from Rao's second application) with network activity for one or more other data communication requests (from Rao's first application), before allowing network activity in association with the first Internet access request (Rao's second application). SAMSUNG-1003, ¶[115]; SAMSUNG-1005, claims 1, 5.⁴

[2.1]

RCD renders [2.1] obvious. SAMSUNG-1003, ¶[116]; SAMSUNG-1005, [0003], [0046], [0075], [0179], [0182], [0188]-[0189]; SAMSUNG-1006, [0080].

Rao teaches Internet service activities can occur from applications that

⁴ The ordering of applications in Rao and the '433 Patent is reversed. SAMSUNG-1003, ¶[116].

are interacting with a user in the user interface (UI) foreground and from applications in the background (not in the UI foreground): “[a]lthough an application is running in the foreground and currently in active use by the user, a network packet generated or received for an application running in the background may be processed ahead of a network packet generated or received for the application running in the foreground.” SAMSUNG-1005, [0003]. In addition, “network packets” are intercepted “transparently to the one or more applications on the client.” SAMSUNG-1005, [0046]. “In some embodiments, the first application is running in the foreground, and the second application is running in the background.” *Id.* Further, a POSITA would have known that some applications are capable of Internet service activity both when in the foreground and in the background, e.g., some email applications, which include foreground components (e.g., reading/composing messages) and background components. SAMSUNG-1003, ¶[116] (citing SAMSUNG-1038); *see also* SAMSUNG-1006, [0080] (“a background application (e.g., synchronizing files or emails)”). As described above, email is an example of a first end-user application. SAMSUNG-1005, [0179]; SAMSUNG-1006, [0080]; SAMSUNG-1003, ¶[116]. A POSITA would have known that email is capable of both foreground activity (e.g., a user composing a message) and background activity (e.g., retrieving incoming messages). SAMSUNG-1005, [0075], SAMSUNG-1003, ¶[116].

[2.2]

RCD renders [2.2] obvious. SAMSUNG-1005, [0003], [0038], [0040],

[0080], [0182], [0188]-[0189], SAMSUNG-1003, ¶¶[117]-[119].

Rao teaches classifying whether an application is in the foreground or background e.g., “the policies 520 define prioritization based on whether an application is running in the foreground or the background of the client.” SAMSUNG-1005, [0182]; *see also id.*, [0188]. Rao further teaches that some foreground applications are in active use. *Id.*, [0003] (“although an application is running in the foreground and currently in active use by the user”). A POSITA would have known that “active use,” as Rao describes it, indicates user interaction. SAMSUNG-1003, ¶[117].

Rao describes applying Internet activity access controls based on application prioritization (e.g., foreground or background). SAMSUNG-1005, [0182], [0188]-[0189]; SAMSUNG-1003, ¶[118]. Rao teaches using the priority to control Internet access, teaching that “[t]he client provides the prioritized ... network packets for communications via a network stack of the client.” SAMSUNG-1005, [0038]. In some cases, this results in an Internet access control such as “holding, by the client, in the queue a network packet associated with the second application, and releasing the held network packet upon communication of the ... network packets associated with the first application prioritized ahead of the held network packet.” SAMSUNG-1005, [0040].

A POSITA would have understood or found obvious that Rao’s teachings concerning applying access controls based on application prioritization would apply to specific examples of applications, such as Rao’s example of email,

which is a first end-user application. SAMSUNG-1003, ¶[119]; SAMSUNG-1005, [0080].

[3]

RCD renders [3] obvious. SAMSUNG-1005, [0003], [0180], [0182]-[0183]; SAMSUNG-1003, ¶¶[120]-[122]; *see* discussion of Element [2.2] (email as first end-user application).

Rao explains that, “although **an application is running in the foreground and currently in active use by the user**, a network packet generated or received for an application running in the background may be processed ahead of a network packet generated or received for the application running in the foreground.” SAMSUNG-1005, [0003]. Thus, Rao is teaching that active use by the user indicates that the application is running in the foreground.⁵ SAMSUNG-1003, ¶[121].

Rao further uses the identification of foreground or background to assign or arrange applications to a group whose members share at least one attribute, which can be foreground or background. SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶[122]. Such a classification is used to assign packets to priority queues used for network transmissions. *Id.* Regarding queues, Rao teaches that the remote access client “may comprise any queues 540a-540n for queuing and

⁵ The converse is not necessarily true. SAMSUNG-1003, ¶[121].

prioritizing network communications of the client.” SAMSUNG-1005, [0180].

Rao’s queues “may be organized by levels of priority, such as high, medium, low, or numerically.” SAMSUNG-1005, [0180]. To determine a packet’s target queue, the remote access client “may have ... policies 520 for specifying client-side prioritization of network communications related to applications” and the policies can “define prioritization based on whether an **application is running in the foreground or the background** of the client.” SAMSUNG-1005, [0182]. Thus, a POSITA would have recognized that Rao’s device classifies an application’s packets as foreground/background, which can be based on “active use by the user,” and uses the classification to prioritize network transmissions. SAMSUNG-1003, ¶[122].

[6.1]

RCD renders [6.1] obvious. SAMSUNG-1005, [0003]; SAMSUNG-1003, ¶¶[123]-[126]; *see* discussion of Elements [2.2], [3] (email as first end-user application).

Preliminarily, Rao discusses concerns relating to prioritization of background processes over foreground processes in prior art systems. SAMSUNG-1005, [0003]. Specifically, Rao describes scenarios where network activity is not delayed: “although an application is running in the foreground and currently in active use by the user, a network packet generated or received for an application running in the background may be processed ahead of a network packet generated or received for the application running in the foreground,” which Rao

notes is “not always desirable.” *Id.* For example, a VoIP application may provide a telephone call while “other applications on the client may be running that are not related to the real-time data communication of VoIP.” *Id.* In these cases, “network packets for these applications may be processed ahead of the real-time network packets of the VoIP telephone call thereby increasing the latency and reducing the quality of the voice communication.” *Id.*; SAMSUNG-1003, ¶[124]

Based on Rao’s discussion, a POSITA would have known that an application running in the background is classified as not interacting with the user because background applications, by definition, do not interact with users. SAMSUNG-1003, ¶[125] (citing SAMSUNG-1019). A POSITA would have further understood that RCD uses the foreground/background classification to assign network traffic from a given application to a queue with corresponding priority. SAMSUNG-1003, ¶[126]; *see* discussion of Element [3].

[6.2]

RCD renders [6.2] obvious. SAMSUNG-1005, [0080], claim 5; SAMSUNG-1003, ¶¶[127]-[129].

To address challenges that can occur when processing packets in order, Rao teaches delaying packets based on prioritization, describing “application-aware prioritization of network communications” where “prioritizations are based on priorities of the application.” SAMSUNG-1005, [0080]. Rao states,

“[t]he remote access client transparently intercepts network communications associated with applications, ... detects the network communication is associated with an application, and determines priorities for the network communications based on a priority for the application.” SAMSUNG-1005, [0080]. For example, “an application on the client may be communicating real-time data communications, such as VoIP, to a peer client” and “the network packet may be communicated ahead of non-real-time data communications or ahead of network communications from other applications.” *Id.* A POSITA would have known that communicating data in priority order, as Rao describes it, rather than in the order received requires holding (delaying) data. SAMSUNG-1003, ¶[128]; SAMSUNG-1005, claim 5 (“holding ... in the queue a network packet associated with the second application, and releasing the held network packet upon communication of... network packets associated with the first application prioritized ahead of the held network packet”). As described above, data from background applications are assigned lower priority than data from interactive, foreground applications, so data from background applications are delayed. SAMSUNG-1003, ¶[128].

Thus, in Rao, data from an application that is classified as not interacting with a user (e.g., a background request from the email application) can be delayed until data from an application classified as interacting with a user (e.g., VoIP data) is received. SAMSUNG-1003, ¶[129].

For at least the same reasons as discussed for Element [1.6], RCD renders [10] obvious. SAMSUNG-1003, ¶¶[130]-[132]; SAMSUNG-1005, [0182], [0187]; *see* §III.A.2 (discussion of Element [1.6]).

As described for Element [1.2.b], the '433 Patent states that network type examples include “2G, 3G, [and] WiFi.” SAMSUNG-1001, 95:9-10. As described for Element [1.6], a POSITA would have known that each network type can be implemented using one or more networking protocols, and Rao teaches that its policies “may be specified in accordance to the **type of one or more protocols used by the applications.**” SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶[131].

Rao further explains that the remote access client “determines the association of network packets with applications 338a-338n ... to determine priorities and apply any priority based policies.” SAMSUNG-1005, [0187]. A POSITA would have recognized or found obvious that, to “apply any priority based policies” for the application, as Rao describes it, the remote access client selects the appropriate traffic control policy element. SAMSUNG-1003, ¶[132]. Therefore, since network protocols indicate network types, and Rao teaches selecting a policy based on network protocol, Rao teaches or renders obvious selecting a policy based on wireless network type. *Id.*

In addition, as described above, Cole teaches applying Internet access controls (asking the user to find a better connection) on behalf of the first end-user application (file download) based on being connected to the 3G wireless

network type that is to provide data communication for the request. *Id.*; SAMSUNG-1003, ¶[109] (discussing SAMSUNG-1006, [0077]-[0078]).

[11.1]

RCD renders [11.1] obvious. SAMSUNG-1005, [0082], [0125], [0172], [0198]; SAMSUNG-1006, [0035], FIG. 2; SAMSUNG-1003, ¶¶[133]-[138].

Rao teaches that the client may be a smart phone. SAMSUNG-1005, [0198]. A POSITA would have known or found obvious that Rao's smart phone would include a WLAN modem for communicating data for Internet service activity between the device and a WLAN, as was well known by the critical date. SAMSUNG-1003, ¶[134].

Rao provides more detailed teachings regarding the WLAN modem to communicate data for Internet service activity, e.g., teaching that the computing device includes a network interface, which can comprise a “**modem** or any other device suitable for interfacing the computing device⁶ 102 to any type of network capable of communication.” SAMSUNG-1005, [0125]. Rao also teaches that the network interface of the device interfaces to a LAN or the Internet through connections including LAN or WAN links, wireless links, or a com-

⁶ Rao uses the terms “computing device” and “client” interchangeably, explaining that “the environment 180 includes multiple computing devices 102a-102c (herein also referred to as clients 105a-105c).” SAMSUNG-1005, [0086].

ination. SAMSUNG-1005, [0125]. Therefore, a POSITA would have understood or found obvious that Rao's device includes a modem to communicate data with a LAN or a wireless connection, or a combination, i.e., a WLAN. SAMSUNG-1003, ¶[135]. A POSITA would have further known that 802.11 is a WLAN protocol. *Id.*

Rao teaches that "the present invention may be generally described in connection with an internet protocol (IP) based protocol, such as a transport control protocol (TCP) or user datagram protocol (UDP)." SAMSUNG-1005, [0082]. As described above, a POSITA would have known that TCP/IP is used by the Internet, and Rao further teaches the network interface of the device "interface[s] to ... the Internet." SAMSUNG-1005, [0082], [0125]. Rao therefore teaches a WLAN modem to communicate data for Internet service activities between the device and at least one WLAN. SAMSUNG-1003, ¶[136] (citing SAMSUNG-1011).

Rao further teaches that the modem communicates data for Internet service activities, describing mechanisms for data transfer for Internet services, including the MTU parameter indicating "the size of the largest unit of data that can be sent over a ... network" and indicating "the largest datagram or packet than can be transmitted by an Internet Protocol (IP) layer interface." SAMSUNG-1005, [0172]; SAMSUNG-1003, ¶[137]. Since a POSITA would have known that IP is used by the Internet, a POSITA would have further understood that Rao's WLAN modem communicates data for Internet service activities.

SAMSUNG-1003, ¶[137].

Additionally, RCD includes a WLAN modem for the same reasons as discussed above for Element [1.2.a]. *See* §III.A.1.c; SAMSUNG-1006, [0035] (“WLAN modem 235”), FIG. 2; SAMSUNG-1003, ¶[138].

[11.2]

RCD renders [11.2] obvious. SAMSUNG-1003, ¶[139].

As described for Element [1.6], Rao renders obvious determining whether to apply Internet activity access controls based at least on which network protocol (e.g., wireless network type) is being used. *See* discussion of Element [1.6]; SAMSUNG-1003, ¶[139]. Since different policies can apply to different network types, a POSITA would have recognized that one policy can specify that packets of network type WLAN can be assigned to a queue with a first priority, and a second policy can specify that packets of network type WWAN can be assigned to a queue with a different priority. SAMSUNG-1003, ¶[139]; *see* SAMSUNG-1005, [0182]-[0184] (“any suitable means and/or mechanisms.”). In such cases, when the WLAN provides data communication for Internet access requests, the Internet access controls of the WWAN policy will not be applied. SAMSUNG-1003, ¶[139].

Cole similarly teaches that, when a user “selects a file for download” that is “larger than the user anticipated and is taking a long time to transfer” and “the lengthy transfer is conducted using the WWAN modem,” the “connection manager 260 identifies the load on the WWAN modem 230 and asks the user to find

a better connection.” SAMSUNG-1006, [0088]. A POSITA would have recognized that since this policy applies to a WWAN, it would not apply to a user on a WLAN. SAMSUNG-1003, ¶[140].

[13]

RCD renders [13] obvious. SAMSUNG-1006, [0090]; SAMSUNG-1003, ¶¶[141]-[142]; §III.A.1.C. For example, Cole teaches “instances where the connection manager 260 may change the configuration of the communication functions in direct response to the power state of the mobile device 110.” SAMSUNG-1006, [0090]; §III.A.1.c. A POSITA would have recognized that Cole teaches that the device performs ongoing monitoring of the power state, which includes “whether the mobile device 110 is connected to an external power supply, the level of charge remaining, if operating on battery power, and the remaining time to fully charge the battery,” and uses such data to dynamically determine whether to “change the configuration of the communication functions in direct response to the power state of the mobile device 110.” SAMSUNG-1006, [0090]; SAMSUNG-1003, ¶[141].

Since factors such as time to fully charge and whether operating on battery power change dynamically, a POSITA would have known that Cole is teaching dynamically changing the determination of whether to access controls based on a power state of the device. SAMSUNG-1003, ¶¶[141]-[142].

[14]

RCD renders [14] obvious. SAMSUNG-1005, [0003], [0182], [0188],

[0195]; SAMSUNG-1003, ¶¶[143]-[145].

Rao explains that policies “define prioritization based on whether an application is running in the foreground or the background.” SAMSUNG-1005, [0182]. Rao further teaches the remote access client may have policies “for specifying client-side prioritization of network communications related to applications” and “may determine whether the application 338a-338n associated with the network packet is running” in the foreground or the background. SAMSUNG-1005, [0182], [0188]. A POSITA would have known that device usage state, as Rao describes it, can include whether an application is executing, including whether it is executing in the foreground or background. SAMSUNG-1003, ¶[144]. A POSITA would have known that systems routinely monitored which applications were active or inactive. *Id.* (citing SAMSUNG-1022). Thus, a POSITA would have recognized that the Rao device performs ongoing monitoring of which applications are running, and which are running in the foreground and background, so it can dynamically determine whether to apply the Internet access controls. *Id.*, ¶[145]; *see also* SAMSUNG-1005, [0195].

[17]

RCD renders [17] obvious. SAMSUNG-1005, [0182]-[0183], [0195]; SAMSUNG-1003, ¶¶[146]-[148].

Rao teaches the client may have policies for specifying client-side prioritization of network communication, or network service activity policies. SAM-

SUNG-1005, [0182]; SAMSUNG-1003, ¶[147]. A POSITA would have recognized the policies form a set of policies or a policy set. SAMSUNG-1003, ¶[147].

Further, Rao describes that these policies “may be ... downloaded via a gateway.” SAMSUNG-1005, [0183]. A POSITA would have known that a gateway is a network element, and that adding the downloaded policies to the policy set is updating the network service activity control policy set based on the information (policies) downloaded from the network element (gateway). SAMSUNG-1003, ¶[148]. A POSITA would have further recognized that such a configuration would allow for centralized control and/or remote administration of multiple devices in prioritizing network packets, and/or would allow devices to maintain up-to-date policies with which to prioritize network packets. *Id.*

B. GROUND 1B: Rao-Cole-Freund renders claims 2-3, 5, 7-9 and 16 obvious

1. Rao-Cole-Freund

(a) Freund

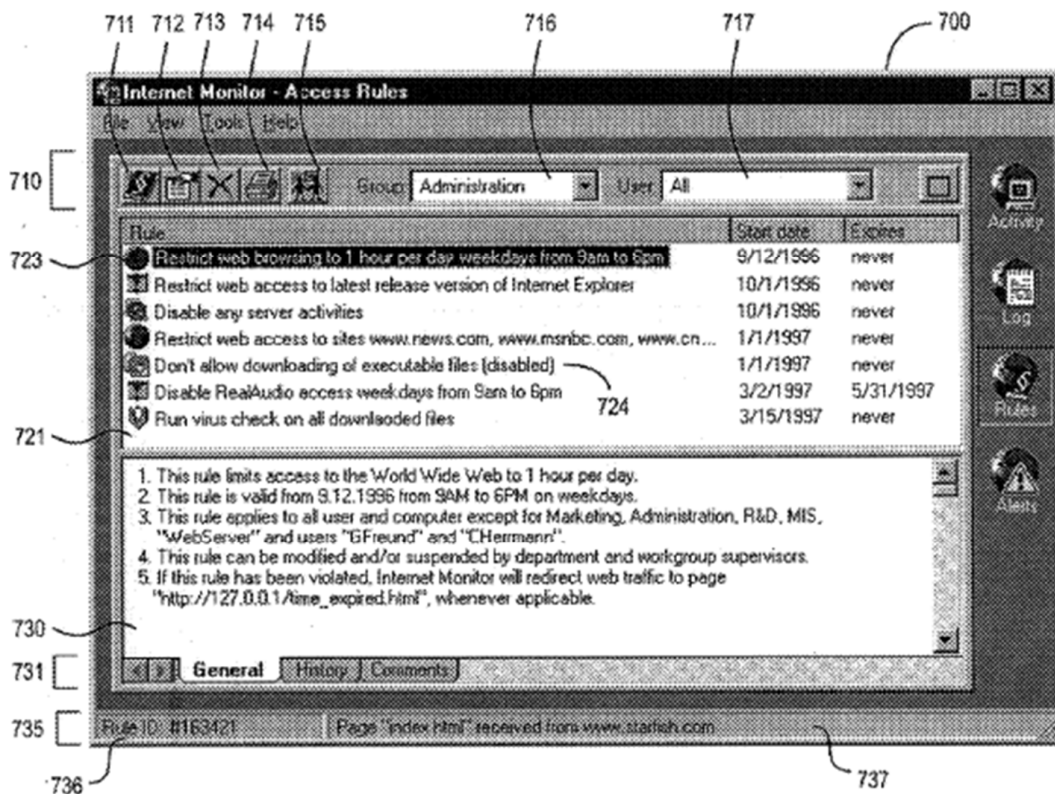
Freund relates to using “access rules” for efficient use of computing resources and controlling the use of networks. SAMSUNG-1007, 3:62-67.

“[A]ccess rules can include criteria such as total time a user can be connected to the Internet,” “time a user can interactively use the Internet,” and “a list of applications or application versions that a user can or cannot use in order to access the Internet,” among others. *Id.*, 4:8-19. To apply the rules, Freund classifies

whether an application is interacting with the user in the device UI foreground.

Id., 10:16-20. Freund addresses challenges, including “hording[sic] available network bandwidth through use of bandwidth-intensive applications (e.g., real-time audio programs).” *Id.*, 2:12-14.

To enable rule configuration, “a preferred user interface or ‘wizard’ dialogs for configuring rules” displays “rules governing operation of the Internet access monitor” and rules that “are available for a current configuration” and allows a user to create, edit, or delete rules. *Id.*, 24:16-24. Figure 7A (below) shows an example UI panel.



SAMSUNG-1007, FIG. 7A.

Policies are loaded from a network element (“supervisor”), and “the Supervisor filters rules appropriate for the client ... and transmits them to the Client Monitor.” SAMSUNG-1007, 28:14-18. The Client Monitor “saves a copy of the rules onto a local hard disk” where they are ready for use. SAMSUNG-1007, 28:18-19.

(b) Combination

Rao and Freund describe using policies/rules to control network traffic. For example, as described above, Rao “may apply a policy to determine a condition of the client 105 ... at the time of transmission of the packet.” SAMSUNG-1005, [0109]. Further, the frame monitor “may identify an application 338 that generated the packet,” and the frame monitor “may make a policy-based determination to transmit the packet to the gateway 340 responsive to the identified application.” *Id.* Rao explains such “policies 520 may be specified by any suitable means and/or mechanisms,” including the name or type of the application, “the type of one or more protocols used by the applications 338a-338n and/or the size of the payload of the network packet,” and “whether an application is running in the foreground or the background of the client.” *Id.*, [0182]-[0184]. Rao notes that a POSITA “will recognize and appreciate the multitude of ways to define client-side application priorities.” *Id.*

A POSITA would have recognized that the network traffic control policies of Freund are simply additional examples of client-side policies, such as

those Rao contemplates. SAMSUNG-1003, ¶[150]. For example, Freund includes “access rules [that] can include criteria such as total time a user can be connected to the Internet ... time a user can interactively use the Internet ... a list of applications or application versions that a user can or cannot use in order to access the Internet, a list of URLs (or WAN addresses) that a user application can (or cannot) access, a list of protocols or protocol components ... that a user application can or cannot use, and rules to determine what events should be logged.” SAMSUNG-1007, 4:9-19. A POSITA would have naturally recognized that Freund’s policy examples are among the “multitude of ways to define client-side application priorities” explained in Rao. SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶[150].

Rao further teaches that policies “may be configurable by a user by any suitable means and/or mechanism ... such as a user interface, graphical or otherwise, design and constructed for configuring or specifying the policies.” SAMSUNG-1005, [0183]. For details on the UI, a POSITA would have looked to references such as Freund, which shows “bitmap screenshots illustrating a preferred user interface or ‘wizard’ dialog for configuring rules” including a preferred interface that “provides a ‘view’ of rules governing operation of the Internet access monitor, displaying all of the rules which are available for a current configuration.” SAMSUNG-1007, 6:47-49, 24:17-20, FIGS. 7A-K; SAMSUNG-1003, ¶[151]. Such a UI allows a user to create, edit, or delete rules. SAMSUNG-1007, 24:22-24.

Rao explains that policies “may be accessible by the agent 326, configured into the agent 326, or loaded by the agent 326,” e.g., the policies “may be provided by or downloaded via the gateway.” SAMSUNG-1005, [0183]. For implementation details on how to obtain the policies, a POSITA would have looked to references such as Freund. SAMSUNG-1003, ¶[152]. As described above, Freund teaches an example of policies being loaded by an agent: “the Supervisor filters rules appropriate for the client (i.e., application, Host, and other rules), and transmits them to the Client Monitor.” SAMSUNG-1007, 28:14-18.

Because both Rao and Freund teach using policies/rules to control network traffic, including defining and loading policies/rules, it would have been obvious to a POSITA to combine the teachings of Rao and Cole with Freund’s teachings to achieve the benefits of Freund’s UI for configuring rules and for more detailed enumeration of network traffic control policies contemplated but not explicitly described in Rao. SAMSUNG-1003, ¶[153].

In operation, the resulting Rao-Cole-Freund Device (RCFD) would use the policy-based network selection techniques of Cole to determine the best network connection, and use the traffic management techniques of Rao and Freund to use that network efficiently. SAMSUNG-1006, [0062]; SAMSUNG-1005, [0182]-[0183]; SAMSUNG-1007, 4:9-19; SAMSUNG-1003, ¶[154]. In addition, the policies governing the operation of RCFD would be configured with the UI techniques of Freund and/or loaded from a network element using the

techniques of Rao and Freund. SAMSUNG-1006, [0062]; SAMSUNG-1005, [0182]-[0183]; SAMSUNG-1007, 24:22-24; SAMSUNG-1003, ¶[154]. The components of RCFD each operate as they would in isolation. SAMSUNG-1003, ¶[155]. A POSITA would have a reasonable expectation of success in creating a combination, which would have required only routine programming knowledge well within the skill of a POSITA before the Critical Date. *Id.* Indeed, the change would have amounted to nothing more than the use of a known technique to improve similar mobile devices in a similar way and combining prior art elements according to known methods to yield the predictable results described above. *Id.*; *KSR*, 550 U.S. at 417.

RCFD's processor would be configured to perform the operations discussed in this Ground. SAMSUNG-1003, ¶[154]; *see also* §III.A.1.c.

2. Analysis

[2]-[3]

RCFD renders [2]-[3] obvious. SAMSUNG-1007, 8:63-9:3; 10:16-24, 38-44, 12:53-54; SAMSUNG-1005, [0119]; SAMSUNG-1003, ¶¶[156]-[158]; *see* §III.A.2.

As described in §III.B.1.b, Freund teaches “monitoring of time spent by an employee for ‘actively’ interacting with the Internet,” and notes that “[a]ctive use occurs when a user directly interacts with an Internet application (e.g., Web browser) while that application accesses the Internet.” SAMSUNG-1007, 10:16-24. A POSITA would have known that directly interacting with a Web

browser, as Freund describes it, occurs when the Web browser is in the UI foreground. SAMSUNG-1003, ¶[156]. Freund further explains that “[a] given application itself can be examined for determining whether it is ‘active’ by determining whether the application receives ‘focus’ and/or receives user input (e.g., mouse clicks or keystrokes).” SAMSUNG-1007, 10:40-44. A POSITA would have known that mouse clicks and keystrokes are instances of direct interaction with an application. SAMSUNG-1003, ¶[156]. Freund differentiates mouse or keyboard use from “background use which occurs when an application or process executing in the background (i.e., does not have ‘focus’) accesses the Internet, such as a mail client which intermittently polls an Internet-based mail server.” SAMSUNG-1007, 10:20-24. Thus, Freund teaches classifying whether an application is executing in the background or foreground, and further teaches classifying that the first end-user application is interacting with the user in the UI foreground when the user of the device is directly interacting with that application. *Id.*, 10:20-24, 10:40-44; SAMSUNG-1003, ¶[156].

Freund uses this classification to impose network access limits on users, e.g., “by blocking access to the WAN.” SAMSUNG-1007, 12:53-54; SAMSUNG-1003, ¶[157]. The classification is important since, as Freund explains, “[t]he system should preferably regulate the amount of time users can access the Internet, with specific considerations for detecting interactive or ‘active’ use by the user versus background or ‘passive’ use by certain applications.” SAMSUNG-1007, 8:63-67. Specifically, Freund notes that “access to the Internet

which occurs in the background is not counted against the per-day time limit imposed on users.” *Id.*, 10:38-40. Freund explains that “[t]his differentiation prevents the system from mistakenly blocking access of a user based on excessive use, when in fact a background application is instead responsible for the activity.” *Id.*, 8:67-9:3.

[5]

RCFD renders [5] obvious. SAMSUNG-1007, 3:15-16, 10:14-24; SAMSUNG-1003, ¶¶[159]-[160].

For example, Freund defines “‘background’ use” as “when an application accesses the Internet without user interaction.” SAMSUNG-1007, 3:15-16. Freund additionally contrasts active and background use, explaining that active use “occurs when a user directly interacts with an Internet application (e.g., Web browser) while that application accesses the Internet” while background use “occurs when an application or process executing in the background (i.e., does not have ‘focus’) accesses the Internet, such as a mail client which intermittently polls an Internet-based mail server.” *Id.*, 10:14-24. Since Freund defines background use as occurring when an application uses background data services, i.e., Internet access without user interaction, then by Freund’s definition, an application is classified as not interacting with a user (“without user interaction”) when the application uses background data services. SAMSUNG-1003, ¶[160].

[7]

RCFD renders [7] obvious. SAMSUNG-1005, [0182]-[0183]; SAMSUNG-1003, ¶¶[161]-[165].

Rao describes policies for “specifying client-side prioritization of network communications related to **applications**.” SAMSUNG-1005, [0182]. The policies “may be specified by **the name of the application 338a-338n and/or the type of application**.” *Id.* The policies “may comprise any type and format of syntax and/or language for specifying a policy, and may be provided ... electronically ... via a file, such as an XML file.” *Id.*, [0183]. Further, since policies may be specified by the name of the application, a POSITA would have recognized that one approach to specifying the names of applications to which the policy applies is to include a list of application names in the policy. SAMSUNG-1003, ¶¶[162]-[163].

Moreover, Freund explains that access rules can include “a list of applications or application versions that a user can or cannot use in order to access the Internet,” among others. SAMSUNG-1007, 4:8-14. A POSITA would have recognized that the RCFD, which includes the access rules of Freund, would thus include Freund’s list of applications, a list that includes the applications to which the access rules apply. SAMSUNG-1003, ¶[164].

A POSITA would have recognized from Rao’s teaching that the applications associated with a policy can be stored in XML, which is a structured list data structure, as an application list, which indicates an association between the

policy controls and applications on that list. *Id.*; SAMSUNG-1003, ¶¶[161]-[165].

[8]

RCFD renders [8] obvious. SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶¶[166]-[168].

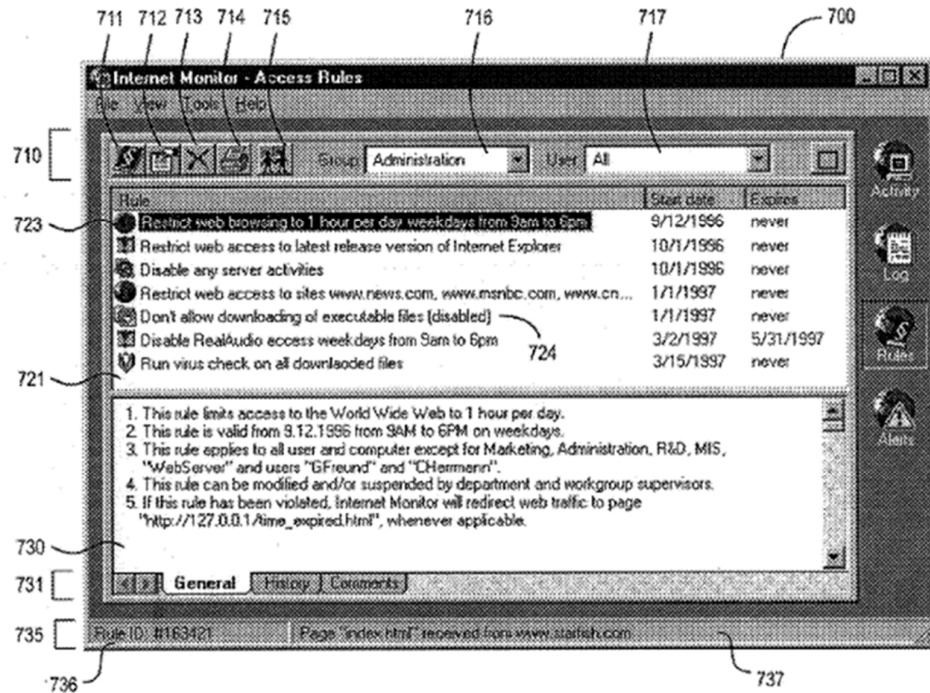
In addition to the discussion in Claim [7], Rao teaches that, “if **one application 338a is running, a second application 338b** may have a higher or lower priority.” SAMSUNG-1003, ¶[167] (describing multiple applications).

Further, as described above in Claim [7], Freund explains that a policy can include a list of applications to which the policy applies. SAMSUNG-1007, 4:8-14. A POSITA would have recognized Freund’s use of “applications” indicates that the list includes a first and second application. SAMSUNG-1003, ¶[168]. Further, since a policy’s application list determines whether the policy applies to an application, Freund teaches that Internet activity access controls (policies) are associated with applications (including a second end-user application) based on whether the applications are identified by the application list. *Id.*

[9]

RCFD renders [9] obvious. SAMSUNG-1003, ¶¶[169]-[171]; SAMSUNG-1005, [0183]; SAMSUNG-1007, 24:16-20, 25:1-13, FIGS. 7A-K.; §III.B.1.b.

For example, Figure 7A of Freund shows a UI:



SAMSUNG-1007, FIG. 7A

Freund explains, "FIGS. 7A-K illustrate a preferred user interface or 'wizard' dialogs for configuring rules," and in FIG. 7A, a preferred interface "provides a 'view' of rules governing operation of the Internet access monitor, displaying all of the rules which are available for a current configuration." SAMSUNG-1007, 24:16-20. The policies (rules) can be associated with applications using the "wizard dialog 740 [that] asks the user what kind or type of new rule should be created." *Id.*, 25:1-3, FIGS. 7A-K. Freund explains that "any given rule is a combination of access rights granted on the basis of available applications, permitted time limits, permitted user activities, permitted protocols, and the like." *Id.*, 25:3-6. "[T]he user can select type 742 for limiting what applications (including individual applications) can do on the Internet."

Id., 25:10-13. A POSITA would have recognized such access rights as Internet activity access controls, as Freund describes them. SAMSUNG-1003, ¶[171].

[16]

RCFD renders [16] obvious. SAMSUNG-1007, 10:13-17, 30:59-67; SAMSUNG-1005, [0003]; SAMSUNG-1003, ¶[172].

For example, Freund teaches that “[t]hese access rules can be qualified by optionally specifying: ... time of day when the rule should be applied (for example from 9 am to 5 pm).” SAMSUNG-1007, 10:13-17. A POSITA would have known that such access rules are Internet access controls because they can, e.g., “[d]elay Internet access for non-critical Applications or Protocols” and “[d]isable Internet Access for non-critical or Protocols.” SAMSUNG-1003, ¶[172]; SAMSUNG-1007, 30:59-67.

C. GROUND 1C: Rao-Cole-Singh renders claims 2 and 4 obvious

1. Rao-Cole-Singh

(a) Singh

Singh relates to “displaying windows on a graphical user interface based on relative priorities.” SAMSUNG-1008, Abstract. Singh explains that computing devices allow multiple applications to operate concurrently, but an issue with “simultaneous display of multiple windows is the arrangement of the windows on the GUI” is that “[t]he display area of the graphical user interface available to windows is limited.” *Id.*, 1:20-25, 1:36-40. Thus, “it is desirable to position, size, and/or configure the windows on the GUI in order to maximize

the benefit of the display area of the GUI for the user.” *Id.*, 1:40-42.

Consequently, Singh teaches using the “relative priorities” of windows for arranging the windows on the GUI. *Id.*, Abstract; SAMSUNG-1003, ¶[69]. A “higher priority window may cover a lower priority portion of a lower priority window to provide for a simultaneous viewing of the higher priority window and a higher priority portion of the lower priority window.” SAMSUNG-1008, Abstract.

(b) Combination

Rao describes a scenario where an “application is running in the foreground and currently in active use by the user, a network packet generated or received for an application running in the background may be processed ahead of a network packet generated or received for the application running in the foreground.” SAMSUNG-1005, [0003]. This is undesirable because “network packets for [background] applications may be processed ahead of the real-time network packets of [a foreground] VoIP telephone call thereby increasing the latency and reducing the quality of the voice communication.” *Id.* To prevent background traffic from interfering with foreground traffic, Rao teaches policies that “define prioritization based on whether an application is running in the foreground or the background of the client” and “the network packets are communicated according to the determined priority.” SAMSUNG-1005, [0182], [0184].

A POSITA would have recognized that, in cases where multiple windows are displayed simultaneously (e.g., with the highest-priority window having “focus” and covering portions of lower-priority windows), it could be challenging for Rao’s device to prioritize based on determining which application is running in the foreground. SAMSUNG-1003, ¶[174]. In such cases, multiple windows are in the foreground but partially displayed and one window has the focus (and thus should have the highest priority). *Id.* In an example, in the window with focus, a user is playing an interactive on-line game that requires real-time communication. *Id.* Another foreground window displays the user’s email, but the user interacts with email only infrequently (e.g., between rounds of the game). *Id.* While both windows are in the foreground, network traffic related to the game should receive priority when the game has focus. *Id.*

Therefore, a POSITA would have recognized and appreciated “the multitude of ways to define client-side application priorities” and further recognized that the window priority of Singh represents such an example. SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶[175].

In operation, the processor of the resulting Rao-Cole-Singh Device (RCSD) would use the policy-based network selection techniques of Cole to determine the best network connection and use the traffic management techniques of Rao as clarified by Singh to use that network efficiently. SAMSUNG-1006, [0062]; SAMSUNG-1005, [0182]-[0183]; SAMSUNG-1008, 4:52-55, Abstract; SAMSUNG-1003, ¶[176]. The components of RCSD each operate as they

would in isolation. SAMSUNG-1003, ¶[176]. A POSITA would have a reasonable expectation of success in creating a combination, which would have required only routine programming knowledge well within the skill of a POSITA before the Critical Date. *Id.*, ¶[177]. Indeed, the change would have amounted to nothing more than the use of a known technique to improve similar mobile devices in a similar way and combining prior art elements according to known methods to yield the predictable results described above. *Id.*; *KSR*, 550 U.S. at 417. RCSD’s processor would be configured to perform the operations discussed in this Ground. SAMSUNG-1003, ¶[177]; *see also* §III.A.1.c.

2. Analysis

[2.1]

For at least the reasons discussed for Element [2.1] of Ground 1A, RCSD renders [2.1] obvious. *See* §III.A.2, discussion of Element [2.1]; SAMSUNG-1003, ¶[178].

[2.2]

RCSD renders [2.2] obvious. SAMSUNG-1008, 9:33-35; SAMSUNG-1003, ¶¶[179]-[180]; *see* §III.C.1.b.

For example, Singh teaches that, “when a user interacts with a window, the window becomes the highest priority window.” SAMSUNG-1008, 9:33-35. A POSITA would have understood or found obvious that, in response to user interaction, RCSD’s processor makes an application’s window the highest priority (as described by Singh), and, since that application’s window is displayed with

highest priority, the processor is classifying the application as high priority according to the user interaction. SAMSUNG-1008, 9:33-35; SAMSUNG-1003, ¶[179].

As discussed above for Ground 1A, Element [2.2], Rao teaches applying policies (“Internet activity access controls”) based on application prioritization. *see* §III.A.2, discussion of Element [2.2]; SAMSUNG-1003, ¶[180].

[4]

RCSD renders [4] obvious. SAMSUNG-1005, [0182]; SAMSUNG-1008, 9:19-21, 9:33-35; SAMSUNG-1003, ¶¶[181]-[183].

Singh describes a “window management function [that] determine[s] a relationship of windows with one another.” SAMSUNG-1008, 9:19-21. Singh teaches that, “when a user interacts with a window, the window becomes the highest priority window.” SAMSUNG-1008, 9:33-35. A POSITA would have known that users interact with foreground windows, and in Singh, users only interact with the highest priority window (because any interaction causes the window to be assigned the highest priority). SAMSUNG-1003, ¶[182]. Therefore, a POSITA would have understood or found obvious that Singh’s window management function uses a state of UI priority (e.g., highest priority) to classify that the application is interacting with the user in the UI foreground. *Id.*

D. GROUND 1D: Rao-Cole-Montemurro renders claims 12 and 20 obvious

1. Rao-Cole-Montemurro

(a) Montemurro

Montemurro describes communication devices “capable of at least two communication modes (e.g. WLAN, WMAN and WWAN and/or wired modes)” that “can be configured to optimize communications using a policy-based mechanism to configure connections and routes.” SAMSUNG-1009, Abstract. A “rules engine evaluates its policies on a state change (e.g. network availability, time of day, etc.) to configure a routing table” and “provides an appropriate connection to an application for its respective communications.” *Id.* Policies can be responsive to various factors (e.g., bandwidth, cost, time of day, application type, etc.). *Id.* “Rules engine 206A configures the communication operations with a set of rules/policies.” *Id.*, [0029].

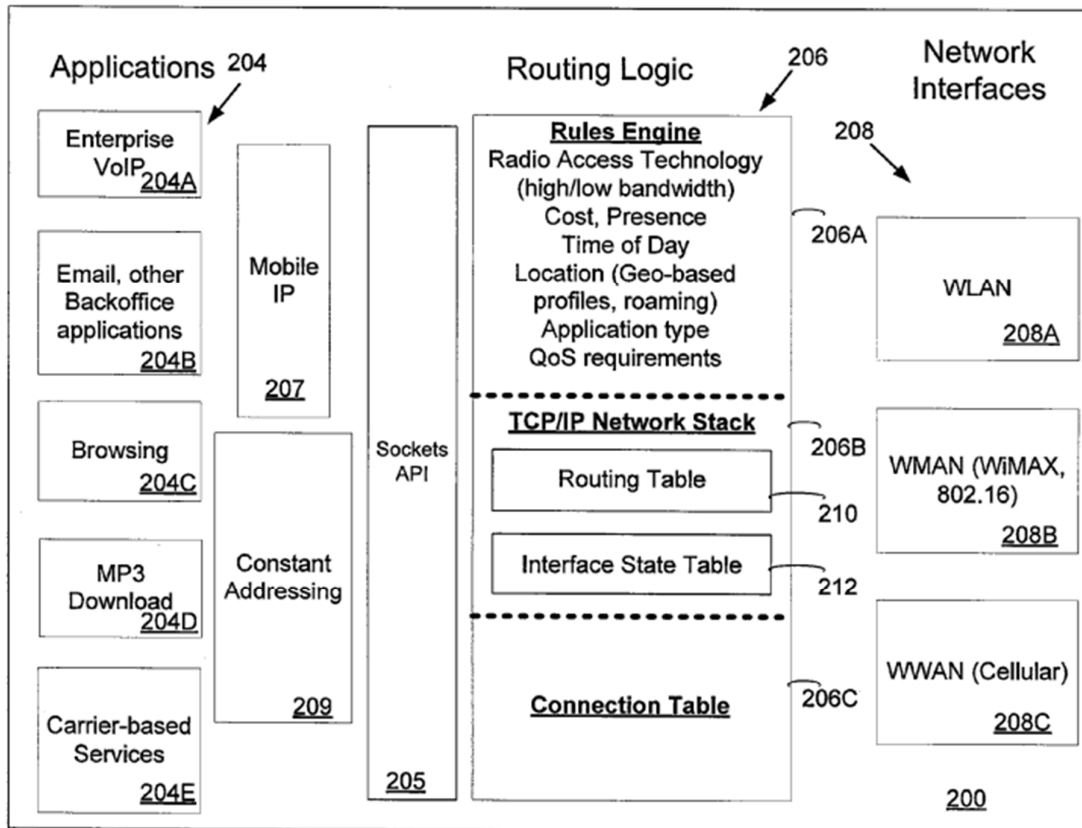


Figure 2

SAMSUNG-1009, FIG. 2

Various applications can benefit from network selection techniques, including VoIP, email, and MP3 downloading applications. *Id.*, [0025]-[0037].

(b) Combination

As described above, in RCD, the device would select a network connection using the techniques of Cole, then use the techniques of Rao to use the connection efficiently. *See* §III.A.1.c. However, a POSITA would have recognized that, in some circumstances, further efficiency would have been gained by assigning different networks to different applications, such as the examples from Montemurro, where “the MP3 download application 204D runs on the lowest

cost network ... available” and “the CRM application ... only synchronizes the sales contact database (e.g. 120B) over a WLAN network 106.” SAMSUNG-1009, [0029]; SAMSUNG-1003, ¶[184]. Thus, to improve the operation of RCD and further improve efficiency, a POSITA would have looked to teachings of other references, such as Montemurro. SAMSUNG-1003, ¶[187].

In operation, the resulting Rao-Cole-Montemurro Device (RCMD) would initially select a network using the techniques of Cole. *See* §III.A.1.c; SAMSUNG-1003, ¶[185]. As applications such as VoIP and email began executing on RCMD, Montemurro’s “rules engine evaluates its policies on a state change (e.g. network availability, time of day, etc.)” to select a network appropriate for the particular application. *Id.*; SAMSUNG-1009, Abstract. On the selected networks, RCMD would use the techniques of Cole to prioritize network traffic. *See* §§III.A.1.a, III.A.1.c; SAMSUNG-1003, ¶[185]. In one example, if VoIP and MP3 download were both assigned to the WLAN, the techniques of Rao would prioritize the real-time traffic of the VoIP over the download. SAMSUNG-1005, [0003], [0179]-[0184]; SAMSUNG-1003, ¶[188]. The components of RCMD each operate as they would in isolation. SAMSUNG-1003, ¶[185]. A POSITA would have a reasonable expectation of success in creating a combination, which would have required only routine programming knowledge well within the skill of a POSITA before the Critical Date. *Id.* Indeed, the change would have amounted to nothing more than the use of a known technique to improve similar mobile devices in a similar way and combining

prior art elements according to known methods to yield the predictable results described above. *Id.*; *KSR*, 550 U.S. at 417. RCMD's processor would be configured to perform the operations discussed in this Ground. *See* §III.A.1.c. SAMSUNG-1003, ¶[185]; *see also* §III.A.1.c.

2. Analysis

[12]

RCMD renders [12] obvious. SAMSUNG-1009, [0013], [0029]; SAMSUNG-1005, [0119]; SAMSUNG-1003, ¶¶[186]-[187].

For example, Montemurro teaches a WWAN using the GSM protocol (“mobile device 102 is capable of wireless communication in accordance with ... WWAN (e.g. GSM Cellular) standards”). SAMSUNG-1009, [0013]. Montemurro further teaches that “[r]ules engine 206A configures the communication operations with a set of rules/policies that could include various factors such as ... network roaming.” *Id.*, [0029]. An example of Internet activity access controls (“rules/policies”) can include a “CRM application ... only synchroniz[ing] the sales contact database (e.g. 120B) over a WLAN network 106.” *Id.* Because “roaming” is a factor with respect to the rules/policies, a POSITA would have understood or found obvious that Montemurro discloses an example where the sales contact database is synchronized on a home WWAN but not a roaming WWAN. SAMSUNG-1003, ¶[186].

[20]

RCMD renders [20] obvious. SAMSUNG-1009, [0024], [0048]; SAMSUNG-1005, [0106], [0110], [0166], [0190], [0205]; SAMSUNG-1003, ¶¶[188]-[191].

For example, Montemurro teaches that “applications can be developed and operated to provide different usage models that may vary depending on the mode of operation that is available at runtime.” SAMSUNG-1009, [0024]; SAMSUNG-1003, ¶[189]. The rules engine “configures the communication operations with a set of rules/policies that could 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.” SAMSUNG-1009, [0029]; SAMSUNG-1003, ¶[189].

Montemurro teaches that the Internet activity access controls can cause a user application to transition to a different state, e.g., “[s]ome access technology switches will result in IP address changes” so “an application using the connection needs to be aware of the IP address, the change may not be transparent and may need to be communicated to (or otherwise discoverable by) the application.” SAMSUNG-1009, [0048]. Montemurro gives another example where connection “differences are significant (e.g. between GSM/GPRS and WAN 802.11 technologies)” so “an application may need to tailor its behaviour to ac-

count for the new access technology in use” such as “[b]uffer sizes, re-transmission timers etc.” that “may need to be changed.” *Id.* A POSITA would have recognized that cases where an application tailors its behavior (e.g., IP address changes, altered buffer sizes, and modified re-transmission timers) are examples of application transitions to different states. SAMSUNG-1003, ¶[190].

E. GROUND 1E: Rao-Cole-Gandhi renders claims 15 and 18-19 obvious

1. Rao-Cole-Gandhi

(a) Gandhi

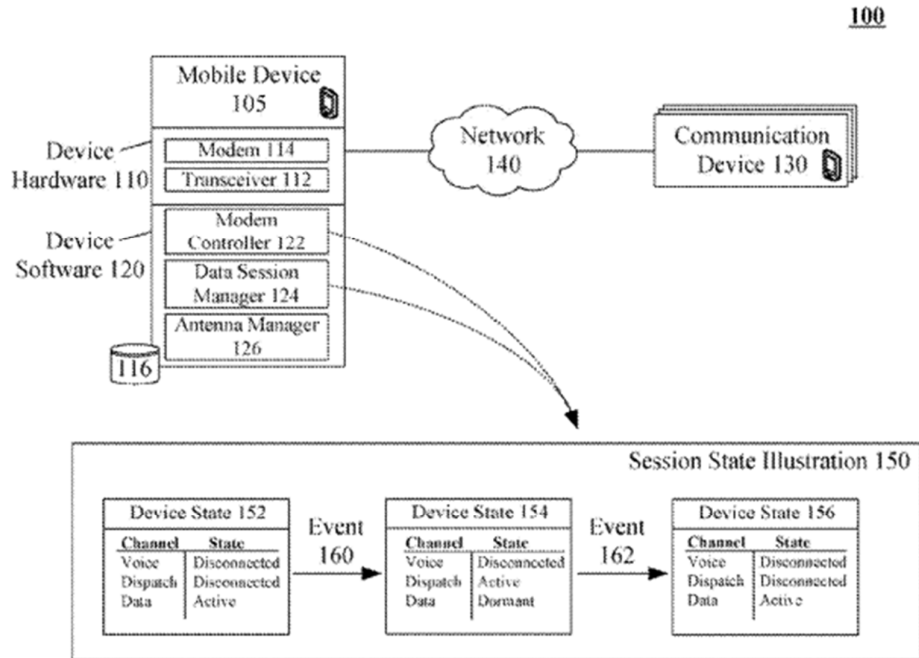
Gandhi describes a “dual transmit mobile communication device that includes multiple modems, a modem controller, and a data session manager.”

SAMSUNG-1010, Abstract. The presence of multiple modems created various operational challenges. *Id.*, [0004].

Gandhi addresses these challenges by “ensur[ing] that only one of the modems is transmitting at any one time.” *Id.*, Abstract. Gandhi’s device can include at least three different states (active, dormant, disconnected) for data communication sessions. *Id.*, [0007]. The “data session manager” can shift or toggle between the different states. *Id.*

As illustrated in FIG. 1 (below), Gandhi’s system “can include a modem controller 122, a data session manager 124, and an antenna configuration manager 126.” *Id.*, [0025]. The modem controller “can manage which of multiple modems 114 or modem states are active,” and “[t]he data session manager 124 and the modem controller 124 interact with each other to prevent concurrent or

simultaneous transmissions.” *Id.*



SAMSUNG-1010, FIG. 1

(b) Combination

As described above, RCD “can connect to one or more networks 104 through a variety of connections including ... wireless connections” using the modems in RCD. SAMSUNG-1005, [0095]; *see* §III.A.1.c. Since RCD can connect using multiple wireless connections, a POSITA would have understood that such devices would face operational challenges that occur when the “mobile device transmits over more than one channel at a time.” SAMSUNG-1010, [0004]; SAMSUNG-1003, ¶[192].

Therefore, a POSITA would have been motivated to apply the teachings

of Gandhi to solve issues arising from the support for multiple wireless connections by “ensur[ing] that only one of the modems is transmitting at any one time.” SAMSUNG-1010, Abstract; SAMSUNG-1003, ¶[193]. The resulting Rao-Cole-Gandhi Device (RCGD) would include Gandhi’s modem controller, data session manager, and antenna manager. *Id.* In operation, RCGD would select a network using Cole’s techniques; use that network efficiently using Rao’s techniques; and ensure that additional channels are not improperly opened using Gandhi’s techniques. *Id.*; SAMSUNG-1010, Abstract; *see also* III.1.A.c. The components of RCGD each operate as they would in isolation. SAMSUNG-1003, ¶[193]. A POSITA would have a reasonable expectation of success in creating a combination, which would have required only routine programming knowledge well within the skill of a POSITA before the Critical Date. SAMSUNG-1003, ¶[194]. Indeed, the change would have amounted to nothing more than the use of a known technique to improve similar mobile devices in a similar way and combining prior art elements according to known methods to yield the predictable results described above. *Id.*; *KSR*, 550 U.S. at 417.

Combining Rao-Cole and Gandhi would have involved (1) combining prior art elements according to known methods to yield predictable results; and (2) use of known techniques to improve similar devices (methods, or products) in the same way. *See* MPEP §2143. Such a combination would have amounted to nothing more than the use of a known technique to improve similar smart phone devices equipped with network interfaces in a similar way and combining

prior art elements according to known methods to yield the predictable results described above. *KSR*, 550 U.S. at 417; SAMSUNG-1003, ¶[194]. RCGD's processor would be configured to perform the operations discussed in this Ground. SAMSUNG-1003, ¶[195]; *see also* §III.A.1.c.

2. Analysis

[15]

RCGD renders [15] obvious. SAMSUNG-1006, [0088]; SAMSUNG-1010, [0008], [0029], [0033]; SAMSUNG-1003, ¶¶[196]-[200]; §III.A.1.C.

Cole teaches that, when the WWAN modem is active (i.e., the modem power state is active) and a lengthy transfer occurs, the connection manager can apply the Internet activity access controls by instructing the user to identify a better connection. SAMSUNG-1003, ¶[197]. Cole gives an example where a “lengthy transfer is conducted using the WWAN modem ... which consumes significant battery power.” SAMSUNG-1006, [0088]. There, Cole's connection manager “identifies the load on the WWAN modem 230 and asks the user to find a better connection.” *Id.* When the user connects to a WLAN and the WWAN modem changes to the inactive state, the connection manager applies a second Internet activity access control, reminding the user to download the file. *Id.* A POSITA would have known that Cole's connection manager performs ongoing monitoring of the power control state to dynamically determine whether and to apply Internet activity access controls. SAMSUNG-1003,

¶[198].

Gandhi further teaches that a “data session manager can notify the modem controller whenever a data traffic channel changes its state, which permits the other modems to be blocked whenever a data channel is being used.” SAMSUNG-1010, [0008]. Gandhi also teaches that, “[i]f a predetermined time period passes, where the active modem is inactive 242, the controller 206 can disable 244 that modem and shift the associated communication session to a dormant mode” after which “[t]he data session modem can then be activated.” *Id.*, [0033].

A POSITA would have recognized that, when the WWAN modem is active (i.e., the corresponding data channel is being used), the Internet activity access controls of the RCGD would be active. SAMSUNG-1003, ¶[200]. However, when the controller disables the WWAN modem (changing its power control state), the RCGD processor dynamically changes the determination of whether to apply the Internet activity access controls such that the Internet activity access controls no longer apply. *Id.* RCGD provides ongoing monitoring so its data session manager (e.g., as taught by Gandhi) “can detect an event for initializing a data traffic channel,” enabling the device to determine “if any current modem activity exists that could prevent a data channel from being opened,” ensuring that “only one modem is able to be simultaneously active.” *Id.*; SAMSUNG-1010, [0029]. In addition, when the controller changes the

power control state of the WWAN modem by disabling it, the RCGD's processor dynamically changes the determination of whether to apply the Internet activity access controls such that the Internet activity access controls associated with the activated data session model would be applied. SAMSUNG-1003, ¶[200].

[18]

RCGD renders [18] obvious. SAMSUNG-1010, [0010], [0025], [0029], [0031]; SAMSUNG-1003, ¶¶[201]-[202].

In Gandhi, the device software “can include a modem controller,” and the modem controller “can manage which of multiple modems 114 or modem states are active.” SAMSUNG-1010, [0025]. The modem controller ensures “only one modem is able to be simultaneously active.” *Id.*, [0029]. In addition, “[t]he modem controller can prevent the data session manager from activating a data traffic channel whenever a modem other than the modem needed for the data traffic channel is active.” *Id.*, [0010]. Gandhi teaches that “the data session manager 204 can selectively operate in a data dedicated mode where interruptions of an active data session 231 are prevented.” *Id.*, [0031]. For example, if RCGD's WLAN modem is active, enforcing the Internet activity access control that only one modem can be active prevents a power state change of the WWAN modem. *Id.*; SAMSUNG-1003, ¶[202]; §§III.A.1.c, III.E.1.b.

[19]

RCGD renders [19] obvious. SAMSUNG-1010, [Abstract], [0029]-

[0030]; SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶¶[203]-[206].

Gandhi teaches an Internet activity access control in which “only one of the modems is transmitting” at a time, and no data session on another modem is placed in an active state when that modem is actively transmitting. SAMSUNG-1010, Abstract, [0029]; SAMSUNG-1003, ¶[204]. If a data traffic channel attempts to use an idle modem (a modem that is not transmitting), but that “data traffic channel has a lower priority,” then a message can be sent “to deny the initialization attempt,” disallowing use of the idle modem. SAMSUNG-1010, [0030]; SAMSUNG-1003, ¶[204]. Thus, a POSITA would have known that, since only one modem is allowed to transmit, the access control ensures that all other modems remain idle (not placed in an active state), even if a lower-priority data traffic channel attempts to use the idle modem. *Id.*

However, Gandhi teaches that such access controls do not apply to all data traffic sessions. *Id.*, ¶[205]; SAMSUNG-1010, [0030]. For example, Gandhi explains that the priority of a data traffic channel that wants to transmit can be “compared against a priority of an existing channel” and when the “data traffic channel has a higher priority” then “activity can be blocked on the currently active channel, which disables transmissions over the blocked channel,” making that modem idle (not transmitting). SAMSUNG-1010, [0030]. After the previously active channel is blocked, and its modem is idle, then the higher priority data traffic channel can activate and use its modem. *Id.* Therefore, a POSITA

would have recognized that Gandhi's access control (denying the ability to activate a modem) does not apply to the higher-priority data traffic channel, and Gandhi permits the modem associated with that higher-priority data traffic channel to change the power state to non-idle. SAMSUNG-1003, ¶[205].

As described above, Rao teaches that data traffic sessions can be associated with applications, e.g., stating that the client may have policies for specifying client-side prioritization of network communications related to applications" which can "be specified by any suitable means and/or mechanisms." SAMSUNG-1005, [0182]; SAMSUNG-1003, ¶[206]. Therefore, RCGD renders obvious that, when the power state of the modem is idle (e.g., not transmitting data), Internet access controls prevent power state changes (e.g., the modem remains idle even if lower-priority application request use of the modem) until a data communication request is received from a second (higher priority) application for which the Internet activity controls do not apply. SAMSUNG-1003, ¶[206].

IV. PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION

A. 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 were previously before the Office. While relatives of Rao and Cole (PCT application WO 2006/012610A2 (“Rao-2”) and U.S. Pub. No. 2008/0080457 (“Cole-2”)) were cited on the face of the ’433 Patent, there is no evidence that the Office substantively considered these references among the references listed on the first 11 pages of the ’433 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 and Cole-2 were cited on the face of the ’433 Patent, none of Rao, Cole, Rao-2, Cole-2, or the obviousness of the Challenged Claims in view of those references was ever addressed during prosecution. As highlighted in Grounds 1A-1E, the Examiner clearly did not appreciate Rao’s or Cole’s disclosures and how those references in combination with other prior art references not previously before the Office (Freund, Singh, Montemurro, and Gandhi) 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* §III.A-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. Discretionary denial under §314(a) is not merited

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 Mar. 20, 2020) (precedential) (“*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 eliminated any risk of duplicated effort by voluntarily presenting a *Sotera* stipulation. 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, the *Fintiv* factors do not favor denial.

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

Factor 2 is neutral; the Court’s trial date is speculative at this point and

subject to change. The Board will likely issue its Final Written Decision around February 2025, approximately six months after the currently scheduled trial date (August 5, 2024). SAMSUNG-1018, 1. However, as the Board and Director have previously recognized, “scheduled trial dates are unreliable and often change.” SAMSUNG-1015, 8.

Factor 3 favors institution; 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-1018, 5.

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

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

Factor 6 favors institution; the merits of this Petition are compelling, as described in this Petition.

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 '433 Patent is the subject of civil actions *Headwater Research LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00467, E.D. Tex., filed December 6, 2022 (SAMSUNG-1004) and *Headwater Research LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00422, E.D. Tex., filed October 26, 2022. Petitioner is not aware of any other disclaimers, reexamination certificates, or IPR petitions addressing the '433 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 IPR39843-0159IP1@fr.com (referencing No. 39843-0159IP1 and cc'ing PTABInbound@fr.com, axf-ptab@fr.com, jjm@fr.com and jjh@fr.com).

Attorney Docket No. 39843-0159IP1

IPR of U.S. Patent No. 9,277,433

Respectfully submitted,

Dated August 14, 2023

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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 13,951 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated August 14, 2023

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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 August 14, 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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