

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Gregory G. Raleigh, et al.
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Title: DEVICE-ASSISTED SERVICES FOR PROTECTING NETWORK
CAPACITY

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PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES
PATENT NO. 11,405,224 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
	D. Level of Ordinary Skill in the Art.....	3
II.	THE '224 PATENT.....	3
	A. Brief Description.....	3
	B. Prosecution History.....	5
III.	THE CHALLENGED CLAIMS ARE UNPATENTABLE.....	6
	A. [GROUND 1A] – Claims 1-11 and 16-17 are rendered obvious by Cole, D’Amore, and Rao	6
	1. Overview of Cole	6
	2. Overview of D’Amore	9
	3. Combination of Cole and D’Amore	11
	4. Overview of Rao	17
	5. Combination of Cole-D’Amore and Rao	20
	6. Analysis	25
	B. [GROUND 1B] – Claims 13-15 are rendered obvious by Cole, D’Amore, Rao, and Freund.....	68
	1. Overview of Freund.....	68
	2. Combination of Cole-D’Amore-Rao and Freund	69
	3. Analysis	72
	C. [GROUND 1C] – Claim 12 is rendered obvious by Cole, D’Amore, Rao, and Aleksic	75
	1. Overview of Aleksic.....	75
	2. Combination of Cole-D’Amore-Rao and Aleksic	76
	3. Analysis	79
IV.	PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION.....	81
	A. <i>Discretionary Denial under 325(d) is not warranted</i>.....	81
	B. 35 U.S.C. §314(a) – Discretionary Denial is not Merited in view of Petitioner’s <i>Sotera</i> Stipulation.....	83
V.	CONCLUSION AND FEES	85

VI.	MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1).....	85
A.	Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1).....	85
B.	Related Matters Under 37 C.F.R. § 42.8(b)(2).....	85
C.	Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3).....	85
D.	Service Information	86

EXHIBITS

- SAMSUNG-1001 U.S. Patent No. 11,405,224 to Raleigh, et al. (“the ’224 Patent”)
- SAMSUNG-1002 Excerpts from the Prosecution History of the ’224 Patent (“the Prosecution History”)
- SAMSUNG-1003 Declaration and Curriculum Vitae of Dr. Patrick Traynor
- SAMSUNG-1004 Complaint, *Headwater Research LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00422, E.D. Tex., October 26, 2022
- SAMSUNG-1005 U.S. Patent Publication No. 2008/0080458 A1 (“Cole”)
- SAMSUNG-1006 U.S. Patent Publication No. 2009/0119773 A1 (“D’Amore”)
- SAMSUNG-1007 U.S. Patent Publication No. 2006/0039354 A1 (“Rao”)
- SAMSUNG-1008 U.S. Patent No. 5,987,611 (“Freund”)
- SAMSUNG-1009 U.S. Patent Publication No. 2005/0037740 A1 (“Smith”)
- SAMSUNG-1010 European Patent Publication No. 1 484 871 A1 (“Kelz”)
- SAMSUNG-1011 U.S. Patent No. US 2008/0057894 A1 (“Aleksic”)
- SAMSUNG-1012 U.S. Patent No. 7,924,730 B1 (“McAllister”)
- SAMSUNG-1013 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-1014 U.S. Patent No. 6,947,723 B1 (“Gurnani”)
- SAMSUNG-1015 Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (USPTO June 21, 2022) (“Director’s Guidance”)
- SAMSUNG-1016 Samsung Stipulation letter regarding IPR grounds in District court litigation

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

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

LISTING OF CHALLENGED CLAIMS

Claim 1	
[1pre]	A wireless end-user communications device, comprising:
[1.1]	at least one wireless modem;
[1.2]	a processor configured to:
[1.3]	for each given application of a plurality of applications on the wireless end-user device, monitor a network service usage activity of the wireless end-user communications device associated with the given application;
[1.4]	classify, as a first classification for each given one of the network service usage activities, a classification based on the application associated with the given network service usage activity and that allows for a differential network access control, wherein the differential network access control comprises a set of service usage control policies applicable when a network service is available via the at least one wireless modem, including at least a first policy that allows the given network service usage activity to currently communicate data with a network destination via the at least one wireless modem, and a second policy that defers data communication associated with

	the given network service usage activity until a device state change occurs;
[1.5]	associate each given one of the network service usage activities with a service usage control policy dynamically selected from the set of service usage control policies, based on the first classification of the given network service usage activity and at least one device state; and
[1.6]	manage network data access via the at least one wireless modem for each of the plurality of applications according to the dynamically selected service usage control policy for each given network service activity of that application; and
[1.7]	a memory coupled to the processor and configured to provide the processor with instructions.
Claim 2	
[2]	The wireless end-user communications device of claim 1, wherein the dynamically selected service usage control policy for a given network service usage activity is further selected based on an application behavior for the application associated with that network service usage activity.

Claim 3	
[3]	The wireless end-user communications device of claim 1, wherein the dynamically selected service usage control policy for a given network service usage activity is further selected based on whether the application associated with that network service usage activity is currently in the foreground of user interaction.
Claim 4	
[4]	The wireless end-user communications device of claim 1, wherein the set of service usage control policies further comprises a third policy that blocks data communication associated with the given network service usage activity.
Claim 5	
[5]	The wireless end-user communications device of claim 1, wherein the dynamically selected service usage control policy for a given network service usage activity is further selected based on a messaging layer behavior for the application associated with that network service usage activity.

Claim 6

[6]	The wireless end-user communications device of claim 1, wherein for the second policy that defers data communication associated with the given network service usage activity until the device state change occurs, the device state change comprises a change in device power state.
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Claim 7

[7]	The wireless end-user communications device of claim 1, wherein for the second policy that defers data communication associated with the given network service usage activity until the device state change occurs, the device state change comprises a change from a modem power save state that is not triggered by the given network service usage activity.
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Claim 8

[8]	The wireless end-user communications device of claim 1, wherein for the second policy that defers data communication associated with the given network service usage activity until the device state change occurs, the device state change comprises a change to a network connection state that is not triggered by the given network service usage activity.
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Claim 9

[9]	The wireless end-user communications device of claim 1, wherein for the second policy that defers data communication associated with the given network service usage activity until the device state change occurs, the device state change comprises an aggregation of demand from multiple network service usage activity.
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Claim 10

[10]	The wireless end-user communications device of claim 1, wherein for the second policy that defers data communication associated with the given network service usage activity until the device state change occurs, the device state change comprises a change in user interaction with the wireless end-user communications device.
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Claim 11

[11]	The wireless end-user communications device of claim 1, wherein the dynamic selection of the service usage control policy is further based on a user preference setting for a given one of the applications.
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Claim 12	
[12]	The wireless end-user communications device of claim 1, wherein the processor is further configured to monitor power consumption for each of the plurality of applications, and wherein the dynamic selection of the service usage control policy for a given network service usage activity is further based on the monitored power consumption for the application associated with the given network service usage activity.
Claim 13	
[13]	The wireless end-user communications device of claim 1, wherein the processor is further configured to monitor network service usage behavior for each of the plurality of applications, and wherein the dynamic selection of the service usage control policy for a given network service usage activity is further based on a comparison of the monitored network service usage behavior for the application associated with the given network service usage activity to expected access limits for that application.
Claim 14	
[14]	The wireless end-user communication device of claim 13, wherein the dynamic selection of the service usage control policy restricts

	network access due to the monitored network service usage behavior exceeding the expected access limits for the application associated with the given network service usage activity.
Claim 15	
[15]	The wireless end-user communication device of claim 1, wherein the second policy limits an allowable duration of network access events for a given application.
Claim 16	
[16]	The wireless end-user communication device of claim 1, wherein the second policy time windows network access events for a given application.
Claim 17	
[17]	The wireless end-user communication device of claim 1, wherein the at least one wireless modem comprises first and second modems, and wherein the service usage control policy dynamically selected for at least one given one of the network service usage activities is further selected in dependence upon which of the first and second modems will supply network connectivity for that network service usage activity.

Samsung Electronics Co., Ltd. (“**Petitioner**” or “**Samsung**”) petitions for *Inter Partes* Review (“**IPR**”) of claims 1-17 (“**the Challenged Claims**”) of U.S. Patent No. 11,405,224 (“**the ’224 Patent**”). Compelling evidence presented in this Petition demonstrates at least a reasonable likelihood that Petitioner will prevail with respect to at least one of the Challenged Claims.

I. REQUIREMENTS FOR IPR

A. Grounds for Standing

Petitioner certifies that the ’224 Patent is available for IPR. This petition is being filed within one year of service of a complaint against Petitioner. SAMSUNG-1004; SAMSUNG-1017. Petitioner is not barred or estopped from requesting review of the Challenged Claims on the below-identified grounds.

B. Challenge and Relief Requested

Petitioner requests an IPR of the Challenged Claims on the grounds noted below. Dr. Patrick Traynor provides supporting testimony in his Declaration. SAMSUNG-1003, ¶¶1-144.

Ground	Claim(s)	35 U.S.C. § 103
1A	1-11 and 16-17	Cole in view of D’Amore and Rao
1B	13-15	Cole in view of D’Amore, Rao, and Freund
1C	12	Cole in view of D’Amore, Rao, and Aleksic

The ’224 Patent claims priority to a number of provisional applications, the

earliest of which was filed January 28, 2009. SAMSUNG-1001, Cover. While Petitioner does not concede that January 28, 2009 is the priority date that should be afforded to the '224 Patent, for the purposes of this proceeding, each of the references asserted in this Petition qualifies as prior art under 35 USC §§102(a), (b), or (e) (as shown in the table below) even if the January 28, 2009 date of the provisional application is used as the priority date (“the Critical Date”) of the '224 Patent.

Reference	Filing Date	Publication Date
Cole	Sep. 29, 2006	Apr. 3, 2008
D’Amore	May 27, 2008	May 7, 2009
Rao	Jul. 22, 2005	Feb. 23, 2006
Freund	May 6, 1997	Nov. 16, 1999
Aleksic	Aug. 31, 2006	Mar. 6, 2008

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, ¶[24]. Petitioner reserves the right to respond to any constructions offered by Patent Owner or adopted by the Board. Petitioner is not

conceding that each challenged claim satisfies all statutory requirements, nor is Petitioner waiving any arguments concerning claim scope or grounds that can only be raised in district court. For this petition, Petitioner applies prior art in a manner consistent with Patent Owner's allegations of infringement before the district court.

D. Level of Ordinary Skill in the Art

A person of ordinary skill in the art ("POSITA") relating to the subject matter of the '224 Patent as of January 28, 2009 would have had (1) at least a bachelor's degree in computer science, electrical engineering, or a related field, and (2) three to five years of experience with networking, power consumption of networked computing devices, and/or wireless digital communications systems. SAMSUNG-1003, ¶¶[22]-[23]. Additional graduate education could substitute for professional experience, and *vice versa*. *Id.*

II. THE '224 PATENT

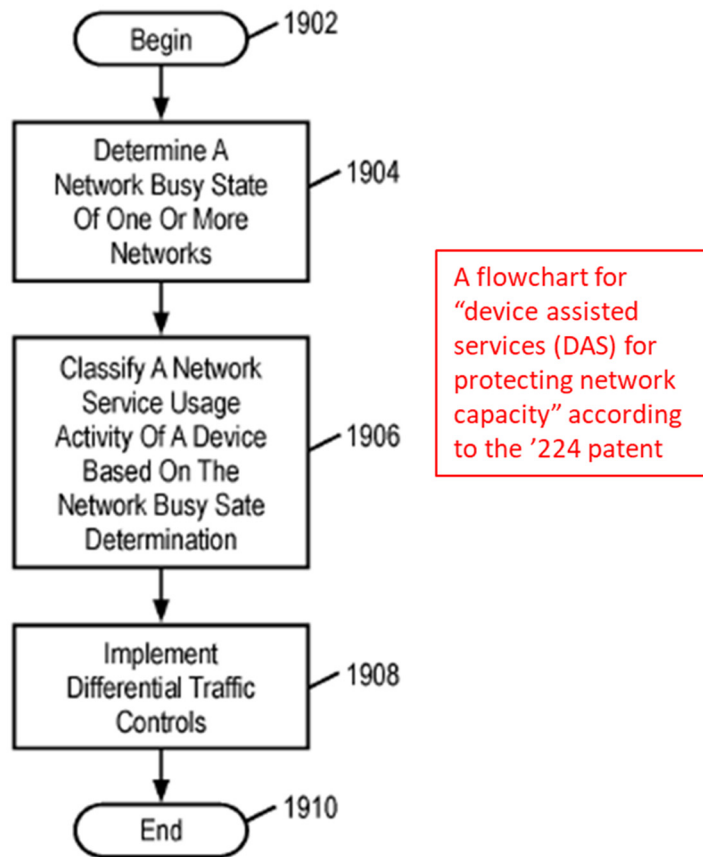
A. Brief Description

The '224 Patent is directed to "a Device Assisted Services (DAS) for protecting network capacity." SAMSUNG-1001, Abstract. This includes "classifying" network activities "for differential network access control" with "priority levels" and determining respective "network service usage control polic[ies]." SAMSUNG-1001, Abstract, 77:23-49. The '224 Patent describes that these "priority levels" can be "based on one or more criteria/measures," to include "network busy

state, current access network, time based criteria, an associated service plan, and/or other criteria/measures.” SAMSUNG-1001, 77:23-49; SAMSUNG-1003, ¶[25].

The ’224 Patent describes “network capacity controlled service[s]” as being “selected for differential network service usage control for protecting network capacity.” SAMSUNG-1001, 14:17-36. Additionally, the ’224 Patent explains that a “network capacity controlled services classification” includes “one or more network services associated with a network capacity controlled service/class priority setting for differential network service usage control for protecting network capacity.” SAMSUNG-1001, 14:17-36; SAMSUNG-1003, ¶[26].

An example process for “implementing differential traffic controls” is shown below in FIG. 19 of the ’224 Patent. SAMSUNG-1001; 72:34-67, 73:1-20. As illustrated below in step 1906, the process includes “classifying a network service usage activity ... to facilitate differential network access control for protecting network capacity.” SAMSUNG-1001, 72:40-44. The process continues in step 1908 by “implementing differential traffic controls” which are “based on the service usage activity classification for protecting network capacity.” SAMSUNG-1001, 72:64-66; SAMSUNG-1003, ¶[27].



SAMSUNG-1001, FIG. 19.¹

B. Prosecution History

The '224 Patent was allowed after one Office Action, in which only claim 1 was rejected under 35 U.S.C. § 102 as being anticipated by Morgensen (U.S. Patent Pub. No. 2004/0268351 A1). SAMSUNG-1002, 95-99. Following this Office Action, claim 1 was amended and claims 2-17 were added. SAMSUNG-1002, 87-94. Allowance was then received for all claims. SAMSUNG-1002, 27-33. During

¹ Annotations to the figures throughout this Petition are shown in color.

prosecution, the Examiner did not consider any of Cole, D’Amore, Rao, Freund, and Aleksic. These references render the Challenged Claims obvious, as discussed below. SAMSUNG-1003, ¶[28].

III. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. [GROUND 1A] – Claims 1-11 and 16-17 are rendered obvious by Cole, D’Amore, and Rao

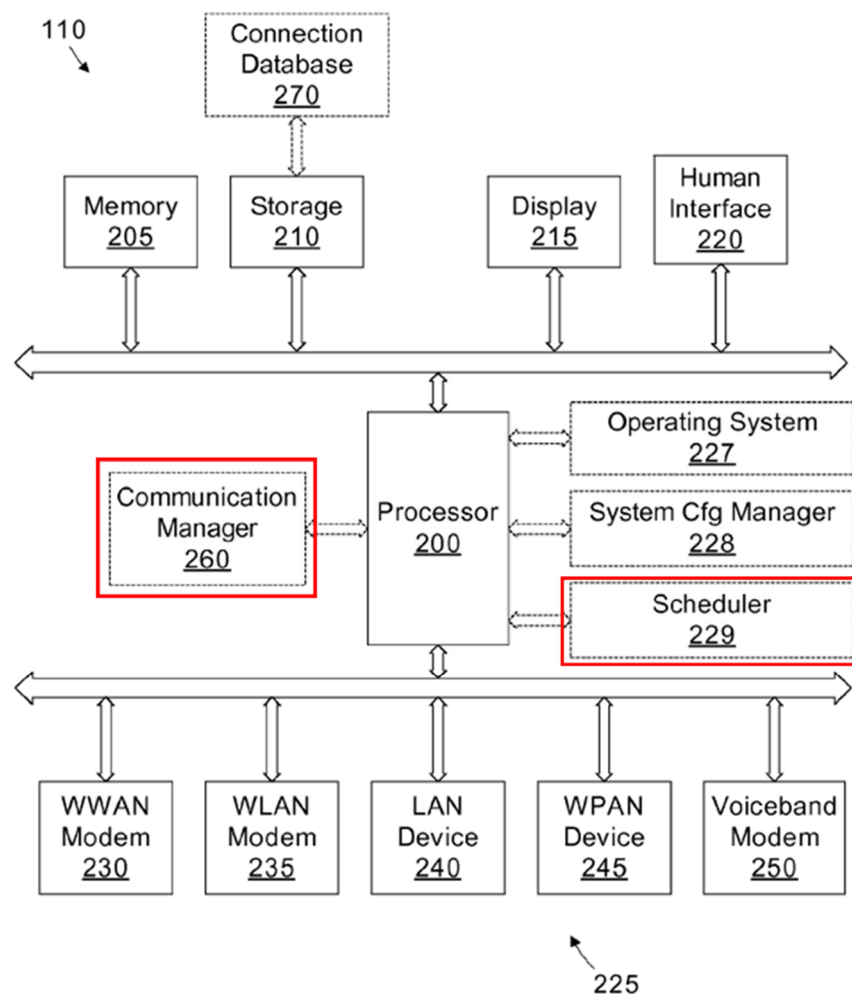
1. Overview of Cole²

Cole describes “[a] method for configuring a mobile device including a plurality of communication interfaces” including a “first communication interface” and multiple “second ... communication interfaces” that are “selected for establishing a second connection to a remote network.” SAMSUNG-1005, Abstract, ¶[0014]. Cole uses a “connection manager 260”³ to select “communication interfaces” for connecting to remote networks (e.g., a wireless local area network (WLAN), a wireless wide area network (WWAN), and a wireless personal area network (WPAN)). SAMSUNG-1005, ¶¶[0015], [0003], [0031], [0035], [0036],

² Descriptions of the references and combinations in Section III are incorporated into each mapping that includes citations to these references. Emphasis is added to text using bold and/or italicized font unless otherwise indicated.

³ Cole also refers to the “connection manager 260” as the “communication manager 260.” SAMSUNG-1005, ¶[0088], FIG. 2.

FIGS. 1, 2. The connection manager can also “schedule various events” using a “scheduler” (also annotated) to “effectively use available bandwidth.” SAMSUNG-1005, ¶¶[0074], [0036], [0118], [0119]. This includes taking action when “monitored loads” exceed a “predetermined threshold.” SAMSUNG-1005, ¶[0075], [0077]; SAMSUNG-1003, ¶[29].



SAMSUNG-1005, FIG. 2.

Cole’s “connection manger” manages communication interfaces to “determine which connections should be active at any given time.” SAMSUNG-1005,

¶[0036]. This determination includes monitoring various network connectivity metrics, such as, battery power, connection bandwidth, communication capabilities, connection availability, user preferences, application requirements, and mobile device resources. SAMSUNG-1005, ¶¶[0036], [0080]. For instance, in some cases, the connection manager may establish a connection with a communication interface based on application requirements. SAMSUNG-1005, ¶[0069]. To assist in evaluating communication interfaces, the connection manager “maintains data related to each of the communication interfaces,” to include “connection name, connection technology type, a location (LOC), a configuration flag (CFG), a bandwidth (BW), a connection time (CT), a user interaction required (UI) flag, a fast connect availability flag (FC), a power characteristics (PC), thermal characteristics (TC), a vendor name, a technical support contact (TSC) information, an ignore flag,” and more. SAMSUNG-1005, ¶[0037]. Cole describes that these above parameters may be “based on historical data ... user specified parameters, or static parameters,” and may also be “monitored” by the connection manager. SAMSUNG-1005, ¶[0038]; SAMSUNG-1003, ¶[30].

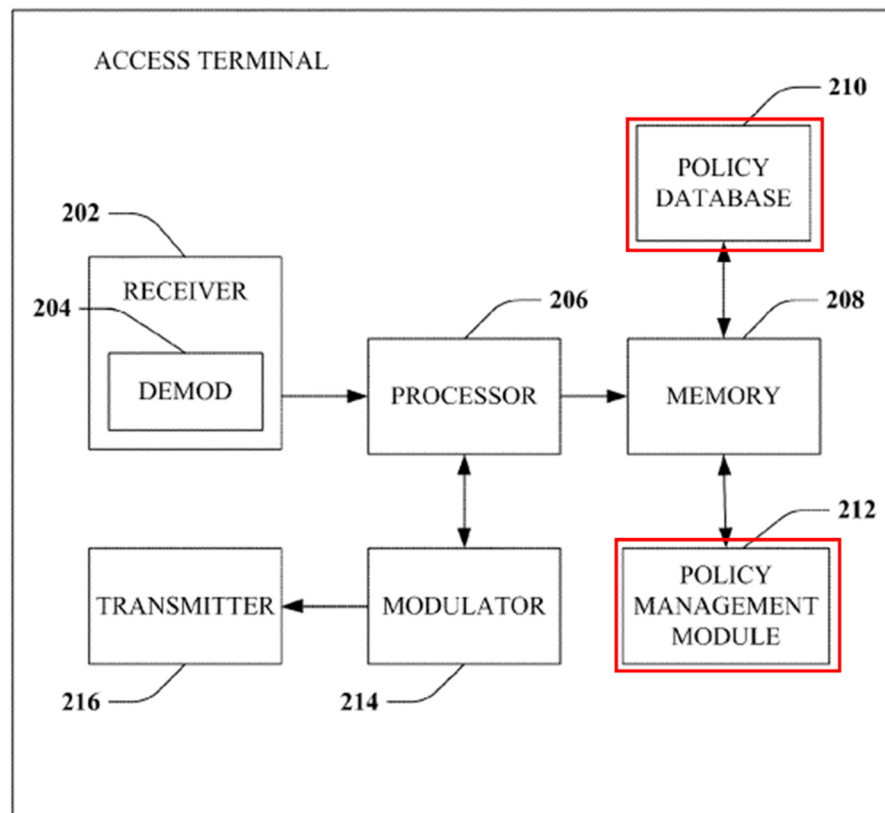
Cole describes that, when “the monitored load exceeds a predetermined threshold (e.g., 85% of capacity), the connection manager 260 may take one of several actions to manage the load.” SAMSUNG-1005, ¶[0075]. For example,

Cole describes that applications can be “aborted,” “postpone[d],” cancelled and re-scheduled, and “block[ed].” SAMSUNG-1005, ¶[0080], ¶¶[0085]-[0090], ¶[0125]. Cole additionally describes that these above actions can be taken in response to mobile device states, including a “power state.” SAMSUNG-1005, ¶¶[0090]-[0098]. “By monitoring the load on an active connection, the connection manager 260 tries to proactively prevent increased latency from an overloaded connection from impacting the performance of the running applications or the efficiency of the user.” SAMSUNG-1005, ¶[0075]; SAMSUNG-1003, ¶[31].

2. Overview of D’Amore

D’Amore describes “management and arbitration of dedicated mobile communication resources for mobile applications.” SAMSUNG-1006, Abstract. This management is accomplished through a “priority level that establishes an importance with respect to one or more other mobile applications and at least one mobile resource.” SAMSUNG-1006, Abstract. D’Amore explains that, “[if] competing applications attempt to access the mobile resource concurrently, access can be provided to an application having higher priority level” and that “control of a resource can be taken away from an application having lower priority in order to affect control of such resource for a higher priority application.” SAMSUNG-1006, Abstract; SAMSUNG-1003, ¶[32].

D'Amore's FIG. 2 (reproduced below) depicts an example of an access terminal, which is also referred to as a "mobile station, mobile, mobile device, [or] cellular device." SAMSUNG-1006, ¶¶[0049], [0019]. D'Amore's access terminal includes a policy database 210 and a policy management module 212 (outlined in red in D'Amore's FIG. 2 below). SAMSUNG-1006, ¶[0050]; SAMSUNG-1003, ¶[33].



SAMSUNG-1006, FIG. 2.

D'Amore's policy database 210 "associates a privilege code or a priority level, or both, with at least one mobile application." SAMSUNG-1006, ¶[0050].

This priority level “establishes a relative order of importance for the mobile application with respect to other mobile applications” for “managing and prioritizing access to network/device resources.” SAMSUNG-1006, ¶[0050]; SAMSUNG-1003, ¶[34].

D’Amore’s policy management module 212 can “approve or deny access to a mobile device resource and/or mobile network resource for a mobile application” “based at least in part on a priority level or a privilege code associated with the mobile application.” SAMSUNG-1006, ¶[0050]. The policy management module 212 also includes “a configuration module” that allows “customization of privilege code or priority level information for one or more mobile applications” by a “user.” SAMSUNG-1006, ¶[0063]; SAMSUNG-1003, ¶[35].

3. Combination of Cole and D’Amore

It would have been obvious to a POSITA to combine the teachings of Cole and D’Amore such that D’Amore’s policies (e.g., policies stored in policy database 210, policy management module 212) would have been incorporated into the decision making of Cole’s connection manager. SAMSUNG-1003, ¶[36]; *see supra* §III.A.1, §III.A.2. As Dr. Traynor explains, a POSITA would have combined Cole and D’Amore to further improve the management of applications in devices such as Cole’s mobile device. SAMSUNG-1003, ¶¶[36]. For instance:

- 1) The increased ability to manage application priority and mobile device

- resources provided by D'Amore would have enabled Cole's mobile device to host additional and more complex applications without fear of conflict. SAMSUNG-1006, ¶¶[0003]-[0004]; SAMSUNG-1003, ¶[38].
- 2) D'Amore's "privilege codes" would have been used in the Cole mobile device to prevent unauthorized resource access, increasing user privacy protection and offering increased control of sensitive mobile device information and resources. SAMSUNG-1006, ¶¶[0006], [0049]-[0051]; SAMSUNG-1003, ¶[37].
- 3) The ability of D'Amore's "service provider" to initially set priority levels for applications would enable greater provider control of mobile device resources across many such mobile devices, while simultaneously reducing requirements for user interaction to specify priorities for each one of many applications executing on their mobile device. SAMSUNG-1006, ¶¶[0050]-[0051], [0070]; SAMSUNG-1003, ¶[38].
- 4) D'Amore's application level "priority policies" would add additional granularity to the decisions of Cole's connection manager, such that the connection manager has a more accurate understanding of the activity/application priority when making deferral or rescheduling decisions. SAMSUNG-1005, ¶¶[0074]-[0097]; SAMSUNG-1006, ¶¶[0050]-[0051]; SAMSUNG-1003, ¶[37].

5) Incorporating D’Amore’s application level priorities would also allow conflict-resolution in the event Cole’s connection manager was faced with conflicting priorities, for example, determining which application should be afforded a rescheduled time slot during a time of limited connectivity. SAMSUNG-1005, ¶¶[0118]-[0127]; SAMSUNG-1006, ¶¶[0050], [0051]; SAMSUNG-1003, ¶[38].

As explained below in more detail, combining Cole and D’Amore would have been obvious at least because such a combination would have merely involved (1) combining prior art elements according to known methods to yield predictable results; and the (2) use of known techniques to improve similar devices in the same way. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-421, 82 USPQ2d 1385, 1395-97 (2007); *MPEP 2143*; SAMSUNG-1003, ¶[39]. Indeed, Cole already describes utilizing certain policies to control the execution of applications and the combination of D’Amore’s teachings would simply involve adding D’Amore’s known policies to Cole’s similar system, thus, for at least this reason, making the Cole-D’Amore combination predictable and foreseeable with a reasonable expectation of success. SAMSUNG-1005, ¶[0074]-[0075]; SAMSUNG-1003, ¶¶[39]. Moreover, because Cole’s connection manager “proactively prevent[s] increased latency from an overloaded connection from impacting the performance of the running applications,” a similar design objective to D’Amore, the

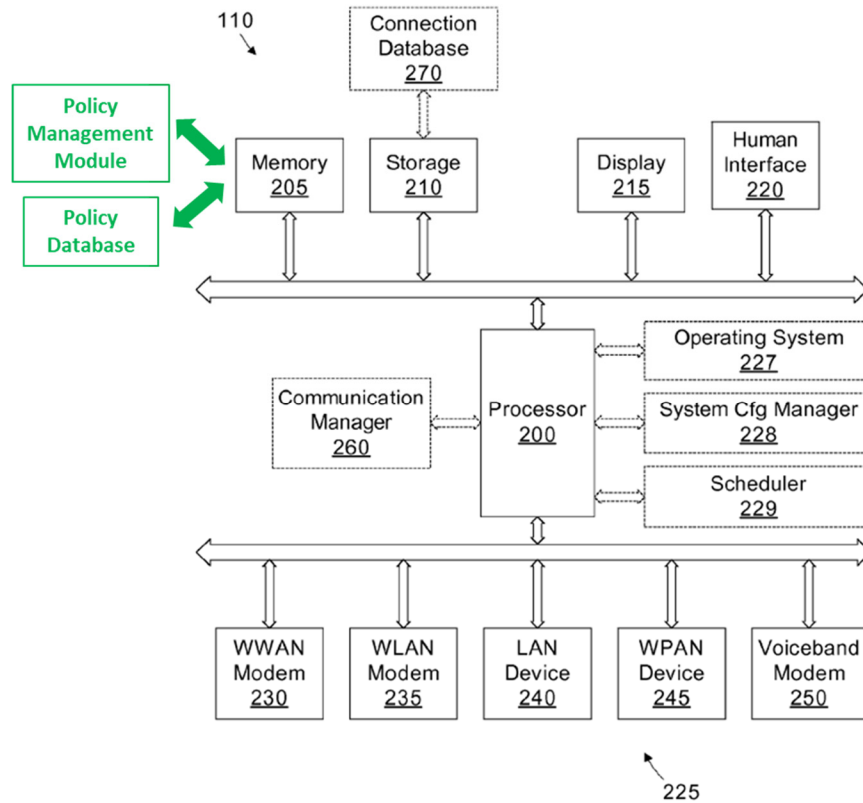
use of D'Amore's policies in Cole would have improved a similar device in the same way. SAMSUNG-1005, ¶[0074]; SAMSUNG-1006, ¶[0032] ("systematically multiplex and distribute mobile device and/or network resources"); SAMSUNG-1003, ¶[39].

Incorporating D'Amore's policies (e.g. policy database 210, policy management module 212, and policies therein) into Cole's communication manager would also have been predictable and foreseeable with a reasonable expectation of success because D'Amore's policies describe similar actions as those taken by Cole's connection manager in response to undesirable application activities. SAMSUNG-1005, ¶¶[0074]-[0097]; SAMSUNG-1006, ¶¶[0060]-[0061]. For example, D'Amore describes an "access termination module" that can "remove access to a system resource." SAMSUNG-1006, ¶[0060]. Similarly, Cole's connection manager "determines if one or more actions that are consuming bandwidth should be postponed." SAMSUNG-1005, ¶[0085], *see also* ¶¶[0074]-[0097]. As Dr. Traynor explains, a POSITA would have recognized or found obvious that the postponement of an action by Cole's connection manager would also have involved removing access to device resources for an application, like in D'Amore. SAMSUNG-1003, ¶[40]. Additionally, both Cole and D'Amore implement their techniques in end-user devices ("mobile devices"). SAMSUNG-1005, ¶¶[0014]-[0015], SAMSUNG-1006, ¶¶[0007]-[0016]; SAMSUNG-1003, ¶[40]. Finally, the

incorporation of D'Amore's policies would have simply involved the implementation of software in a system already designed to execute similar program modules (e.g., Cole's "connection manager 260," "scheduler 229," and D'Amore's "policy management module 212") and implement priority rules. SAMSUNG-1005, ¶¶[0033]-[0036], [0074]; SAMSUNG-1006, ¶¶[0032], [0049], [0052]. As Dr. Traynor explains, "the decision to implement D'Amore's policies in Cole would have been an obvious design choice as a POSITA would have naturally experimented with known policies within the capability of Cole's processing ability, such as those described in D'Amore." SAMSUNG-1003, ¶[40].

In an example of the combined Cole-D'Amore system, illustrated below in Cole's Figure 2, D'Amore's policies (e.g., policies stored in policy database 210, policy management module 212) would have been incorporated into Cole's memory 205, storage 210, and/or connection database 270, such that they could be referenced by the communication manager 260 when making deferral and rescheduling decisions. SAMSUNG-1005, ¶¶[0034]-[0036], ¶¶[0074]-[0097], FIG. 2; SAMSUNG-1006, ¶¶[0049]-[0060], FIG. 2; SAMSUNG-1003, ¶[41]. In the combined system, application activities would have been assigned a priority level or code based on their associated application (e.g., "classified"), as taught by D'Amore, and Cole's connection manager 260 would leverage this additional gran-

ularity when determining which application activities should be deferred. SAMSUNG-1005, ¶[0034]-[0036], ¶¶[0074]-[0097], FIG. 2; SAMSUNG-1006, ¶¶[0049]-[0060], FIG. 2; SAMSUNG-1003, ¶[41]. Moreover, Cole's scheduler evaluates many device states and parameters when scheduling application tasks. SAMSUNG-1005, ¶¶[0119]-[0126]. Therefore, D'Amore's priority policies would assist Cole's connection manager 260 in directing the scheduler to effectively schedule application tasks and improve the ability of the mobile device to use available network bandwidth (e.g., by reducing the number of high-priority tasks that are spuriously rescheduled, thus forcing the user to override the scheduler and execute the task). SAMSUNG-1005, ¶¶[0119]-[0126]; SAMSUNG-1006, ¶¶[0059]-[0061]. In doing so, the Cole-D'Amore device would improve network utilization efficiency by preferentially scheduling higher priority application activities during times of network availability (one of the main objectives of Cole). SAMSUNG-1005, ¶¶[0006]-[0011], ¶¶[0074]-[0075]; SAMSUNG-1003, ¶[41].



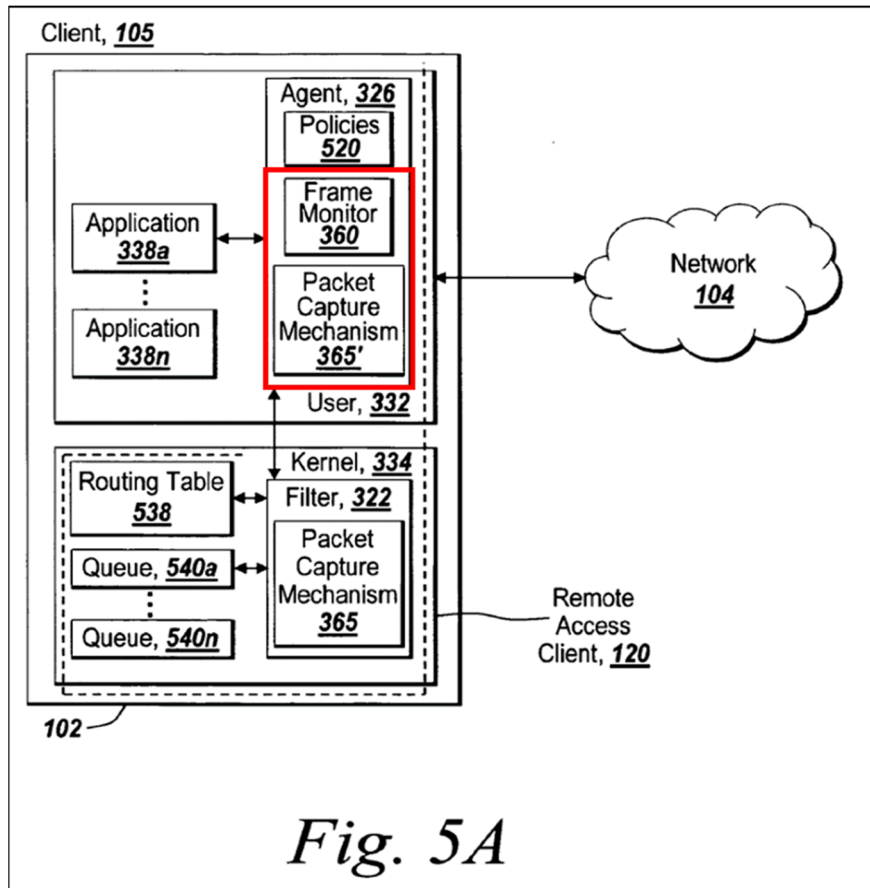
SAMSUNG-1006, FIG. 2 (modified based on D'Amore).

4. Overview of Rao

Rao discloses performing “intelligent and client centric prioritization of application network communications on a client based on the type and/or priority of an application.” SAMSUNG-1007, ¶[0179], FIG. 5A. Rao’s method can be used to prioritize “data communications” of some applications over others (e.g., “real-time data communications” over data communications from “non-real-time data communication applications”), and can be used to “compliment Quality of Service (QOS) networks where network traffic prioritization occurs in intermediary network devices, such as switches and routers.” *Id.*, ¶[0184]. In order to effectuate

this prioritization, Rao describes the use of a “packet capture mechanism” that “inspects” the network packets of applications and a “frame monitor” that “identifies an application ... that generated the packet.” SAMSUNG-1007, ¶[0109], ¶¶[0158]-[0159], ¶[0176], ¶[0180], ¶[0185], ¶[0191], FIG. 5A; SAMSUNG-1003, ¶[42].

As shown in Rao’s FIG. 5A below, Rao discloses that a “remote access client 105 of computing device 102 is connected to network 104” through one or more “LAN or WAN links” and/or “wireless connections.” SAMSUNG-1007, ¶[0179]. Further, “[t]he client 105 may execute one or more applications 338a-338n, which access the network 104 via the agent 326 and filter 322 of the remote access client 120.” SAMSUNG-1007, ¶[0179]. As examples, Rao’s applications can communicate with one or more servers on the network 104, such as “an application server providing email services such as Microsoft Exchange,” “a web or Internet server,” “a desktop sharing server,” or “a collaboration server.” SAMSUNG-1007, ¶[0090]; SAMSUNG-1003, ¶[43].



SAMSUNG-1007, FIG. 5A.

Rao's system implements "one or more policies 520 for specifying client-side prioritization of network communications related to applications 338 a-338 n." SAMSUNG-1007, ¶[0182]. These policies "may be specified by any suitable means and/or mechanisms." SAMSUNG-1007, ¶[0182]. For instance, these policies can "define prioritization" based on criteria such as: "the name of the application," "the type of application," "the type of one or more protocols used by the application[s]," "the size of the payload of the network packet," "whether an applica-

tion is running in the foreground or the background of the client,” and/or “the destination network address, such as host name or IP address, and/or destination port number.” SAMSUNG-1007, ¶[0182]; SAMSUNG-1003, ¶[44].

Rao deploys these policies by intercepting packets of network traffic associated with applications, determining the priority of the packets based on the application that is associated with each packet, and selectively communicating the packets to the network based on the determined priority. SAMSUNG-1007, ¶¶[0184]-[0190], FIG. 5B. As an example, Rao’s system can “use the policies 520 to determine which network packets to queue and/or discard.” SAMSUNG-1007, ¶[0207]. In particular, Rao’s system includes “a packet capture mechanism 365, 365” (annotated above in Figure 5A) for “intercepting network traffic of any of the applications 338a-338n of the client 105.” SAMSUNG-1007, [0080], [0184]-[0186], FIG. 5A; SAMSUNG-1003, ¶[45].

5. Combination of Cole-D’Amore and Rao

It would have been obvious to a POSITA to modify the Cole-D’Amore system based on the teachings of Rao such that Rao’s packet assessment and prioritization techniques (e.g., packet capture mechanism 365, frame monitor 360, and additional prioritization techniques) would have been incorporated in the Cole-D’Amore mobile device. SAMSUNG-1005, ¶¶[0074]-[0097], FIG. 2; SAM-

SUNG-1007, ¶¶[0158]-[0159], [0176], [0180], [0185], [0191], FIG. 5A; SAM-SUNG-1003, ¶[46]. As Dr. Traynor explains, a POSITA would have been motivated to update the Cole-D'Amore mobile device based on the teachings of Rao for the following reasons:

- 1) Incorporating the functionality of Rao's frame monitor 360 into the connection manager of Cole-D'Amore would beneficially provide Cole-D'Amore's system with an additional capability to identify application traffic at the packet level, allowing for inter-application classification of activities based on protocol. SAMSUNG-1007, ¶[0109], [0179]-[0184]; SAMSUNG-1003, ¶[47].
- 2) A POSITA would have recognized that Rao describes prioritization techniques (e.g., "whether an application is running in the foreground or the background") that would enhance the priority policies of the Cole-D'Amore device, allowing the connection manager to consider the impact (e.g., deferring an active browsing session or a call in progress) to the mobile device user. SAMSUNG-1006, ¶¶[0059]-[0061]; SAMSUNG-1007, ¶¶[0109], [0179]-[0184], FIG. 5A; SAMSUNG-1003, ¶[48].

As explained below, combining Cole-D'Amore with the teachings of Rao

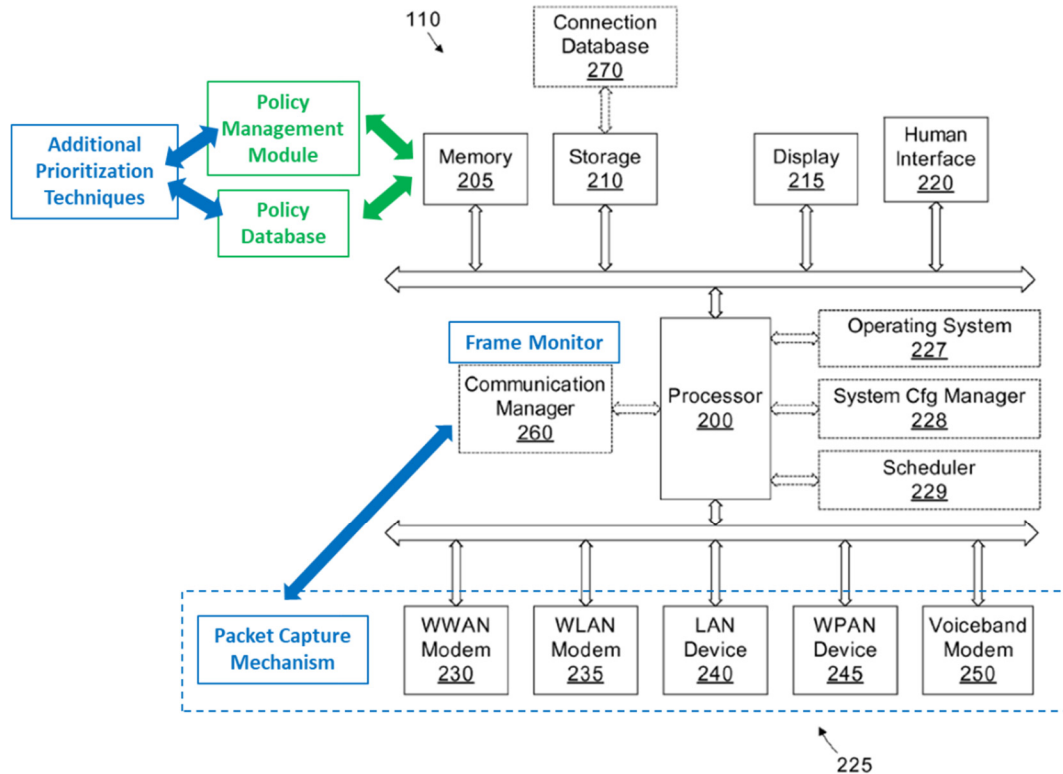
would have involved (1) combining prior art elements according to known methods to yield predictable results; and (2) using known technique to improve similar devices in the same way. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-421, 82 USPQ2d 1385, 1395-97 (2007); *MPEP 2143*; SAMSUNG-1003, ¶[49]. Indeed, Cole describes policy decisions similar to Rao (the “actions” of the connection manager 260 to defer or reschedule activities – similar to Rao’s agent 326) and the incorporation of Rao’s known prioritization methods into the Cole-D’Amore system would have yielded predictable results. SAMSUNG-1005, ¶[0074]-[0075]; SAMSUNG-1007, ¶[0040] (“preventing” and “holding” activity traffic). Moreover, because Cole’s connection manager “proactively prevent[s] increased latency from an overloaded connection from impacting the performance of the running applications,” a similar design objective to Rao, the use of Rao’s prioritization techniques in Cole would have been improving a similar device in the same way. SAMSUNG-1005, ¶[0074]; SAMSUNG-1007, ¶[0179] (“prioritization of application network communications on a client based on the type and/or priority of an application”); SAMSUNG-1003, ¶[49].

Incorporating Rao’s packet assessment and prioritization techniques (e.g., packet capture mechanism, frame monitor, and additional prioritization techniques) into the Cole-D’Amore device would have been predictable and foreseeable with a

reasonable expectation of success because Rao also describes “optimizing ... communications” on mobile devices that “run one or more applications 338 that access a network” (“effectively use the available bandwidth”). SAMSUNG-1005, ¶¶[0074]-[0097], [0104]; SAMSUNG-1007, ¶¶[0075], [0088], [0133], [0179]-[0184]. Like Cole and D’Amore, Rao describes that its techniques can be implemented in end-user devices (“mobile telephones”). SAMSUNG-1005, ¶¶[0014]-[0015], SAMSUNG-1006, ¶¶[0007]-[0016]; SAMSUNG-1007, ¶[0130]. Additionally, as Dr. Traynor explains, the use of computer program modules to monitor and identify application packet flow on mobile devices was known as of the Critical Date. SAMSUNG-1003, ¶[50]. Kelz (a European patent application) corroborates Dr. Traynor’s explanation and describes a “controller module” that includes a “QoS packet processor,” which can “monitor the packet flow” of applications. SAMSUNG-1010, ¶[0036]; SAMSUNG-1003, ¶[50]. Additionally, the incorporation of Rao’s prioritization techniques would have been nothing more than the implementation of software in a system already designed to execute similar program modules. SAMSUNG-1005, ¶¶[0033]-[0036], [0074]; SAMSUNG-1007, ¶¶[0092] (a “software set-up”). As Dr. Traynor explains, “the decision to implement Rao’s prioritization techniques in Cole would have been an obvious design choice as a POSITA would have naturally experimented with additional known policies within the capability of Cole’s processing capability, such as those described in Rao.”

SAMSUNG-1003, ¶[50].

In an example of the combined system, illustrated below in Cole's Figure 2, Rao's packet capture mechanism and frame monitor would have been incorporated as program modules in the Cole-D'Amore device, such that they would monitor and identify data packets transmitted from the mobile device. SAMSUNG-1005, ¶¶[0034]-[0036], [0074]-[0097], FIG. 2; SAMSUNG-1006, ¶¶[0049]-[0060], FIG. 2; SAMSUNG-1007, ¶¶[0109], [0158]-[0159], [0176], [0180], [0185], [0191], FIG. 5A. In the combined Cole-D'Amore-Rao system, the packet capture mechanism and frame monitor would have aided the connection manager to classify and associate activities to applications, thus allowing the connection manager to reduce the impact of deferring and rescheduling activities on the mobile device and user. *Id.* Additionally, Rao's prioritization techniques would have been used to further enhance the policy management module of the Cole-D'Amore device to allow the connection manager to make more effective prioritization decisions by monitoring additional application characteristics, for example, whether the application is running in the foreground or background. *Id.* In doing so, the Cole-D'Amore-Rao device would have been able to more effectively use available network connections by preferentially scheduling higher priority application tasks during times of network availability (one of the main objectives of Cole). SAMSUNG-1005, ¶¶[0006]-[0011], [0074]-[0075]; SAMSUNG-1003, ¶[51].



SAMSUNG-1005, FIG. 2 (modified based on CDR combination).

6. Analysis

[1.pre]

To the extent the preamble is limiting, the Cole-D'Amore-Rao combination (hereinafter referred to as “**CDR**”) renders [1.pre] obvious. For example, Cole’s communication system 100 includes “a mobile device 110 interfacing with a plurality of communication networks 120, such as a wireless wide area network (WWAN).” SAMSUNG-1005, ¶[0031], FIGS. 1, 2 (reproduced below); SAMSUNG-1003, ¶[52].

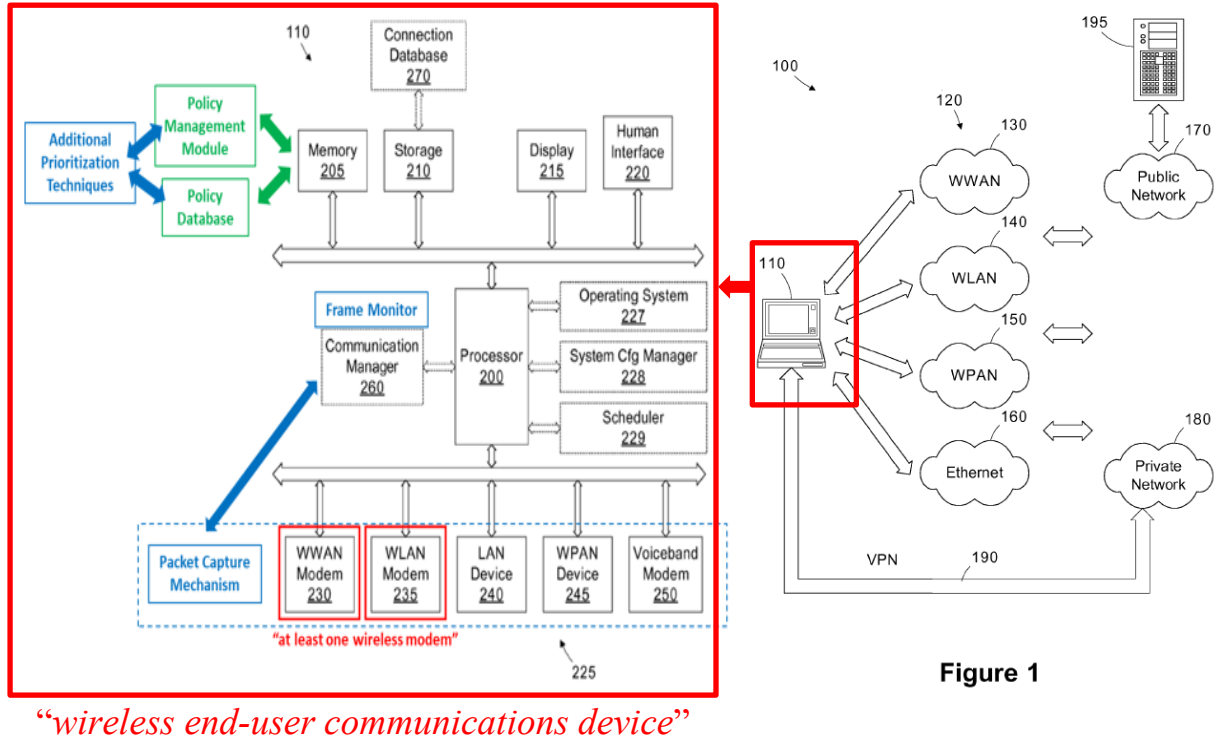


Figure 1

SAMSUNG-1005, FIG. 2 (left, modified based on CDR), FIG. 1 (right).

The “mobile device 110 may be ... a notebook computer, ... a personal data assistant (PDA), a mobile telephone, etc.” SAMSUNG-1005, ¶[0034]. Cole’s example implementations of the mobile device 110 are consistent with the examples of end-user devices described in the ’224 Patent, which include “smart phone devices, net book devices, tablet computing devices, and various other **wireless mobile computing devices.**” SAMSUNG-1001, 3:29-44; SAMSUNG-1003, ¶[53].

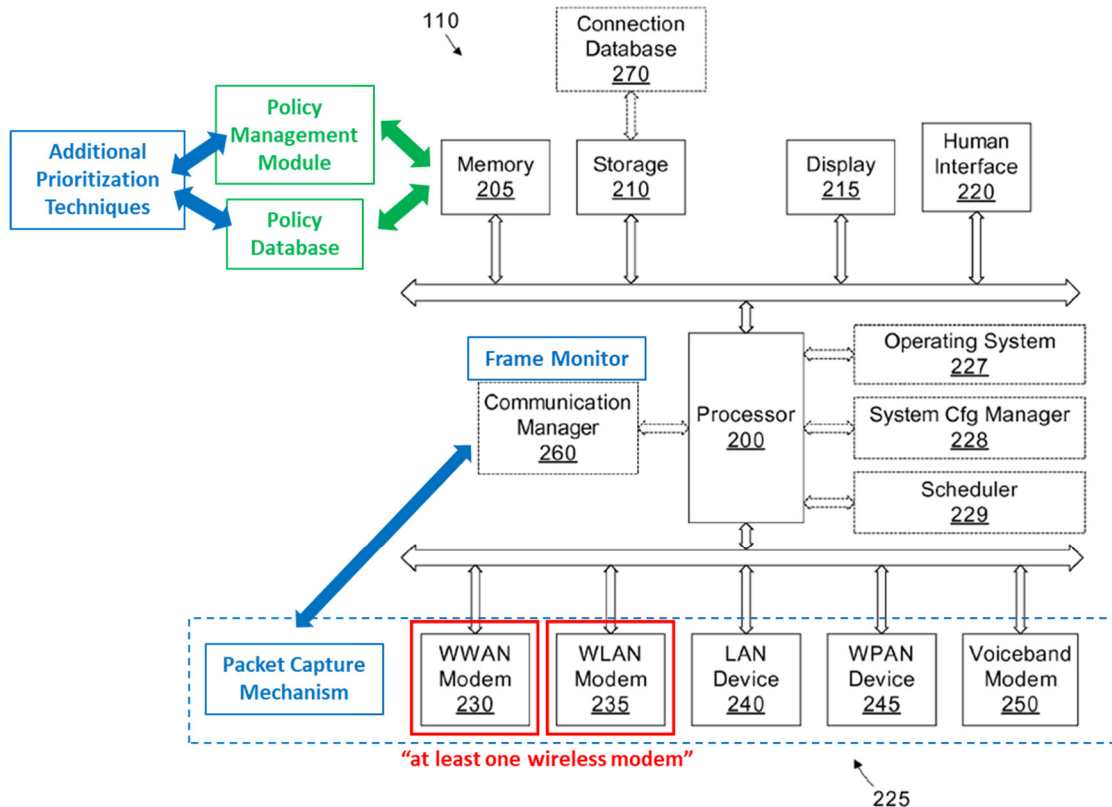
As Dr. Traynor explains, it would have been known or obvious to a POSITA

that Cole's mobile device 110 is a "wireless end-user communication device" because Cole's mobile device 110 can wirelessly communicate with other devices and can be used by an end-user. SAMSUNG-1003, ¶[54]. Indeed, Smith, a US patent application, corroborates this understanding and explains that an "end-user device," can be "a **wireless telephone station**, a wired telephone station, a **personal digital assistant**, and a laptop computer." SAMSUNG-1009, [0007]; SAMSUNG-1003, ¶[54].

As explained in more detail below, CDR also renders obvious the various features of the wireless end-user communications device claimed in the '224 patent's claims. SAMSUNG-1003, ¶[55].

[1.1]

As shown in Cole's FIG. 2 below, Cole's mobile device 110 includes "***at least one wireless modem***," such as a WWAN modem and a WLAN modem. SAMSUNG-1005, ¶[0035]. Cole describes these modems as "communication interfaces 225." *Id.*; SAMSUNG-1003, ¶[56].

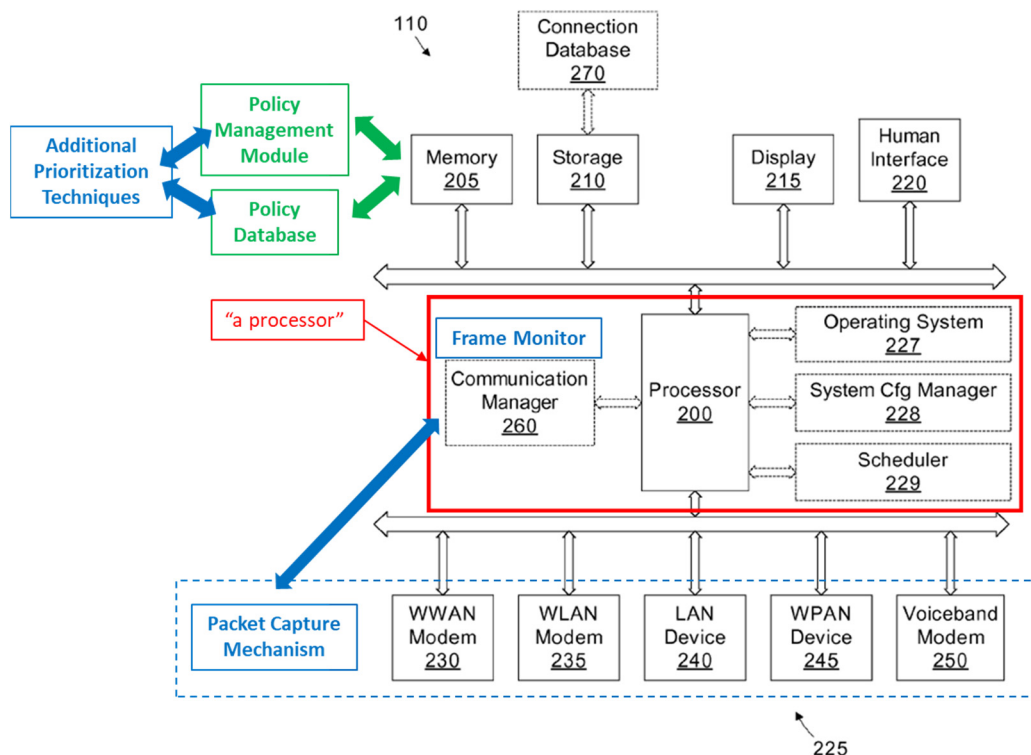


SAMSUNG-1005, FIG. 2 (modified based on CDR combination).

[1.2]

As shown in Cole’s FIG. 2 below, Cole’s mobile device 110 includes a “*processor*.” SAMSUNG-1005, ¶[0015], ¶[0034]-[0036], FIG. 2. Cole’s “processor is coupled to the communication interfaces and operable to implement a connection manager.” SAMSUNG-1005, ¶[0015]; SAMSUNG-1003, ¶[57]. Additionally, Cole describes that the processor executes “various software applications,” to include, for example, “user applications, an operating system 227, a system connection manager 228, a scheduler 229, device drivers, etc.” SAMSUNG-1005,

¶[0034]. Cole also describes its connection manager 260 as a “software application.” SAMSUNG-1005, ¶[0036]; SAMSUNG-1003, ¶[57]. Consistent with this explanation, Dr. Traynor has provided an annotated version of Cole’s FIG. 2 (shown below) in which the red box labelled “a processor” includes several components whose operations are implemented by the processor. SAMSUNG-1003, ¶[57]. Thus, the red box represents, at least in part, a functional equivalent of the processor because the processor executes the operations that are described with respect to these components. SAMSUNG-1003, ¶[57].



SAMSUNG-1005, FIG. 2 (modified based on CDR combination).

Moreover, as Dr. Traynor explains, a POSITA would have recognized or

found obvious that because Cole's processor is configured to implement the connection manager and execute "various software applications," Cole's processor would have been "*configured to*" perform the features [1.03]-[1.7] because these features are implemented by the processor, by itself or in combination with software applications, as described in more detail below. SAMSUNG-1005, ¶[0015], ¶¶[0034]-[0036], [0153], FIG. 2; SAMSUNG-1003, ¶[58].

[1.3]

The '224 patent defines a "*network service usage activity*" as "any activity by the device that includes wireless network communication." SAMSUNG-1001, 12:58-60. Examples of network service usage activities can be found in the specification of the '224 Patent. SAMSUNG-1001, 12:58-67, 13:1-21; SAMSUNG-1003, ¶[59].

Similarly, Cole describes "voice-over-IP (VOIP) session[s]," "surfing a website," "a file ... download," "accessing [a] remote server," and "synchronizing files or email." SAMSUNG-1005, ¶¶[0009], [0033], [0080], [0088]-[0089]. D'Amore and Rao also provide examples of network service usage activities, including "voice communication," "e-mail," "short message service (SMS)," "Internet webpage services," "VoIP calls," and a "TCP connection." SAMSUNG-1006, ¶¶[0029]-[0032], [0068]; SAMSUNG-1007, ¶¶[0003]-[0005], [0024]-[0035]; SAMSUNG-1003, ¶[60].

Cole describes examples of “*a plurality of applications⁴ on the wireless end-user device*” that execute network service usage activities, such as “video,” “audio,” “VOIP,” web browsing, “photo files,” gaming applications (“game performance”), and “email.” SAMSUNG-1005, ¶¶[0009], [0088]-[0091], [0103]-[0105]; SAMSUNG-1003, ¶[61]. Indeed, these examples are consistent with the “applications” described in the ’224 Patent. SAMSUNG-1001, 16:37-56 (“applications, such as streaming of video” and “browsing”). Finally, Cole also describes that the processor 200 executes “user applications.” SAMSUNG-1005, ¶[0034]; SAMSUNG-1003, ¶[61].

Cole’s connection manager 260 “*monitors the load on an active connection*” “to proactively prevent increased latency from an overloaded connection from impacting the performance of the running applications or the efficiency of the user. In general, the connection manager 260 interfaces with the operating system 227 or other applications to schedule various events to effectively use the available bandwidth without negatively impacting performance.” SAMSUNG-1005, ¶[0074]. Specifically, Cole teaches that:

During operation of the mobile device 110, the connection manager

⁴ Petitioner notes that only two applications are needed to satisfy the claim feature of “*each given application of a plurality of applications.*”

monitors the communication load being handled by the selected communication interfaces and compares the monitored load to the bandwidth associated with the connection ... to determine periods of high load. *High load may result from one or more applications facilitating significant data transfers using the selected connection.* SAMSUNG-1005, ¶[0073]; SAMSUNG-1003, ¶¶[62]-[63].

Dr. Traynor explains that a POSITA would have recognized or found obvious that “data transfers” associated with network communication loads are examples of network service usage activities as the data transfers are facilitated by Cole’s “communication interfaces,” or “modems,” which communicate this data over a wireless network, for example, a “WWAN” or “WLAN” (“wireless network communication”). SAMSUNG-1001, 12:58-60; SAMSUNG-1005, ¶¶[0014]-[0015], [0033]-[0037], [0073]-[0075]; SAMSUNG-1003, ¶[64]. Indeed, Cole provides examples of different network service usage activities associated with a given application, for example, a “file ... download” and a “synchronization,” where the connection manager identifies the network service usage activities while “monitoring the load on an active connection” (“*monitor a network service usage activity of the wireless end-user communications device associated with the given application*”). SAMSUNG-1005, ¶¶[0074]-[0075], [0088]-[0089]; SAMSUNG-1003, ¶[64].

Additionally, Rao describes a “packet capture mechanism” that “intercept[s] ... network traffic ... such as **network packets associated with [an] application**” and a “frame monitor” that “identifies an application ... that generated the packet.” SAMSUNG-1007, ¶¶[0109], ¶¶[0158]-[0159], ¶¶[0176], ¶¶[0180], ¶¶[0185], ¶¶[0191], FIG. 5A; §III.A.4. Rao also describes performing this process for “all outbound packets of the client” (“*each given application of a plurality of applications on the wireless end-user device*”). SAMSUNG-1005, ¶¶[0105]. Dr. Traynor explains that the network packets are indicators of “*a network service usage activity ... associated with the given application*” because there would not be any network packet if there were no network service usage activity. SAMSUNG-1003, ¶¶[65]. Rao’s network traffic is described as including, for example, “real-time data,” for example, “RTP [Real Time Protocol] over UDP [User Datagram Protocol] via a TCP/IP [Transport Control Protocol/Internet Protocol] session” (all examples of “packet level” network traffic). SAMSUNG-1007, ¶¶[0153], ¶¶[0184], ¶¶[0198]; SAMSUNG-1003, ¶¶[65].

As Dr. Traynor explains, a POSITA would have recognized that the packet level monitoring of Rao would enhance the ability of CDR’s connection manager to appropriately determine activity/application relationships, thus enabling the connection manager to make more effective classification decisions. SAMSUNG-1003, ¶¶[66]; *see supra* §III.A.5. For example, for an application that is associated

with both “background” and “foreground” activities (e.g., a VoIP application that makes calls and also has recurring background updates), Rao’s packet level monitoring would differentiate how the application was being used, for example, in the foreground (e.g., a call) or background (e.g., an update). SAMSUNG-1003, ¶[66]. Additionally, Rao’s packet level monitoring would have also been used to determine that packets associated with a “file for download” are lossless (e.g., TCP/IP) and, therefore, could be deferred temporarily with less impact to the user. SAMSUNG-1005, ¶[0088]; SAMSUNG-1007, ¶[0082]; SAMSUNG-1003, ¶[66].

Moreover, Dr. Traynor explains that a POSITA would have recognized or found obvious that the ability of the packet capture mechanism to determine the protocol associated with network packets would further enhance the ability of the CDR connection manager to effectively prioritize applications’ network service usage activities, considering which protocols are “lossless” (e.g., TCP) and which are “lossy” (e.g., RTP over UDP). SAMSUNG-1007, ¶¶[0003], [0192]; SAMSUNG-1003, ¶[67]; *see supra* §III.A.5.

[1.4]

The ’224 patent provides examples of “differential network service usage control” including “implementation of a network service usage activity policy (e.g., **block/allow**; traffic control techniques, such as throttle, **delay**, **priority queue**, **time window**, **suspend**, quarantine, kill, remove, and other well known

traffic control techniques).” SAMSUNG-1001, 13:26-42. Additionally, the ’224 patent describes “*differential network access control*” as “implementing different traffic controls for all or some of the network service usage activities (e.g., based on a network busy state or another criteria/measure)” (e.g., implementing differential network service usage controls). SAMSUNG-1001, 64:25-29; SAMSUNG-1003, ¶[68].

The ’224 patent also describes a “*service usage control policy*” as being “used for assisting in network access control of network service usage activities (e.g., deferring some or all of the network capacity demand from these source activities).” SAMSUNG-1001, 12:20-23. Moreover, the ’224 patent describes that service usage control policies are used to “differentially control network services traffic based on a network busy state for an activity, a group of activities, or for a service class” (e.g., implementing differential network access control and/or differential network service usage control). *Id.*, 12:43-47; SAMSUNG-1003, ¶[69].

Consistent with the examples and descriptions provided in the ’224 patent, as noted above, CDR renders obvious [1.4] for at least the reasons noted below. The mapping of the various features of [1.4] are discussed in detail below. SAMSUNG-1003, ¶[70].

“classify, as a first classification for each given one of the network service usage activities, a classification based on the application associated with the given network service usage activity”

Cole describes that certain tasks, activities, and applications may be “**classified**” as background. SAMSUNG-1005, ¶¶[0009], [0080], [0085]; SAMSUNG-1003, ¶[71]. This background classification is consistent with the ’224 patent, which describes that a network service usage activity can be “classified, associated with, and/or assigned to a background class ... to facilitate differential network service usage control to protect network capacity.” SAMSUNG-1001, 13:22-26; 64:21-25. A POSITA would have recognized or found obvious that a classification is made for “*each given one of the network service usage activities*” because to effectively manage network communications, each network service usage activity must be classified and managed, and not doing so would result in potentially overlooking a network service usage activity that could damage or otherwise consume significant network resources. SAMSUNG-1003, ¶[71]. This is explained by Cole, which describes that “some applications [and activities] require large amounts of bandwidth to operate efficiently.” SAMSUNG-1005, ¶[0008]. Indeed, Cole’s disclosure of its “communication load” including activities from “**one or more applications** facilitating significant data transfers” is consistent with the notion that the classification would have been performed “*for each given one of the network service usage activities*.” SAMSUNG-1003, ¶[71]. SAMSUNG-1005,

¶[0073]. Moreover, in differentiating “background” activities from non-background activities, the connection manager “*classifies*” all (“*each*”) of the activities in the communication load as those applications not classified as “background” would be assigned some other designation (e.g., “not background”). SAMSUNG-1005, ¶[0073]; SAMSUNG-1003, ¶[71]. Separately, Rao describes that the “packet capture mechanism” intercepts “any network traffic” (packets associated with “*each given one of the network service usage activities*”) transmitted by the end-user device. SAMSUNG-1007, ¶¶[0101], [0104], [0110]; SAMSUNG-1003, ¶[71].

Rao’s “frame monitor” also “identifies an application 338 that generated the packet” (“*a classification based on the application associated with the given network service usage activity*”). SAMSUNG-1007, ¶[0104], ¶¶[0108]-[0110]. Similarly, D’Amore describes a “system policy manager” (also referred to as the “policy management module”) that can “**delineate services** (“*classify ... a classification based on the application associated with the given network service usage activity*”) into clear priority and/or privilege levels and allow **policy decisions** to be described around such priority levels (“*service usage control policies*”).” SAMSUNG-1006, ¶¶[0036], [0050]-[0052]; SAMSUNG-1003, ¶[72].

In CDR, the packet capture mechanism and frame monitor would classify activities, **based on their application**, to associate the activity and application

with service usage control policies defined in the policy management module. *Id.*, SAMSUNG-1007, ¶¶[0104], [0108]-[0110]; SAMSUNG-1003, ¶[73]; *see infra* §III.A.5, [1.5].

Additionally, the ability of the packet capture mechanism to determine an activity's transmission protocol would have been used to further "classify" the "classification" of the network service usage activity ("classify ... a classification"). SAMSUNG-1007, ¶¶[0003], [0192]; *see supra* §III.A.5, [1.3]. For example, an activity assigned to a "not-a-background" "**classification**" (e.g., audio or video) would be further "**classified**" as a "lossy" activity if the associated transmission protocol is determined to be RTP over UDP. *Id.* As Dr. Traynor explains, by further classifying the activities in this way, the connection manager can evaluate additional relevant context that would be used to more effectively defer activities (e.g., activity UDP packets that are deferred are not able to be recovered). *Id.*; SAMSUNG-1003, ¶¶[74]-[75].

"allows for a differential network access control, wherein the differential network access control comprises a set of service usage control policies applicable when a network service is available via the at least one wireless modem"

Cole describes that "certain background tasks" ("**network service usage activities**") can be "postponed automatically" ("**allows for a differential network access control**"). SAMSUNG-1005, ¶[0085]. This action is consistent with the '224

patent, which gives examples of differential network service usage control (the implementation of *differential network access control*) including actions to “delay” and/or “time window” a network service usage activity. SAMSUNG-1001, 13:26-42. Moreover, as described in [1.3] above, Cole “monitors” these activities prior to determining deferral is required. SAMSUNG-1005, ¶¶[0073]-[0075], [0085], [0088]-[0089]; *see* [1.3], *supra*. The ’224 patent additionally describes “monitoring network service usage activity” as another example of differential network service usage control (“*allows for a differential network access control*”). SAMSUNG-1001, 13:26-42; SAMSUNG-1003, ¶[76].

D’Amore and Rao provide additional examples of differential network access control consistent with the ’224 patent. SAMSUNG-1001, 13:26-42; SAMSUNG-1006, ¶¶[0051]-[0052], [0056], [0060]; SAMSUNG-1007, ¶¶[0102], [0182]-[0195]. For example, D’Amore describes that the “policy management module” can “**approve or deny access** (“*differential network access control*” and “*a set of service usage control policies*”) to a **mobile device resource** and/or **mobile network resource** for a mobile application,” which is provided through a “communication interface” (e.g., a modem) in the CDR device (“*applicable when a network service is available via the at least one wireless modem*”). SAMSUNG-1006, ¶[0051]; *see supra* [1.1]; *see infra* [1.5]. Approving or denying access is “based at least in part on a priority level or a privilege code **associated with**

the mobile application” (the “*service usage control policy*” being associated with the “*network service usage activity*,” and based on the “*first classification [of the network service usage activity]*,” which is further “*based on the application.*”).

SAMSUNG-1006, ¶[0051]; *see infra* [1.5]. In CDR, Cole’s connection manager would also effectuate these examples of differential network access control. SAMSUNG-1006, ¶¶[0051]-[0052], [0056], [0060]; SAMSUNG-1007, ¶¶[0102], [0182]-[0195]; SAMSUNG-1003, ¶[77].

As described above, Cole’s connection manager “determines if one or more actions that are consuming bandwidth [and] should be postponed.” SAMSUNG-1005, ¶¶[0080], [0085]-[0086]. Additionally, Cole’s connection manager “may change the configuration of the communication functions in direct response to the power state of the mobile device.” *Id.*, ¶[0090]. Indeed, Cole describes that “[if] the action can be postponed ... the connection manager 260 **cancels the action and schedules a deferred action**” (“*differential network access control*” and “*a set of service usage control policies*”). *Id.*, ¶[0086]; SAMSUNG-1003, ¶[78].

With respect to the set of service usage control policies (the “*service usage control policies*” comprise “*a set of service usage control policies applicable when a network service is available via the at least one wireless modem*”), CDR discloses various examples. For instance, Rao discloses that a communication can be prioritized when an application is running in the foreground (a “*first policy*”) and queued

when running in the background and not a priority (a “*second policy*”). SAMSUNG-1007, ¶¶[0182]-[0183]. This same prioritization technique and set of policies are applicable when considering packet transmission protocol (e.g., UDP versus TCP). SAMSUNG-1007, ¶[0184]; SAMSUNG-1003, ¶[79]. In Cole, when “the monitored load exceeds a predetermined threshold . . . , the connection manager 260 may take one of several actions to manage the load.” SAMSUNG-1005, ¶¶[0074], [0080], [0085]-[0086]; SAMSUNG-1003, ¶[78]. These actions, such as blocking, throttling, or withholding transmission, are reflective of different deferral policies (at least a “*second policy*”). SAMSUNG-1005, ¶[0125]; SAMSUNG-1003, ¶[78].

“a first policy that allows the given network service usage activity to currently communicate data with a network destination via the at least one wireless modem, and a second policy that defers data communication”

As a preliminary matter, CDR discloses this feature because CDR discloses various policies corresponding to this claimed feature as described above. SAMSUNG-1003, ¶[79]. Moreover, in describing one example of multiple policies, Dr. Traynor explains that a POSITA would have recognized or found obvious that the “determin[ation] if one or more actions that are consuming bandwidth,” made by the connection manager, would be “*at least*” a “*first policy that allows [communication]*” and a “*second policy that defers data communication*” because the communication manager defers or reschedules communication when bandwidth is a

concern, and allows communication otherwise (“effectively use the available bandwidth”). SAMSUNG-1005, ¶¶[0074], [0080], [0085]-[0086]; SAMSUNG-1003, ¶[79]. Indeed, Cole describes that, when “the monitored load exceeds a predetermined threshold ..., the connection manager 260 may take one of several actions to manage the load” (at least a “*second policy*”). *Id.* As noted above, the CDR system also includes examples of a “*second policy that defers data communication*” through policy actions such as blocking, throttling, or withholding transmission. SAMSUNG-1005, ¶[0125]; SAMSUNG-1007, ¶[0195]; SAMSUNG-1003, ¶[79].

Together, these two “*service usage control policies*” comprise “*a set of service usage control policies applicable when a network service is available via the at least one wireless modem.*” *Id.* Additionally in Cole, these “*service usage control policies*” can also be implemented by Cole’s connection manager in response to changes in device “power state.” SAMSUNG-1003, ¶¶[0090]-[0100]; SAMSUNG-1003, ¶[80]. For example, Cole describes an example where an activity begins while a user is traveling on a WLAN. SAMSUNG-1005, ¶[0089] (“a scheduled synchronization starts while the user is traveling”). The connection manager 260 notices the battery consumption from the synchronization during the user’s travels and defers the activity (a “*second policy that defers data communication*”). *Id.* When the user later connects to a LAN, the connection manager 260 then rei-

initiates the synchronization (a “*first policy that allows [communication]*”). SAMSUNG-1005, ¶[0089]; SAMSUNG-1003, ¶[80].

“until a device state change occurs”

Cole describes that “**power state**” (a “*device state*”) can be used to “change the configuration of the communication functions.” SAMSUNG-1005, ¶¶[0087]-[0100]. The ’224 patent acknowledges that a “change in device **power state**” is a “*device state change*.” SAMSUNG-1001, Claim 6. Cole describes that, once an activity is deferred, the connection manager “may reinitiate the action on its own by interfacing with the scheduler 229” (returning to a “*first policy that allows [communication]*”). SAMSUNG-1005, ¶[0087]. Determination to reinitiate the action (“*data communication associated with the given network service usage activity*”) can include “determining if **sufficient battery power** (“*a device state change*”) is present to complete the transaction.” *Id.* The operation of rescinding “*a second policy that defers data communication*” and restoring a “*first policy that allows [communication]*” in response to “*a device state change*” (e.g., a change in power state) is consistent with the examples described in Cole. *Id.*, ¶¶[0088]-[0092]; SAMSUNG-1003, ¶[81].

Moreover, as Dr. Traynor explains, a POSITA would have understood or found obvious that many other features described in Cole, D’Amore, and Rao asso-

ciated with “*service usage control policies*” would be “*device states*” as these features are associated with a “state” of the mobile device. SAMSUNG-1005, ¶¶[0075]-[0100] (describing, among other things, channel “queue[s],” device “thermal conditions,” processor “performance,” device “quietness,” battery “alarms,” whether the device 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”); SAMSUNG-1006, ¶¶[0031]-[0033] (describing, among other things, “arbitrat[ing] access to network and/or device resources”), SAMSUNG-1007, ¶[0182] (describing, among other things, “whether an application is running in the foreground or the background”); SAMSUNG-1003, ¶[82]. For example, the transition of an application from a background to a foreground state (“*a device state change*”) would have been used to rescind the “*second policy that defers data communication*” and implement the “*first policy that allows [communication]*.” SAMSUNG-1007, ¶[0182]. Additionally, the transition of a transmission protocol from one form to another, for example, a VoIP application concluding a voice call using UDP (“*a device state change*”) would also have been used in CDR to replace the “*second policy*” with the “*first*.” SAMSUNG-1007, ¶[0184]. Dr. Traynor further explains that “given that ‘*device state*’ would have been interpreted broadly by a POSITA, there are many possible scenarios where a POSITA would have config-

ured the Cole-D’Amore-Rao device to implement one or more service usage control policies in response to a ‘*change*’ in one or more of these *device states*.” *Id.*; SAMSUNG-1003, ¶[82].

[1.5]

As discussed above with respect to feature [1.4], in CDR’s mobile device, the packet capture mechanism and frame monitor would classify network service usage activities, based on their application, and “*associate each given one of the network service usage activities with a service usage control policy*” defined in the policy management module. SAMSUNG-1007, ¶¶[0104], [0108]-[0110]; SAMSUNG-1003, ¶[83]; *see supra* §III.A.5, [1.4]. The CDR connection manager would then effectuate differential network access control according to the selected service usage control policy. SAMSUNG-1005, ¶¶[0073]-[0075], [0085], [0088]-[0089]; SAMSUNG-1003, ¶¶[83]-[84]; *see supra* §III.A.5, [1.4].

As described above, the CDR connection manager applies and rescinds service usage control policies in response to “device state changes” (“*dynamically*”). SAMSUNG-1005, ¶¶[0085]-[0100]; SAMSUNG-1006, ¶¶[0031]-[0033]; SAMSUNG-1007, ¶[0182]; SAMSUNG-1003, ¶[85]. This is consistent with the ’224 patent, which describes *dynamical selection* based on device states. SAMSUNG-1001, 77:50-53, 86:65-67, 87:1-9; 98:33-44, 99:3-14. A POSITA would have rec-

ognized or found obvious that CDR's connection manager would have “*dynamically [selected]*” these service usage control policies “*based on*” both the network service usage activity “*classification*” and “*at least one device state*” consistent with the examples described in Cole, D'Amore, and Rao. SAMSUNG-1005, ¶¶[0088]-[0100], ¶¶[0119]-[0127], FIG. 6A, FIG. 6B, FIG. 7, FIG. 9; SAMSUNG-1006, ¶[0069], ¶[0087] (describing “*dynamic* priority”); SAMSUNG-1003, ¶[85].

For example, Cole describes:

In one example, the user is surfing a web site and selects a file for download [(a “*network service usage activity*”)]. ... The user is in a public place and the lengthy transfer is conducted using the WWAN modem 230 (e.g., a 3G channel), which consumes significant battery power. The connection manager 260 identifies the **load on the WWAN modem 230** [(“*at least one device state*”)] and asks the user to **find a better connection** [(“*a service usage control policy dynamically selected from the set of service usage control policies*” that defers communication)]. ... When the user returns home, **connects the mobile device 110 to a power source** [(“*at least one device state*”)], and the communication manager 260 connects **using the WLAN modem 235** (e.g., a Wi-Fi connection) [(also “*at least one device state*”)], the connection manager 260 reminds the user to **download the file** [(“*a service usage*

control policy dynamically selected from the set of service usage control policies” that allows communication)]. The connection manager 260 may **provide the address for the file and even open the browser**, or the user may manually open the browser and use the browser history data to find the link to the file. SAMSUNG-1005, ¶[0088]; SAMSUNG-1003, ¶[86].

As described above, the “classification” of the network service usage activity would also be used by CDR’s connection manager in implementing policy decisions. SAMSUNG-1005, ¶¶[0009], [0080], [0085]; SAMSUNG-1006, ¶¶[0036], [0050]-[0052]; SAMSUNG-1007, ¶¶[0104], [0108]-[0110]; SAMSUNG-1003, ¶[87]; see *supra* §III.A.5, [1.3].

[1.6]

In the examples of differential network access control discussed above, the CDR connection manager defers communication in response to certain device states, and allows communication in others through a wireless modem (“*manage network data access via the at least one wireless modem*”). SAMSUNG-1005, ¶¶[0074]-[0100]; SAMSUNG-1003, ¶[88]; see *supra* [1.1], [1.4], [1.5]. Deferring communication is one example of managing network data access. SAMSUNG-1003, ¶[88]. Moreover, the CDR connection manager would have managed the access for “*each of the plurality of applications*” as the CDR mobile device monitors

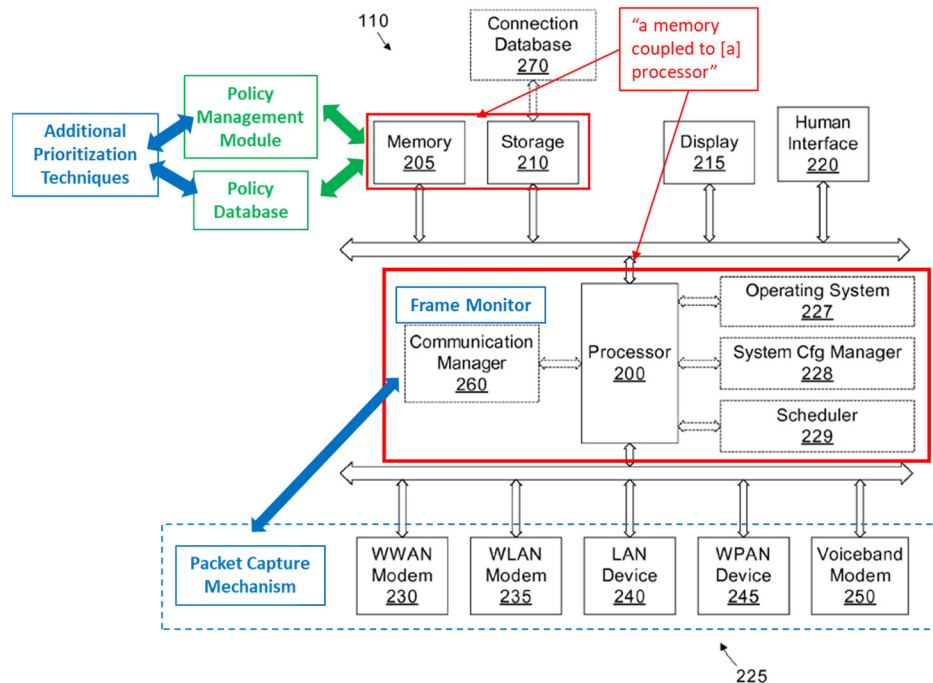
“each given application of a plurality of applications.” SAMSUNG-1003, ¶[88]; *see* [1.3], *supra*. A POSITA would have recognized and found obvious that this *“network data access”* would be *“according to the dynamically selected service usage control policy”* as the CDR connection manager *“manage[s] network data access”* according to these policies. SAMSUNG-1003, ¶[88]; *see supra* [1.4].

D’Amore also describes that the policy management module can control access to “device resources,” which in the CDR system includes *“at least one wireless modem.”* SAMSUNG-1005, ¶[0035], FIG. 2; SAMSUNG-1006, ¶¶[0032]-[0033]. The CDR mobile device would thus be capable of *“manag[ing] network data access”* via the *“at least one wireless modem.”* SAMSUNG-1006, ¶¶[0032]-[0033]; SAMSUNG-1003, ¶[89].

[1.7]

Cole’s mobile device includes a “memory 205 and/or storage device 210 [that] typically store various software applications for execution by the processor 200, such as user applications, an operating system 227, a system connection manager 228, a scheduler 229, device drivers,” and connection manager 260. SAMSUNG-1005, ¶[0033]-[0036], FIG. 2. Accordingly, it would have been obvious to a POSITA that CDR’s memory and storage device are *“configured to provide the processor with instructions.”* SAMSUNG-1003, ¶[90]. As depicted in Cole’s modified FIG. 2 below, the *“memory”* in CDR’s mobile device is also *“coupled to*

the processor.” SAMSUNG-1005, ¶[0033]-[0036]; SAMSUNG-1003, ¶[90].



SAMSUNG-1005, FIG. 2 (modified based on CDR combination).

[2]

Rao describes that “network packets may be further prioritized by **the characteristic of the application ... generating them.**” SAMSUNG-1007, ¶[0193]-[0195]; SAMSUNG-1003, ¶[91]. For example, Rao describes that its remote access client can “recognize **a high number of retransmits to a particular destination** (*“application behavior”*) and, in response, “**throttle back or not communicate network packets**” (a “*dynamically selected service usage control policy for [the] given network service usage activity*” that is “*further selected based on application behavior*”). SAMSUNG-1001, 103:6-33 (“frequent transmission”);

SAMSUNG-1007, ¶[0195]; *see supra* [1.4], [1.5]. Moreover, Rao describes additional “***application behaviors***” to include “a foreground application, the size of the network packet, or the time the network packet was intercepted.” *Id.*, ¶[0193]; SAMSUNG-1003, ¶[91].

As Dr. Traynor explains, a POSITA would have also considered “***application behavior***” to include other application characteristics described in CDR. SAMSUNG-1003, ¶[92]. For example, Cole describes that the connection manager can “[identify] load on the WWAN modem 230” caused by large activities such as a “file for download” that causes a “lengthy transfer” (an “***application behavior***”). SAMSUNG-1005, ¶[0088]. In response to identifying the lengthy transfer, the connection manager “asks the user to find a better connection,” and ultimately defers the activity until “the user returns home [and] the communication manager 260 connects using the WLAN modem” (all collectively a “***dynamically selected service usage control policy for a given network service usage activity... further selected based on an application behavior ... associated with that network service usage activity***”). *Id.* Cole provides an additional example of the communication manager noticing specific application “***behavior***.” *Id.*, ¶[0089]; SAMSUNG-1003, ¶[92]. Additionally, Cole describes that the connection manager 260 “monitors the user's **connection behaviors** to identify patterns and at-

tempt to automate ... configuration changes.” SAMSUNG-1005, ¶[0047]; SAMSUNG-1003, ¶[92].

Moreover, Dr. Traynor explains that Rao’s ability to monitor packet-level traffic would have been used to monitor and respond to intra-**application behavior**. SAMSUNG-1003, ¶[93]. For example, Rao describes that its techniques can be used in “multimedia elements” such as “gaming.” SAMSUNG-1007, ¶[0140]. Dr. Traynor explains that a POSITA would have recognized or found obvious that, when using the CDR device for an “interactive user session,” such as “gaming,” the connection manager 260 would have responded to intra-**application behaviors**, for example, prioritizing the transmission of application UDP packets (e.g., movement commands) over TCP packets (e.g., chat). SAMSUNG-1007, ¶[0140]; SAMSUNG-1003, ¶¶[93]-[94].

[3]

Rao describes “**foreground applications**” that are “**in active use** by the user” (applications that are in the “*foreground of user interaction*”). SAMSUNG-1007, ¶[0003]. Rao describes “**prioritization** based on whether an application is running in the *foreground* or the background” (a “*dynamically selected service usage control policy*”). *Id.*, ¶¶[0182], [0188]-[0189]; *see supra* [1.4], [1.5]. As described above, Rao’s prioritization would be used to “*further*” consider the impact to the mobile device user, for example, “*whether the application associated with*

that network service usage activity is currently in the foreground of user interaction.” *Id.*; *see supra* §III.A.5. A POSITA would have recognized or found obvious that the “foreground applications” of Rao would be “*associated with*” corresponding “*network service usage activities*” because Rao describes such activities, for example, “VoIP telephone calls,” “chat,” and “video.” *Id.*, ¶¶[0133]-[0135], [0140]-[0141], [0198], [0210]; SAMSUNG-1003, ¶[95].

[4]

Cole describes that the connection manager can “*block*” updates (“*data communication associated with the network service usage activity*”) that do not meet “defined prerequisites.” SAMSUNG-1005, ¶[0125]. Moreover, Cole describes that additional conditions can require an activity to be blocked (“the task should be blocked unless the mobile device 110 is connected to external AC power”). SAMSUNG-1005, ¶[0119]. This “*third policy*” would have been in addition to the “*first*” and “*second*” policies described above as Cole’s consideration of power state conditions is in addition to its consideration of connectivity states. SAMSUNG-1005, ¶[0119]; *see supra* [1.4], [1.5]. For example, an activity scheduled with a required “connectivity state” may be later blocked due to a power state. *Id.* Moreover, a POSITA would have recognized or found obvious that blocking updates that do not meet defined prerequisites would be at least “*a third policy*” included in the “*set of service usage control policies*” as this mode of operation is

different than the operation of deferring activities described above in [1.4]. *Id.*;
SAMSUNG-1003, ¶[96]; *see supra* [1.4], [1.5].

In combining Cole with D’Amore, a POSITA would have also recognized that, when applications request access to a “mobile network resource” the “priority level” of the application can be used to “[deny] access to the resource” (“**block**” access). SAMSUNG-1006, ¶¶[0051]-[0052]. As described above, D’Amore’s “priority levels” are stored in a “policy database” (“*a third policy*” included in the “*set of service usage control policies*”). *Id.*, ¶¶[0050]-[0051]; SAMSUNG-1003, ¶[97]; *see supra* [1.4].

Moreover, the act of blocking data communication was well known in the art. SAMSUNG-1003, ¶[98]. Indeed, Freund, a US patent directed to “monitoring access to an open network,” describes a system that “is able to selectively **block** access, as dictated by the configurable rules.” SAMSUNG-1008, Abstract, 19:44-60; SAMSUNG-1003, ¶[98].

[5]

Rao describes a “packet capture mechanism” that can intercept “network packets” and perform various actions. SAMSUNG-1007, ¶[0104]. As Dr. Traynor explains, a POSITA would have recognized or found obvious that “network packets” (e.g., “RTP over UDP via a TCP/IP”) are transmitted using a “**messaging layer**” of the transmitting device. SAMSUNG-1007, ¶[0153], ¶[0184], ¶[0198];

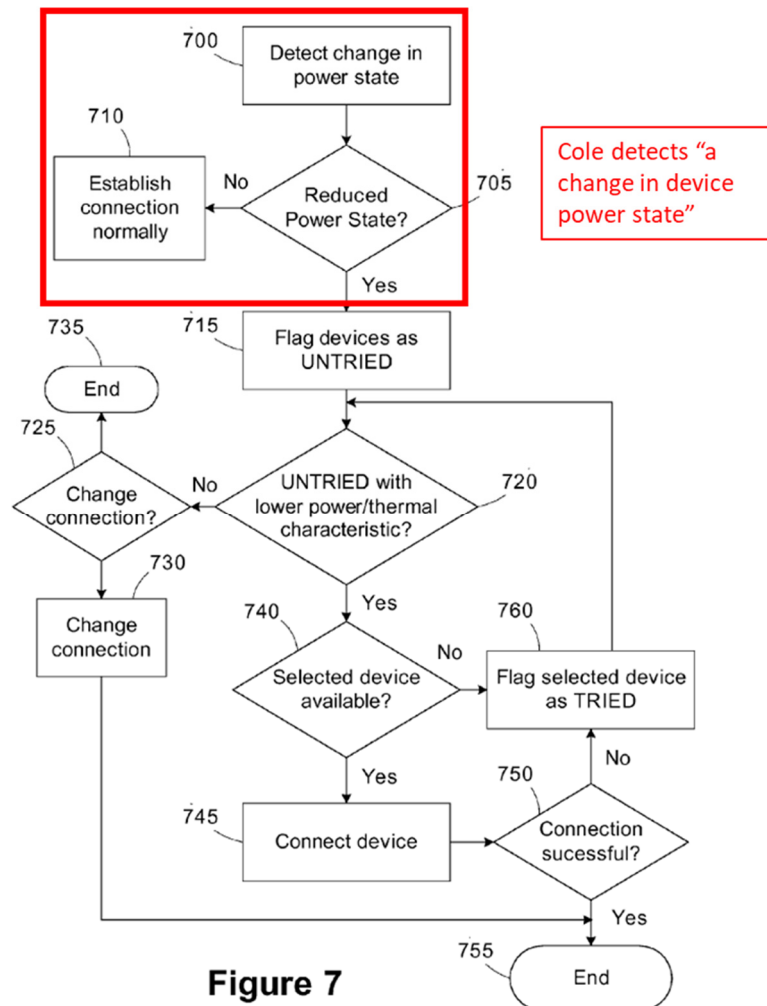
SAMSUNG-1003, ¶[99]. Therefore, network packet transmissions are indicative of “*messaging layer behavior*.” *Id.* Indeed, this understanding in the art is reinforced by McAllister, a U.S. Patent that describes “TCP” and “UDP” as “[Open Systems Interconnection (OSI)] layer 4 protocols,” that form a “**message layer** network (“*[the] messaging layer*”).” SAMSUNG-1012, Cover, 1:61-67, 2:1-26; SAMSUNG-1003, ¶[99]; *see supra* [1.4], [1.5].

As described in [2] above, the Cole-D’Amore-Rao end-user device selects service usage control policies in response to “*application behavior*,” which includes the behavior of the application “*messaging layer*.” SAMSUNG-1005, ¶¶[0088]-[0089]; SAMSUNG-1007, ¶[0104], ¶¶[0193]-[0195]; SAMSUNG-1003, ¶[100]; *see supra* [2].

[6]

Cole describes that the “connection manager 260 may change the configuration of the communication functions in direct response to the power state of the mobile device” (“*a change in device power state*” that rescinds “*the second policy that defers data communication associated with the given network service usage activity*”). SAMSUNG-1005, ¶¶[0087]-[0098], FIG. 7; SAMSUNG-1003, ¶[101]; *see supra* [1.4], [1.5]. For example, Cole describes that in reacting to device power state, “if 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-1005, ¶[0098]. As Dr. Traynor explains, a POSITA would have recognized or found obvious that, in one example, this increased power state would result in allowing previously deferred “*data communication associated with the given network service usage activity*” because Cole provides an example of one such operation (“download the web file”). SAMSUNG-1005, ¶[0088]; SAMSUNG-1003, ¶[101]. Cole’s Figure 7 is reproduced and annotated below.



Moreover, Cole describes that “the user may specify when scheduling a task, that the task **should be blocked unless the mobile device 110 is connected to external AC power**” and that the connection manager “may be configured to block ... updates unless the defined prerequisites are met (e.g., rich connectivity is available, **sufficient battery life is available, the battery is charged and the line power is provided**, etc.” *Id.*, ¶¶[0119], [0125]; SAMSUNG-1003, ¶[102].

[7]

As an initial matter, the '224 Patent describes “power save state” in various contexts, an example of which is provided below. SAMSUNG-1001, 7:47-62.

Another example of device service activity behavior that can have an impact on network performance is the way the **device, device subsystem, and/or modem subsystem power cycling or transitions from one power save state to another**. ... If a device terminates the connection to the base station when **the modem subsystem (e.g., or some other portion of the device)** goes from **active connection state to a power save state**, then each time the device enters power save state and then exits power save state network resources are consumed, sometimes for time periods measured on the order of seconds or in extreme cases even minutes. *Id.*; SAMSUNG-1003, ¶[103].

Cole describes that end-user devices can “be placed into a particular system configuration to emphasize particular performance characteristics” to include “modes” that emphasize “battery life” (“*power save state*”). SAMSUNG-1005, ¶[0091]; SAMSUNG-1003, ¶[104].

Additionally, Cole describes that the “power state” of the mobile device can be used to “change the configuration of the communication functions.” SAMSUNG-1005, ¶[0090]. Cole also describes that “power ... characteristics” (“*power save state*”) can be determined for individual “communication interfaces (“*modem[s]*”).” *Id.*, ¶[0092]-[0097]. Cole describes that a “communication interface” can include a “*modem*.” *Id.*, ¶[0035]; SAMSUNG-1003, ¶[105].

As Dr. Traynor explains, a POSITA would have recognized or found obvious that a “*modem power save state*” removes a “*second policy that defers data communication associated with the given network service usage activity*” as the communication manager “includes the power state information in its evaluation of the appropriate communication interface.” SAMSUNG-1005, ¶[0092]-[0097]; SAMSUNG-1003, ¶[106]; *see supra* [1.4], [1.5], [6]. Cole’s Figure 7 is reproduced and annotated below.

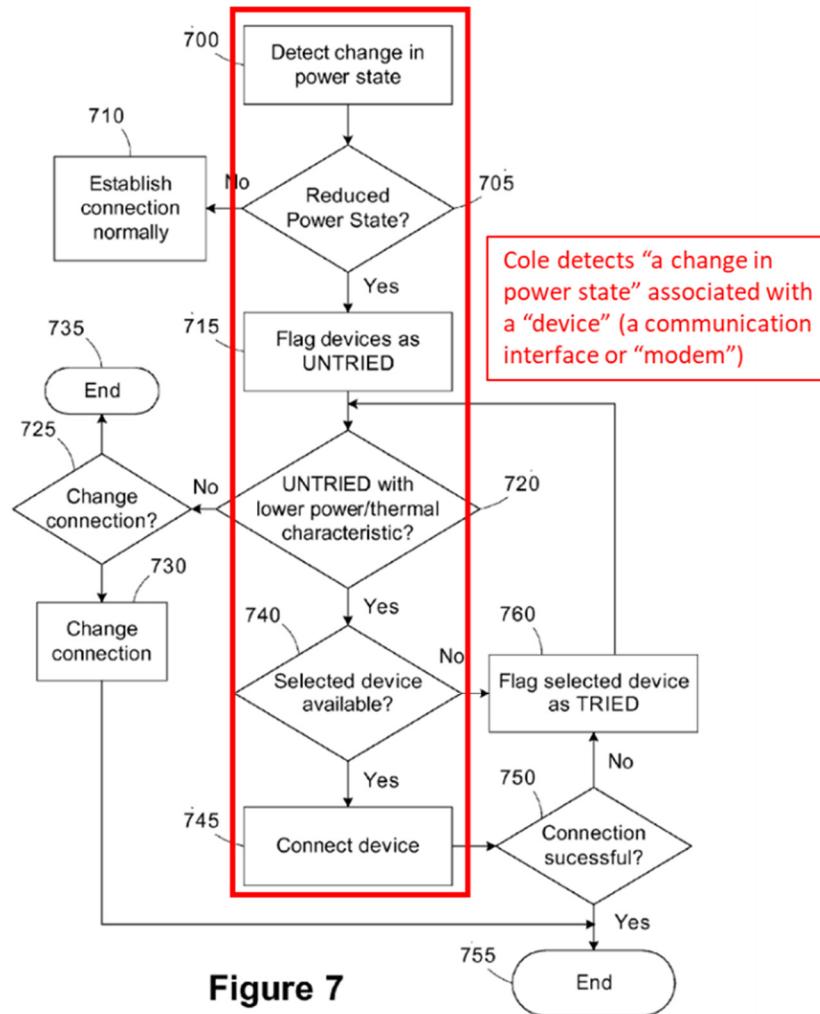


Figure 7

SAMSUNG-1005, FIG. 7.

Moreover, a POSITA would have recognized or found obvious that a device or modem power save state is *"triggered"* by activities other than *"the given network service usage activity"* as Cole describes many such cases where a change in power state is triggered independent of *"activities"* (e.g., whether the device is connected to an external power supply). SAMSUNG-1005, ¶[0090]; SAMSUNG-1003, ¶[107].

[8]

Cole describes that tasks that are unsuitable for the WWAN can be deferred until another more suitable network is available (e.g., the WLAN) (“*the device state change comprises a change to a network connection state*”). SAMSUNG-1005, ¶[0088]; *see supra* [2]. The connection manager connecting to the WLAN in this example “*is not triggered by the given network service usage activity,*” but rather when “the user returns home.” *Id.*; SAMSUNG-1003, ¶[108]

Cole also describes that, when the connection manager “detects a sustained high load on the current communication link over the active communication interface” it determines “if there is a device with **better connectivity** present in the group of untried devices (i.e., as determined by speed, latency, QoS)” (“*network connection state*”). SAMSUNG-1005, ¶[0083], FIG. 6A. Upon detecting an interface “with potentially better connectivity,” the connection manager “attempts to connect using the selected device.” *Id.*; SAMSUNG-1003, ¶[109]. An overview of this process is presented in annotated Figure 6A below.

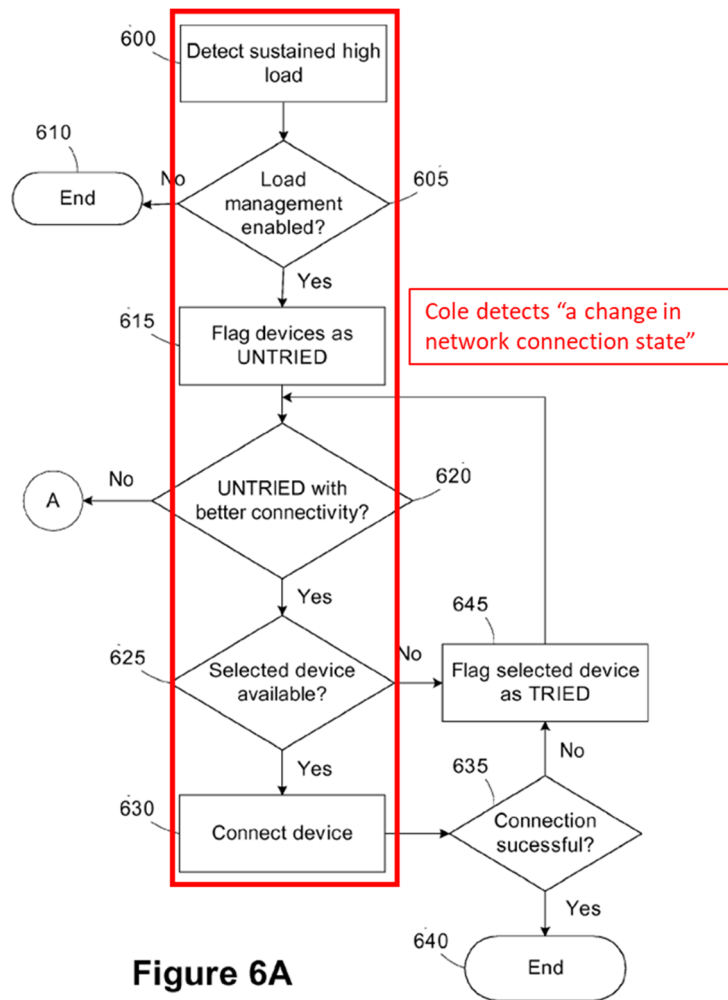


Figure 6A

SAMSUNG-1005, FIG. 6A.

As Dr. Traynor explains, a POSITA would have recognized or found obvious that, because Cole's connection manager selects communication interfaces "proactively," "*a change to a network connection state*" caused by selecting a more suitable communication interface would rescind a "*second policy that defers data communication associated with the given network service usage activity*" and thereby end deferral of data communication. SAMSUNG-1005, ¶¶[0074], [0083]-[0087], FIG. 6A; SAMSUNG-1003, ¶110]; *see supra* [1.4], [1.5]. Indeed,

Cole describes that “[a]ctivities may be triggered by changes in connectivity state” (*“a change to a network connection state”*). SAMSUNG-1005, ¶¶[0121]-[0122]; SAMSUNG-1003, ¶[110].

[9]

Recall from the mapping of claim 1 above that Cole discloses several “second polic[ies] that defer[] data communication associated with the given network service usage activity” through policy actions such as blocking, throttling, or withholding transmission. *See above* [1.4]; SAMSUNG-1005, ¶¶[0074], [0080], [0085]-[0086], [0125]; SAMSUNG-1003, ¶[78]. These second policies can be implemented “to emphasize particular performance characteristics,” e.g., battery life. SAMSUNG-1005, ¶[0091]. Relatedly, Rao describes policies and application activities in which “network packets intercepted ... may be stored in a queue” associated with an application (*“aggregation of demand from multiple network service usage activity”* for each of *“the given network service usage activit[ies]”*). SAMSUNG-1007, ¶[0184]-[0186], [0189]-[0194]; SAMSUNG-1003, ¶[111]. A POSITA would have understood that when packets from various applications are placed in a queue such a queue is one example of an aggregation of demand from multiple network service usage activities. SAMSUNG-1003, ¶[111].

Relatedly, when these queues reach capacity due to queue capacity limits

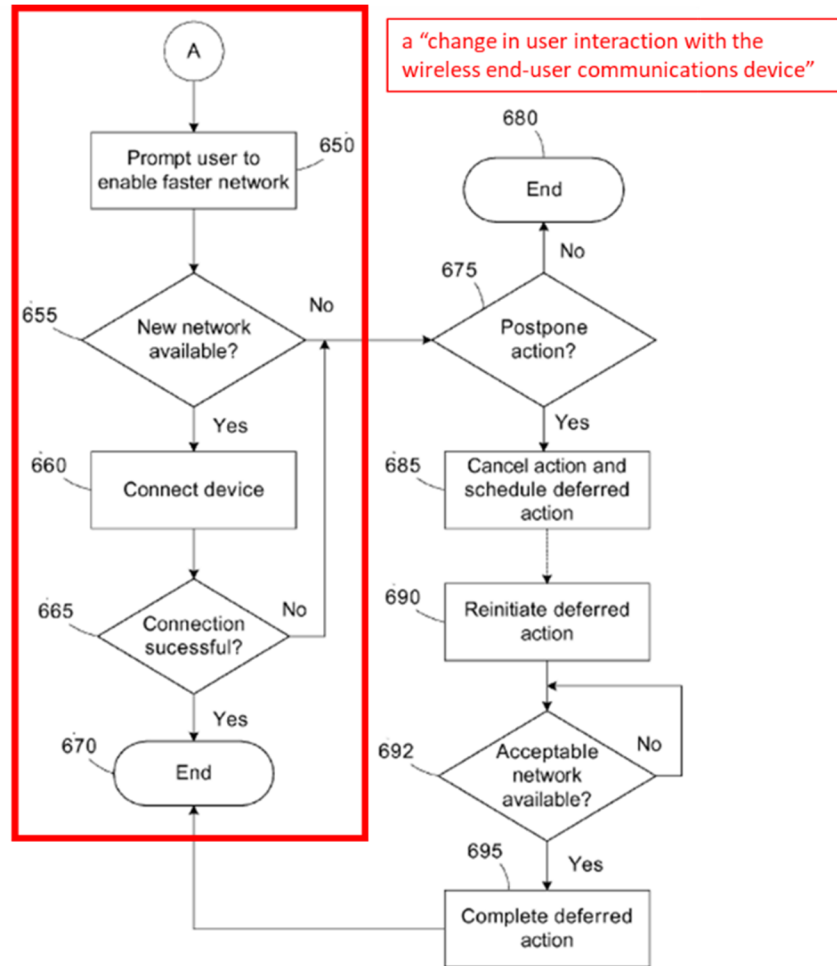
(“until the device state change occurs, the device state change comprises an aggregation of demand”), e.g., arising from an “***aggregation of demand***,” a POSITA would have understood that the deferral of packets by placing them in a queue would be stopped and the packets in the queue would have to be cleared (e.g., by transmitting them or clearing the queue). SAMSUNG-1003, ¶[112]. For example, Dr. Traynor explains that a POSITA would have found obvious that, when the CDR device was placed in a mode to prolong battery life, the transmission of data from the queues of the CDR device would be based on the queue size to prevent overly frequent transmission (rescinding the “***second policy***” in response to “***an aggregation of demand from multiple network service usage activity***”). SAMSUNG-1005, ¶[0091]; SAMSUNG-1007, ¶[0184]-[0186], [0189]-[0194]; SAMSUNG-1003, ¶[112]. For example, in order to reduce the power requirements of Cole’s “communication interfaces” (e.g., modems), a POSITA would have recognized that queuing activities and structuring their transmissions in response to an “***aggregation of demand from multiple network service usage activity***” would lessen the load on the device’s communication interfaces, and thus, lower device battery consumption. SAMSUNG-1005, ¶[0092]-[0099]. Additionally, an “***aggregation of demand***” that exceeds the length of a queue would require disposition (e.g., transmission during a scheduled time slot, or, rescinding “***the second policy***”). SAMSUNG-1005, ¶[0119]-[0127]. Finally, an “***aggregation of demand***”

would also drive a change to Rao's que priority, rescinding "***the second policy***."

Id.; SAMSUNG-1003, ¶[112].

[10]

Cole describes that the user can reinitiate an action after deferral (a "***change in user interaction with the wireless end-user communications device***" rescinding a "***second policy that defers data communication associated with the given network service usage activity***"). SAMSUNG-1005, ¶[0087]. Additionally, Rao describes applications operating "in the foreground and currently in active use by the user" as having a higher priority than background applications. SAMSUNG-1007, ¶[0003]. In view of this, a POSITA would have recognized or found obvious that an application transitioning from a foreground to a background state (e.g., through "***user interaction***") would have resulting in a change in application priority. *Id.*; SAMSUNG-1003, ¶[113]. Cole also describes that the user may overrule the connection manager when making rescheduling decisions ("the user elects not to postpone") ("***a change in user interaction***" that blocks a "***second policy that defers data communication with the wireless end-user communications device***"). *Id.*, ¶[0085]; SAMSUNG-1003, ¶[113]; *see supra* [1.4], [1.5]. An example process where user interaction changes the operation of the end-user device is reproduced and annotated below.

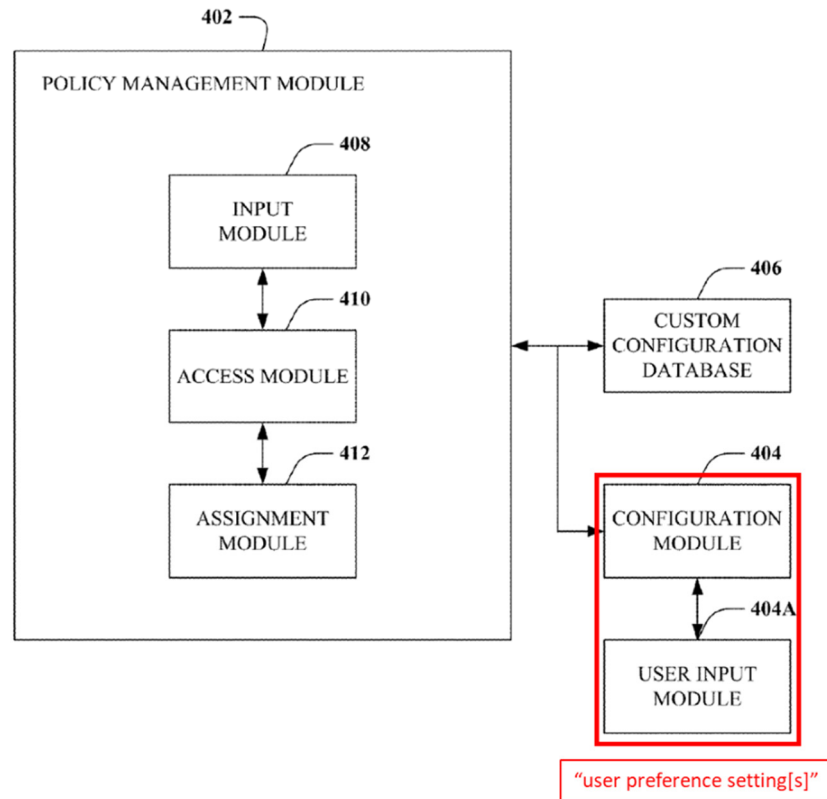


SAMSUNG-1005, FIG. 6B.

[11]

D’Amore describes a “configuration module” that includes a “user input module” that allows a “user” to “to **modify priority level/privilege code** of one or more applications with respect to one or more system resources” (“*a user preference setting*”). SAMSUNG-1006, ¶¶[0063]-[0070]; SAMSUNG-1003, ¶[114].

D’Amore’s user input module is presented in the annotated Figure 4 below.



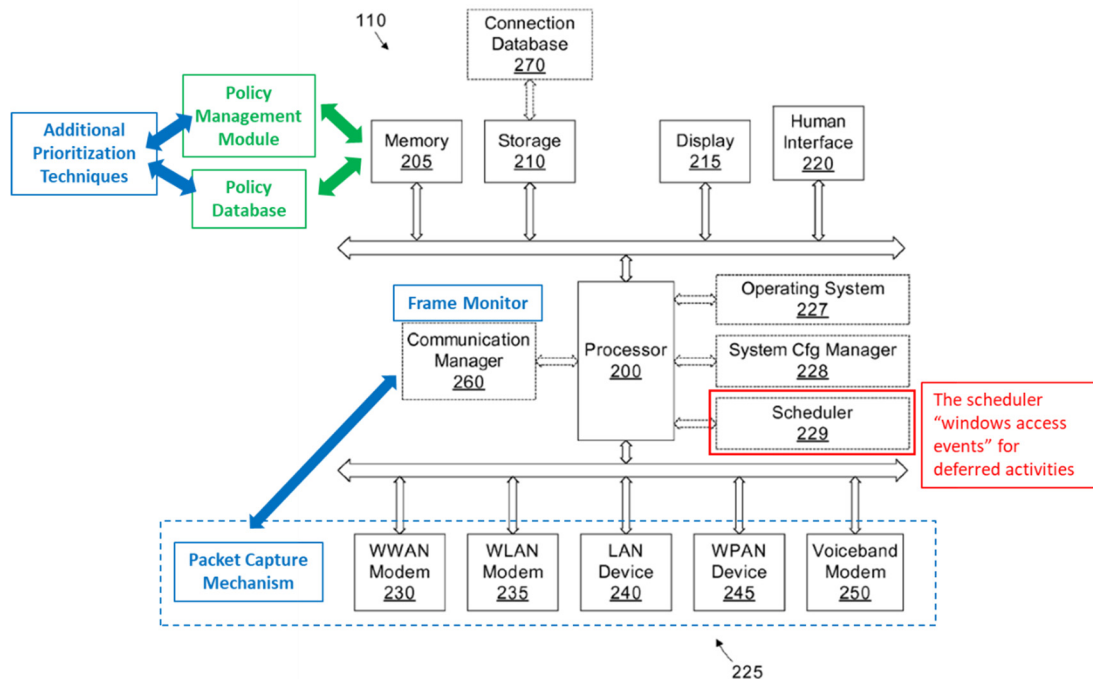
SAMSUNG-1006, FIG. 4.

As Dr. Traynor explains, a POSITA would have recognized or found obvious that “*the dynamic selection of the service usage control policy*” would be “*further based on [the] user preference setting for [the] given one of the applications*” because CDR uses the “priority level” of the application to make policy decisions. SAMSUNG-1003, ¶[115]; *see supra* [1.4], [1.5].

[16]

Cole describes that when activities are deferred (“*the second policy*”), “[t]he connection manager 260 **reschedules the aborted activity at a later time**” (“*windows network access events*”). SAMSUNG-1005, ¶[0080]; SAMSUNG-1003,

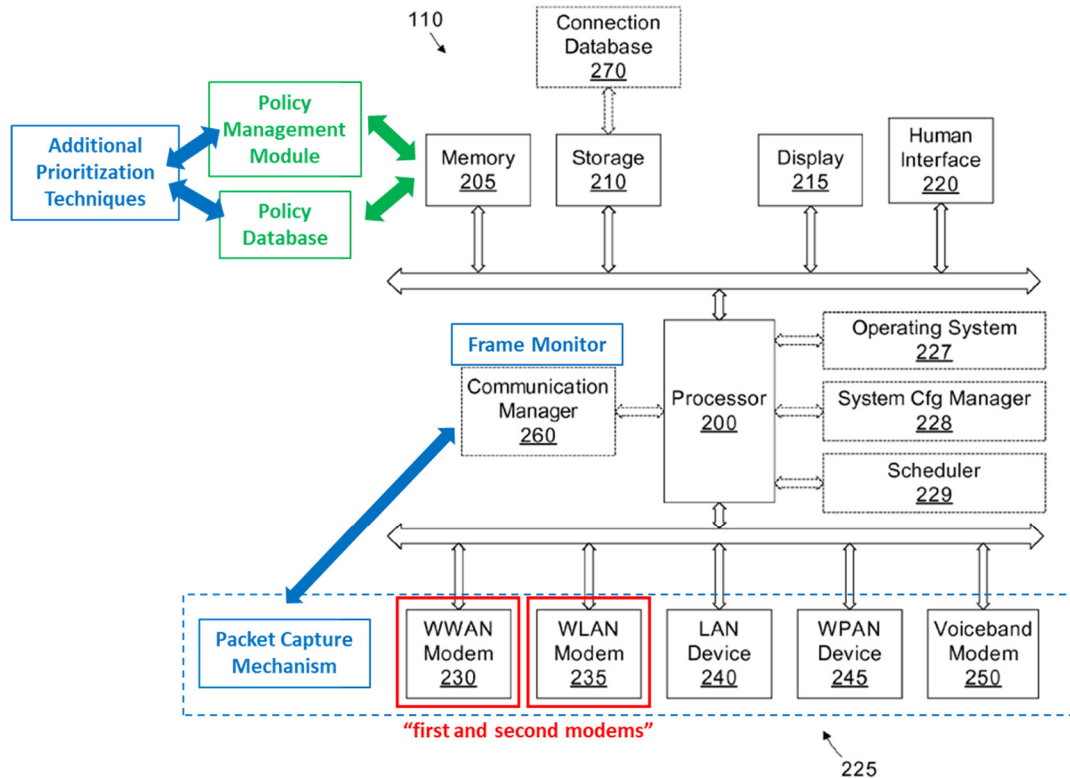
¶[116]; *see supra* [1.4], [1.5]. The deferred action is then “reinitiated by the connection manager 260 ... at some later point in time. In some embodiments, the connection manager 260 may reinitiate the action on its own by interfacing with the scheduler 229.” SAMSUNG-1005, ¶[0087]; SAMSUNG-1003, ¶[116]. Cole’s scheduler is presented in the annotated FIG. 2 below.



SAMSUNG-1005, FIG. 2 (modified based on CDR combination).

[17]

Cole describes that its “mobile devices” have a plurality of “modems,” to include a “**WWAN modem**” and a “**WLAN modem**” (“*first and second modems*”). SAMSUNG-1005, ¶[0035], FIG. 2; SAMSUNG-1003, ¶[117].



SAMSUNG-1005, FIG. 2 (modified based on CDR combination).

Cole describes that tasks that are unsuitable for the WWAN can be deferred until another network is available (e.g., the WLAN). Indeed, Cole describes:

[A] user is in a public place and [a] lengthy [file] transfer is conducted using the WWAN modem 230 (e.g., a 3G channel), which consumes significant battery power. The connection manager 260 identifies the load on the WWAN modem 230 and asks the user to find a better connection. A better connection is not available in the public setting, so the user opts to be reminded to download the web file later. When the user returns home, connects the mobile device 110 to a power source, and

the communication manager 260 connects using the WLAN modem

235 (e.g., a Wi-Fi connection), the connection manager 260 reminds the user to download the file. The connection manager 260 may provide the address for the file and even open the browser, or the user may manually open the browser and use the browser history data to find the link to the file. SAMSUNG-1005, ¶[0088]; SAMSUNG-1003, ¶[118].

As Dr. Traynor explains, a POSITA would have recognized or found obvious that in Cole’s connection manager “*the service usage control policy [is] dynamically selected ... in dependence upon which of the first and second modems will supply network connectivity for that network service usage activity*” because the examples described in Cole take into consideration the communication interface that will be used for the network service usage activity. SAMSUNG-1005, ¶¶[0088]-[0089]; SAMSUNG-1003, ¶[119]; *see supra* [1.4], [1.5].

B. [GROUND 1B] – Claims 13-15 are rendered obvious by Cole, D’Amore, Rao, and Freund

1. Overview of Freund

Freund discloses a “computing environment with methods for monitoring access to an open network, such as a WAN or the Internet.” SAMSUNG-1008, Abstract. Freund’s computer environment includes a system with one or more clients. SAMSUNG-1008, Abstract. Freund describes “[c]lient based monitoring and filtering of access” to include “[a]ccess rules which can be defined [to] specify

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-1008, Abstract. Freund’s system “can determine if a particular process in question should have access to the Internet and what kind of access ... is permissible for the given specific user.” *Id.*; SAMSUNG-1003, ¶[120].

2. Combination of Cole-D’Amore-Rao and Freund

It would have been obvious to a POSITA to modify CDR based on the teachings of Freund such that Freund’s access rules would have been incorporated into the existing priority policies of CDR, to specify when internet access should be revoked for an application that exceeds an allowed usage limit. SAMSUNG-1005, ¶[0034]-[0036], ¶¶[0074]-[0097], FIG. 2; SAMSUNG-1006, ¶¶[0049]-[0060], FIG. 2; SAMSUNG-1007, ¶¶[0158]-[0159], ¶[0176], ¶[0180], ¶[0185], ¶[0191], FIG. 5A; SAMSUNG-1008, 4:5-19, 4:51-63, 10:44-58; SAMSUNG-1003, ¶[121]. A POSITA would have been motivated to combine the teachings of Freund into CDR because Cole describes that “operation of bandwidth intensive applications may significantly affect the user's service bill.” SAMSUNG-1005,

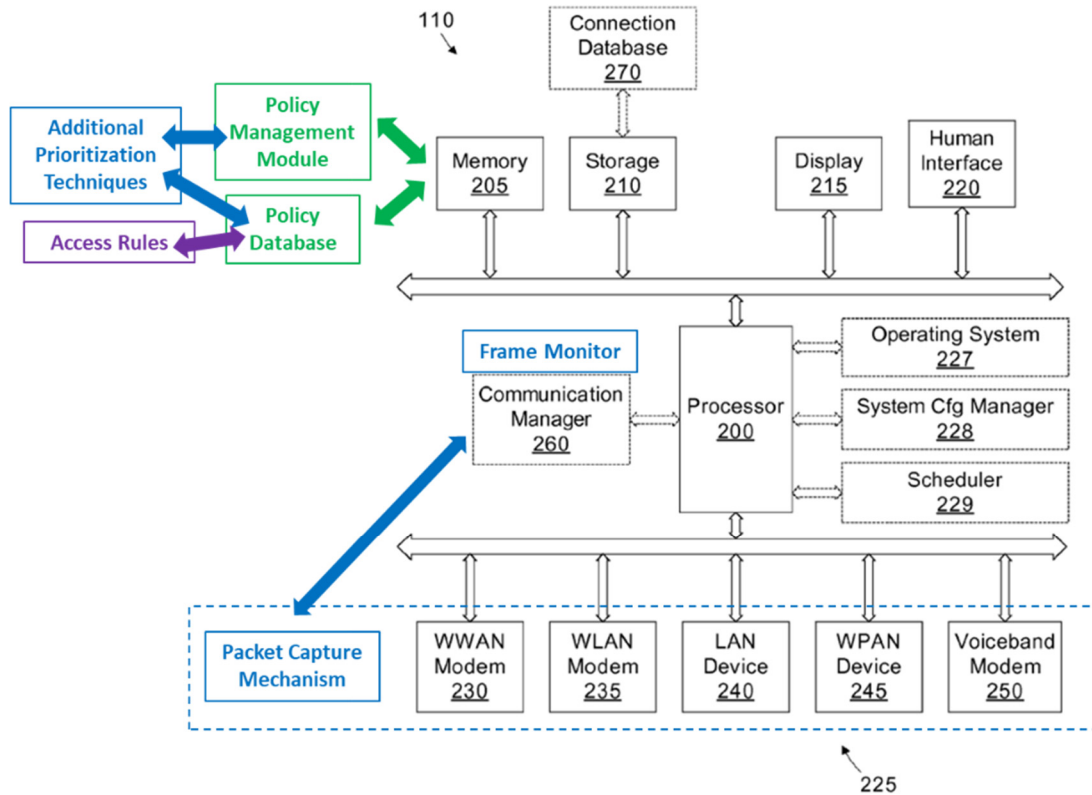
¶¶[0008], [0062], [0067], [0082]. As Dr. Traynor explains, a POSITA would have recognized or found obvious that the techniques of Freund would prevent an “intensive application” from consuming excessive network resources and creating a high “service bill.” *Id.*; SAMSUNG-1008, 4:5-19, 4:51-63, 10:44-58; SAMSUNG-1003, ¶[121]. Indeed, Gurnani, (a US Patent), corroborates “limiting service” in “mobile wireless communication subscribers” to “limit the customer’s ... financial exposure.” SAMSUNG-1014, 3:53-67, 4:1-45; SAMSUNG-1003, ¶[121].

As explained below, combining CDR and Freund would have involved combining prior art elements according to known methods to yield predictable results. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-421, 82 USPQ2d 1385, 1395-97 (2007); *MPEP 2143*; SAMSUNG-1003, ¶[122]. For example, Freund’s access limits would be incorporated as an additional condition to the CDR application priority policies, such that when an application reached its allowable usage limit, the connection manager would suspend or block execution until a later point in time. SAMSUNG-1005, ¶¶[0119]-[0125]; SAMSUNG-1006, ¶¶[0050]-[0051]; SAMSUNG-1008, 4:5-19, 4:51-63; SAMSUNG-1003, ¶[122].

Incorporating Freund’s access rules into CDR’s priority policies would have been predictable and foreseeable with a reasonable expectation of success because Freund’s access rules are maintained in a “database” implemented in “memory”

(much like the CDR “policy database”) and the resulting actions are capable of being implanted by the CDR connection manager (e.g., “blocking access”). SAMSUNG-1005, ¶¶[0119]-[0125]; SAMSUNG-1006, ¶[0050]; SAMSUNG-1008, 4:5-29, 8:1-10; SAMSUNG-1003, ¶[123]. Moreover, like CDR, Freund describes that its techniques can be implemented in a “mobile computer.” SAMSUNG-1005, ¶¶[0014]-[0015], SAMSUNG-1006, ¶¶[0007]-[0016]; SAMSUNG-1007, ¶[0130]; SAMSUNG-1008, 5:14-16; SAMSUNG-1003, ¶[123].

In an example of the combined system, illustrated below in Cole’s Figure 2, Freund’s access rules would have further enhanced the policy management module of the CDR mobile device to include revoking or deferring internet access for applications that exceed internet access limitations. SAMSUNG-1005, ¶¶[0034]-[0036], [0074]-[0097]; SAMSUNG-1008, 4:5-19, 4:51-63, 10:44-58; SAMSUNG-1003, ¶[124]. In doing so, the device in the CDR-Freund combination (hereinafter referred to as “**CDR-Freund**”) would have been able to more effectively use available network connections by revoking access for applications that consume more than an allowable amount of bandwidth or resources (one of the main objectives of Cole). SAMSUNG-1005, ¶¶[0006]-[0011]; SAMSUNG-1003, ¶[124].



SAMSUNG-1005, FIG. 2 (modified based on CDR-Freund combination).

3. Analysis

[13]

Freund, like CDR, describes that individual application “usage” can be “monitor[ed],” and further describes “track[ing] Internet access on a per application basis” (“*monitor network service usage behavior for each of the plurality of applications*”). SAMSUNG-1008, 10:44-58; SAMSUNG-1003, ¶[125]; *see supra* [2]. Freund’s “monitoring” includes “the total time applications access the Internet, and/or monitoring the total time particular users/work stations access the Internet.” *Id.*, 10:5-15; SAMSUNG-1003, ¶[125].

A POSITA would have recognized or found obvious that Freund’s “access rules” would be used by CDR-Freund’s connection manager to revoke or defer network access for activities and applications that exceed specified access limits (“*dynamic selection of [a] service usage control policy for a given network service usage activity*”). SAMSUNG-1005, ¶¶[0074]-[0097]; SAMSUNG-1008, 4:5-19; SAMSUNG-1003, ¶[126]; *see supra* §III.B.2, [1.4], [1.5].

Freund describes that “access rules” can be used to restrict or block network access upon reaching an access limit (“*further based on a comparison of the monitored network service usage behavior ... to expected access limits*”). SAMSUNG-1008, 4:5-19; SAMSUNG-1003, ¶[127].

Moreover, as Dr. Traynor explains, a POSITA would have recognized or found obvious that because Cole’s processor is configured to implement the connection manager and execute “various software applications,” Cole’s processor would have been “*configured to*” perform the features of [13]-[14], as described above and below. SAMSUNG-1005, ¶¶[0015], [0034]-[0036], [0153], FIG. 2; SAMSUNG-1003, ¶[128]; *see supra* [1.2], *infra* [14].

As described above, the CDR-Freund device makes classification decisions on an activity/application basis, and would apply similar methodology in implementing “access rules,” such that they are applied “*for each of the plurality of applications*” and with respect to “*expected access limits for that application.*”

SAMSUNG-1008, 4:5-63; SAMSUNG-1003, ¶[129]; *see supra* [1.3], [1.4], [1.5].

A POSITA would be motivated to implement “access rules” for “each” of the applications on the mobile device because, as previously noted, not doing so would result in potentially overlooking a network service usage activity or application that could damage or otherwise consume significant network resources. SAMSUNG-1005, ¶[0008]; SAMSUNG-1003, ¶[129].

[14]

Freund describes various remedial actions (“*restricts network access*”) that can be performed due to an access rule being violated to include access being “terminated, redirected, [or] modified.” SAMSUNG-1008, 4:51-63; *see supra* [13].

In the CDR-Freund device, the connection manager would implement these actions in response to an access rule violation (a “*dynamic selection of [a] service usage control policy*”). SAMSUNG-1005, ¶¶[0119]-[0125]; SAMSUNG-1003, ¶[130]; *see supra* [1.4], [1.5].

As described above in [13], the CDR-Freund device makes classification decisions on an activity/application basis, and would apply similar methodology in implementing “access rules,” such that they are applied “*for each of the plurality of applications*” and with respect to “*expected access limits for that application.*” SAMSUNG-1008, 4:5-63; SAMSUNG-1003, ¶[131]; *see supra* [1.3], [1.4], [1.5].

[15]

As described in [13], Freund’s “access rules” can include “**permitted time limits**,” (“*allowable duration of network access events*”) for a given application. SAMSUNG-1008, 25:4-5; SAMSUNG-1003, ¶[132]; *see supra* [13], [14]. For instance, Freund describes “track[ing] Internet access on a **per application basis**” (“*for a given application*”). SAMSUNG-1008, 10:5-15; SAMSUNG-1003, ¶[132]; *see supra* [1.4], [1.5], [13].

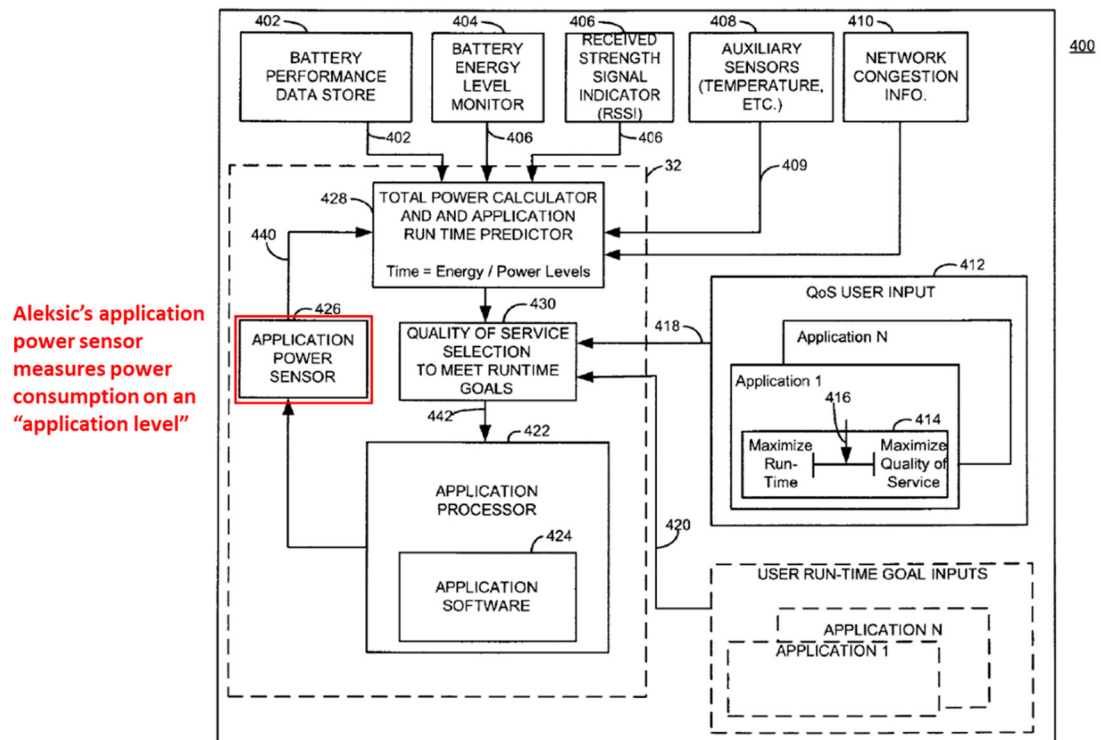
Moreover, as described above, the CDR-Freund device makes classification decisions on an activity/application basis, and would apply similar methodology in implementing “access rules,” such that they are applied for “*a given application.*” SAMSUNG-1008, 4:5-63; SAMSUNG-1003, ¶[133]; *see supra* [1.3], [1.4], [1.5]. For instance, when evaluating a window of “connectivity state” for application “update[s]” the CDR-Freund scheduler would be configured such that the connectivity window is an “*allowable duration of network access events*” as attempting to execute an activity with a longer estimated completion time would result in a failure. SAMSUNG-1005, ¶¶[0124]-[0127]; SAMSUNG-1003, ¶[133].

C. [GROUND 1C] – Claim 12 is rendered obvious by Cole, D’Amore, Rao, and Aleksic

1. Overview of Aleksic

Aleksic describes “a controller that is responsive to a remaining power ca-

capacity of [a] battery” in a portable device. SAMSUNG-1011, Abstract; SAMSUNG-1003, ¶[134]. The controller “provides power for a higher priority feature at the expense of a lower priority functional processing capability feature.” *Id.* Aleksic describes that these “features” can be “software applications.” SAMSUNG-1011, ¶[0003], ¶[0028], ¶[0033], FIG. 10, FIG. 13. Aleksic’s controller includes an “application power sensor” that can “determine how much power is being consumed when executing [an] application.” SAMSUNG-1011, ¶¶[0035]-[0038]; SAMSUNG-1003, ¶[134].



SAMSUNG-1011, FIG. 4.

2. Combination of Cole-D'Amore-Rao and Aleksic

It would have been obvious to a POSITA to modify CDR based on the

teachings of Aleksic such that Aleksic’s application sensors would have enhanced the existing battery monitoring of Cole’s connection manager, such that the connection manager could determine “how much power is being consumed when executing [an] application.” SAMSUNG-1005, ¶¶[0034]-[0036], ¶¶[0074]-[0100], FIG. 2; SAMSUNG-1011, ¶¶[0035]-[0038], FIG. 4; SAMSUNG-1003, ¶[135]. A POSITA would have been motivated to combine the teachings of Aleksic into CDR because Aleksic’s “application level power management system 400” would allow the CDR device to determine at the application level, “how much power is being consumed when executing [an] application” which would further enhance the ability of the connection manager to make deferral and rescheduling decisions based on “power state of the mobile device.” SAMSUNG-1005, ¶¶[0088]-[0100]; SAMSUNG-1011, ¶¶[0035]-[0038]; SAMSUNG-1003, ¶[135]; *see supra* [1.4], [1.5], [6]. As Dr. Traynor explains, incorporating application level power consumption monitoring into the CDR device would also allow application power consumption behavior analysis that the connection manager would use to identify power-intensive applications and activities. *Id.*; SAMSUNG-1003, ¶[135].

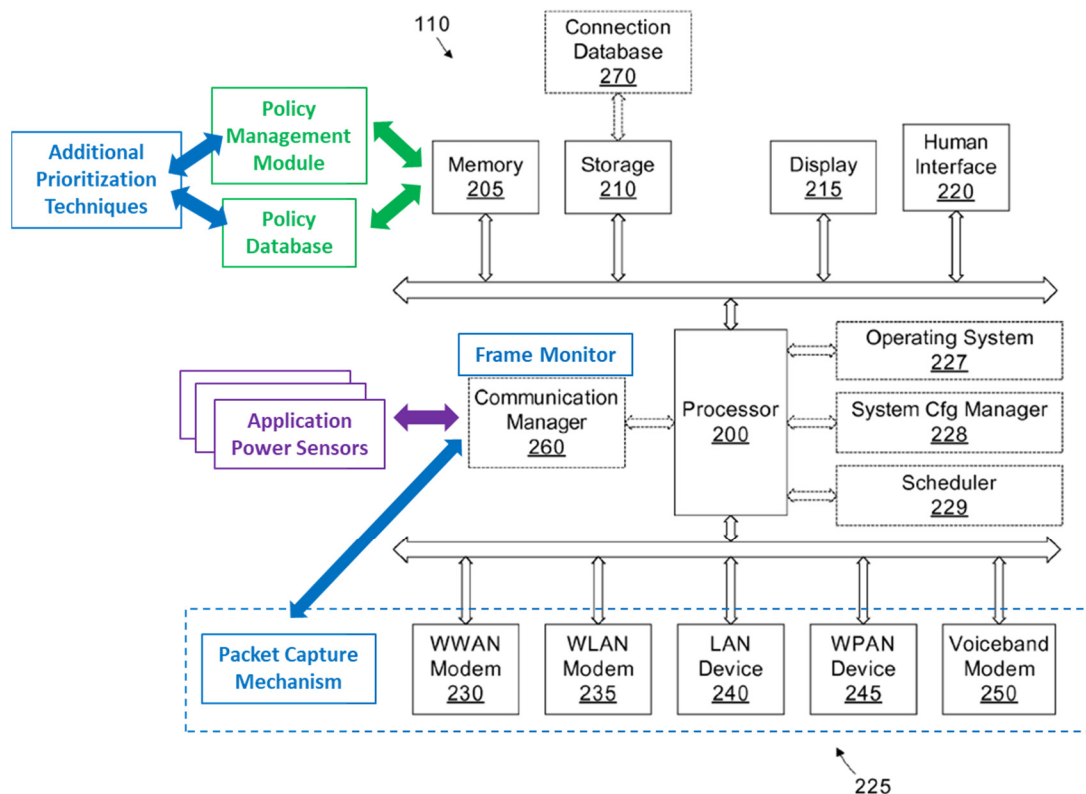
As explained below, combining CDR and Aleksic would have involved (1) combining prior art elements according to known methods to yield predictable results; and (2) use of known techniques to improve similar devices (methods, or products) in the same way. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-

421, 82 USPQ2d 1385, 1395-97 (2007); *MPEP 2143*; SAMSUNG-1003, ¶[136].

Incorporating Aleksic's application power sensors as program modules into CDR's end-user device would have been predictable and foreseeable with a reasonable expectation of success because Cole describes that the operating system 227 "monitors and predicts battery life" and that the connection manager "interfaces with the operating system 227 to identify the current operating mode and power state." SAMSUNG-1005, ¶¶[0088]-[0100]; SAMSUNG-1011, SAMSUNG-1011, ¶¶[0035]-[0038], ¶[0041], FIG. 4, FIG. 5; SAMSUNG-1003, ¶[137]. Like Cole, D'Amore, and Rao, Aleksic describes that its techniques can be implemented in end-user devices (a "portable device"). SAMSUNG-1005, ¶¶[0014]-[0015], SAMSUNG-1006, ¶¶[0007]-[0016]; SAMSUNG-1007, ¶[0130]; SAMSUNG-1011, Abstract, ¶[0022]; SAMSUNG-1003, ¶[137].

In an example of the combined system, illustrated below in Cole's Figure 2, Aleksic's application power sensors would have further enhanced the ability of the CDR connection manager to respond to undesirable battery consumption associated with certain application activities, such that more accurate deferral and re-scheduling decisions would be made regarding power consumption. SAMSUNG-1005, ¶[0034]-[0036], ¶¶[0074]-[0100], FIG. 2; SAMSUNG-1011, ¶¶[0035]-[0038], FIG. 4; SAMSUNG-1003, ¶[138]. For example, when starting a known power-intensive application, the connection manager would be able to expediently

identify, based on past monitoring of that application, that device power level did not support the application's activity, and as a result, recommend deferral or re-scheduling. *Id.* In doing so, the Cole-D'Amore-Rao-Aleksic (hereinafter referred to as “**CDR-Aleksic**”) device would have been able to more effectively use device battery power (one of the purposes of Cole's connection manager) by identifying application activities that have excessive power consumption. SAMSUNG-1005, ¶¶[0090]-[0100]; SAMSUNG-1003, ¶[138].



SAMSUNG-1005, FIG. 2 (modified based on CDR-Aleksic combination).

3. Analysis

[12]

Aleksic describes an “**application level** power management system 400”

that includes an “application power sensor” that can “**determine how much power is being consumed** when executing [an] application” (“*monitor power consumption for each of the plurality of applications*”). SAMSUNG-1011, ¶¶[0035]-[0038]. Aleksic describes monitoring this information for “controlling, at an application level [(“*each of the plurality of applications*”)], **operation of an application** ... based on a determined signal strength and battery capacity level.” *Id.*, ¶[0028]. In incorporating Aleksic into the CDR combination, the deferral and re-scheduling decisions of the connection manager would be further enhanced by Aleksic’s “application level” measurement of power consumption (“*dynamic selection of the service usage control policy for a given network service usage activity*”). SAMSUNG-1005, ¶¶[0088]-[0100]; SAMSUNG-1011, ¶¶[0028], [0035]-[0038]; SAMSUNG-1003, ¶[139].

Indeed, Cole describes that the connection manager can identify and defer application activities that consume significant battery power (“the lengthy transfer is conducted using the WWAN modem 230 (e.g., a 3G channel), **which consumes significant battery power**”). SAMSUNG-1005, ¶¶[0088]-[0100]. In implementing the CDR-Aleksic combination, application power sensors would assist the connection manager in making deferral decisions based on monitoring power consumption “at the application level” (“*dynamic selection of the service usage con-*

trol policy ... based on the monitored power consumption for the application associated with the given network service usage activity”). *Id.*; SAMSUNG-1011, ¶¶[0028], [0035]-[0038]; SAMSUNG-1003, ¶[140].

Moreover, as Dr. Traynor explains, a POSITA would have recognized or found obvious that because Cole’s processor is configured to implement the connection manager and execute “various software applications,” Cole’s processor would have been “*configured to*” perform the features of [12], as described above. SAMSUNG-1005, ¶¶[0015], [0034]-[0036], [0153], FIG. 2; SAMSUNG-1003, ¶[141]; *see supra* [1.2].

As described above, the CDR-Aleksic device makes classification decisions on an activity/application basis, and would apply similar methodology in “*monitor[ing] power consumption*” for “*each of [a] plurality of applications.*” SAMSUNG-1008, 4:5-63; SAMSUNG-1003, ¶[142]; *see supra* [1.3], [1.4], [1.5].

IV. PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION

A. *Discretionary Denial under 325(d) is not warranted*

The Examiner issued only one prior art rejection during the ’224 Patent’s prosecution, against only a single claim, using Morgensen (U.S. Patent Pub. No. 2004/0268351 A1). *See* SAMSUNG-1002, 95-99. There is no indication in the ’224 Patent’s file history that the Examiner substantively considered any of the

prior art applied in this Petition prior to allowing the application that issued as the '224 Patent. *Id.*

While a family member of Cole (U.S. 2008/0080457 (“Cole-2”)) was cited on an IDS by the applicant, this application was not cited by the Examiner and there is no evidence that this reference was substantively considered by the Office. SAMSUNG-1002, 179, 462. Additionally, in the prosecution history of U.S. Patent No. 9,277,445 (a family member of the '224 Patent), the Examiner in that case did not rely upon Cole-2 to formulate a prior art rejection or map to any feature similar to the claims at issue in this Petition. Instead, the Examiner simply stated that Cole-2 “show[s] the connection manager [is] responsive to power state.” SAMSUNG-1013, 478-489.

Additionally, while a family member of Rao (PCT application WO 2006/012610A2 (“Rao-2”)) was cited on an IDS by the applicant, this application was not cited by the Examiner and there is no evidence that this reference was substantively considered by the Office. SAMSUNG-1002, 203.

Because the '224 Patent's prosecution did not involve any discussion between the applicant and the Examiner regarding the teachings of the prior art applied in this Petition, the invalidity challenge based on the prior art asserted in this Petition is not the same as, or substantially similar to, art and arguments previously

presented to the Office in connection with the '224 Patent. *See, generally*, SAM-SUNG-1002. Moreover, even if any of these references were somehow considered to be cumulative, the prosecution history never examined any of the claims in view of the asserted combinations of prior art references applied in this petition. Accordingly, neither condition of the first prong of the *Advanced Bionics* framework is met, and there is no need to reach the second prong to resolve against discretionary denial under Section 325(d). *See, e.g., Oticon Medical AB et. al. v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 20 (PTAB Oct. 16, 2019) (precedential).

Moreover, the Challenged Claims were allowed based on the Examiner's mistaken view that the prior art failed to teach or suggest features [1.5]-[1.7]. SAM-SUNG-1002, 31. As demonstrated in this Petition and with reference to Dr. Traynor's testimony, the Examiner's failure to consider obviousness of the Challenged Claims over the uncited references asserted in this Petition constitutes material error.

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

In *Apple Inc. v. Fintiv, Inc.*, the Board enumerated six factors to determine whether a petition should be discretionarily denied institution under §314(a). IPR2020-00019, Paper 11 at 2-3 (PTAB "precedential" Mar. 20, 2020) ("*Fintiv*"). In June 2022, the USPTO issued updated discretionary denial guidance in view of the *Fintiv* factors and expressly noted that *the PTAB will not discretionarily deny*

institution if Petitioner presents a Sotera stipulation. SAMSUNG-1015, 3, 7-8.

Here, Petitioner has eliminated any risk of duplicated effort by voluntarily presenting a *Sotera* stipulation to Patent Owner. SAMSUNG-1016; *Sotera Wireless, Inc. v. Masimo Corp.*, Case IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020). For at least this reason, the Board should not discretionarily deny this petition.

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

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

Factor 2 is neutral because the Court’s trial date is speculative at this point and subject to change. The Board will likely issue its Final Written Decision around 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 also favors institution because Petitioner has diligently filed this Petition months ahead of the one-year time bar, while the EDTX Litigation is still in its early stages. Beyond exchanging preliminary infringement/invalidity contentions, the parties and the District Court have yet to expend significant resources on

invalidity. SAMSUNG-1018, 5.

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

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

Factor 6 favors institution because the merits of this Petition are compelling, 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. are the real parties-in-interest.

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

The '224 Patent is the subject of a civil action, *Headwater Research LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00422, E.D. Tex., filed November 30, 2022 (SAMSUNG-1004; SAMSUNG-1017). Petitioner and Headwater are also involved in case nos. 2:22-cv-00467 and 2:23-cv-00103, also in E.D. Tex.

Petitioner is not aware of any other disclaimers, reexamination certificates, or IPR petitions addressing the '224 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 IPR39843-0163IP1@fr.com

(referencing No. 39843-0163IP1 and cc'ing PTABInbound@fr.com, axf-ptab@fr.com, jjm@fr.com, and khan@fr.com).

Respectfully submitted,

Dated July 20, 2023

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(Control No. IPR2023-01157)

Attorneys for Petitioner

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 13,974 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated July 20, 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 July 20, 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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