

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,

Petitioners

v.

FOUR BATONS WIRELESS, LLC,

Patent Owner

Case IPR2025-00494

U.S. Patent No. 8,073,436

Petition for *Inter Partes* Review of

U.S. Patent No. 8,073,436

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PETITIONERS' EXHIBIT LIST

Exhibit No.	DESCRIPTION
1001	U.S. Patent No. 8,073,436 (“’436Pat.”)
1002	Declaration of Dr. Michael Kotzin
1003	Curriculum Vitae of Dr. Michael Kotzin
1004	File History of U.S. Patent No. 8,073,436 (“ <i>File History</i> ”)
1005	U.S. Patent Application Publication 2005/0239497 (“ <i>Bahl</i> ”)
1006	U.S. Patent Application Publication 2004/0165563 (“ <i>Hsu</i> ”)
1007	U.S. Patent Application Publication 2003/0130001 (“ <i>Weisshaar</i> ”)
1008	U.S. Patent No. 7,539,175 (“ <i>White</i> ”)
1009	U.S. Patent Application Publication 2003/0081657 (“ <i>Ranta</i> ”)
1010	L. Magalhaes et al., End-to-End Inverse Multiplexing for Mobile Hosts, J. Braz. Comp. Soc. 7 (2001) (“ <i>Magalhaes</i> ”)
1011	U.S. Patent No. 6,983,162 (“ <i>Kotzin</i> ’162”)
1012	Microsoft Windows® 2000 Server Operations Guide (ISBN 1-57231-805-8) (2000) (“ <i>WINDOWS Guide</i> ”)
1013	U.S. Patent Application Publication No. 2004/0053624 (“ <i>Frank</i> ”)
1014	U.S. Patent No. 6,826,406 (“ <i>Vialen</i> ”)
1015	U.S. Patent Application Publication No. 2005/0198350 (“ <i>Tan</i> ”)
1016	U.S. Patent No. 5,737,703 (“ <i>Byrne</i> ”)
1017	U.S. Patent No. 6,791,968 (“ <i>Kotzin</i> ’968”)
1018	Complaint in <i>Four Batons Wireless, LLC, v. Samsung Electronics Co., Ltd. et al.</i> , 2:24-cv-00284 (E.D. Tex. April 26, 2024)
1019	Docket Control Order from <i>Four Batons Wireless, LLC v. Samsung Electronics Co., LTD, et al.</i> , No. 2:24-cv-0284-JRG (ECF 035) (E.D. Tex. Aug. 26, 2024)

LISTING OF CHALLENGED CLAIMS

Reference	Claim Limitation
Claim 1	
1[pre]	A method of controlling a wireless mobile having multiple interfaces, comprising:
1[a]	having said mobile be aware of its applications running on it;
1[b]	having said mobile be aware of its operating situation;
1[c][i]	said multiple interfaces including heterogeneous radio interfaces, and
1[c][ii]	having said mobile control processes, including use of said heterogeneous radio interfaces, of said mobile during silent periods based on one or more of its application awareness and its operating situation awareness, said silent periods being brief intervals during which an application running on said mobile has no application traffic to send or receive;
1[d]	further including having said mobile control use of said interfaces by using a second interface, during a silent period of a second application running on said mobile and using said second interface, to support a first application running on said mobile and using a first interface that is heterogeneous to said second interface such as to use both said first and second heterogeneous interfaces concurrently during said silent period to support said first application.
Claim 2	
[2]	The method of claim 1, further including having said mobile control processes based on both of said application awareness and said operating situation awareness.

Claim 3	
[3]	The method of claim 1, further including having said mobile control radio interface processes based on one or more of said application awareness and said operating situation awareness.
Claim 4	
[4]	The method of claim 3, further including having said mobile control radio interface processes based on both of said application awareness and said operating situation awareness.
Claim 5	
[5]	The method of claim 4, further including having said mobile make use of silent periods based on needs of applications running on said mobile.
Claim 6	
[6]	The method of claim 4, further including having said mobile make use of silent periods based on the operating situation of said mobile.
Claim 7	
[7]	The method of claim 1, further including having said mobile make use of silent periods based on needs of applications running on said mobile.
Claim 8	
[8]	The method of claim 1, further including having said mobile control processes of said mobile during silent periods based on said mobile running a non-real-time application thereon or a real-time application thereon.

Claim 9	
[9]	The method of claim 1, further including having said mobile control processes of said mobile during silent periods based on said mobile moving or not moving.
Claim 10	
[10]	The method of claim 1, further including having said mobile switch to a certain process automatically based on an output from a mobility detector and/or PHY layer parameters.
Claim 11	
[11]	The method of claim 1, further including having said mobile activate a secondary interface to offer enhanced bandwidth during said silent period if either an application needs additional bandwidth or data reception is not at a desired level.
Claim 12	
[12]	The method of claim 11, further including having said mobile compare one or more parameters for both a primary interface and a secondary interface of said mobile and determining if the secondary interface qualifies to assist.
Claim 13	
[13]	The method of claim 1, wherein said first and second heterogeneous interfaces are used concurrently during said silent period to support application traffic of said first application for enhanced bandwidth support by transmitting packetized application traffic for said first application concurrently over both said first and second heterogeneous interfaces.

Claim 14	
[14]	The method of claim 1, wherein said second interface is used during said silent period to perform network discovery functions, which network discovery functions are used for handover of said mobile to a new network, transparent to and without interference to operation of said first application that concurrently uses said first interface during said network discovery.
Claim 15	
15[pre]	A method of controlling a wireless mobile having multiple interfaces, comprising:
15[a]	having said mobile be aware of its applications running on it;
15[b]	having said mobile be aware of its operating situation, and
15[c]	having said mobile control processes of said mobile during silent periods based on one or more of its application awareness and its operating situation awareness;
15[d]	further including having said mobile control processes of said mobile during silent periods based on said mobile running a non-real-time application thereon or a real-time application thereon;
15[e]	further including having said mobile perform certain processes based on: a) if it is running a real-time application and it is stationary; b) if it is running a non-real-time application and it is moving; c) if it is running a non-real-time application and it is stationary; and d) if it is stationary and power consumption is not an issue.
Claim 16	
[16[a]]	The method of claim 15, further including having said mobile perform: e) QoS enhancement if it is running a real-time application and it is stationary;
[16[b]]	f) network discovery if it is running a non-real-time application and it is moving;

[16[c]]	g) energy conservation if it is running a non-real-time application and it is stationary; and
[16[d]]	h) information sharing if it is stationary and power consumption is not an issue.
Claim 17	
[17]	The method of claim 15, further including having said mobile switch to a certain process automatically during said silent periods based on an output from a mobility detector and/or PHY layer parameters, and wherein said silent periods are brief intervals during which an application running on said mobile has no application traffic to send or receive.
Claim 19	
19[pre]	A mobile apparatus, comprising:
19[a]	a plurality of heterogeneous network interfaces;
19[b]	a processor;
19[c]	said mobile being configured to monitor applications running on it, including real time or non real time nature of said applications;
19[d]	said mobile being configured to monitor its operating situation, including moving or non moving status; and
19[e][i]	said mobile being configured to control processes, including use of said heterogeneous network interfaces, of said mobile during silent periods based on one or more of its application awareness and its operating situation awareness, said silent periods being brief intervals during which an application running on said mobile has no application traffic to send or receive;

19[f]	wherein said mobile is configured to switch between modes of operation of based on said application awareness and said situation awareness, including to switch between one or more of the following modes of operation QoS enhancement through multiple address mode, network discovery mode, energy saving mode, and chat with devices mode.
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I. INTRODUCTION

Petitioners Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (“Samsung” or “Petitioners”) request *inter partes* review of claims 1-17 and 19 of U.S. Patent No. 8,073,436 (“the ’436 patent”).

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

Samsung certifies that the ’436 patent is available for *inter partes* review, and that Samsung is not barred or estopped from requesting *inter partes* review to challenge the claims on the grounds herein. Petitioners file this Petition within one year of service of Patent Owner’s (“PO”) complaint against Petitioners in district court. *See Four Batons Wireless, LLC, v. Samsung Electronics Co., Ltd. et al.*, 2:24-cv-00284 (E.D. Tex. April 26, 2024). *See* EX1018.

III. STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED

Samsung respectfully requests review and cancellation under 35 U.S.C § 311 of claims 1-17 and 19 (“challenged claims”) in view of:¹

¹ Petitioners do not concede that any challenged claims satisfy other requirements for patentability that cannot be raised in IPR, including Section 101 and 112.

Prior Art	
1	U.S. Patent Application Publication 2005/0239497 (“ <i>Bahl</i> ”), filed on April 23, 2004, and published October 27, 2005; prior art under 35 U.S.C. §§ 102(a) and 102(e) (EX1005)
2	U.S. Patent Application Publication 2004/0165563 (“ <i>Hsu</i> ”), published August 26, 2004; prior art under 35 U.S.C. § 102(b) (EX1006)
3	U.S. Patent Application Publication 2003/0130001 (“ <i>Weisshaar</i> ”), published July 10, 2003; prior art under 35 U.S.C. § 102(b) (EX1007)
4	U.S. Patent No. 7,539,175 (“ <i>White</i> ”), provisional application filed on November 19, 2004, non-provisional application filed on November 18, 2005; prior art under 35 U.S.C. § 102(e) (EX1008)
5	U.S. Patent Application Publication 2003/0081657A1 (“ <i>Ranta</i> ”), published May 1, 2003; prior art under 35 U.S.C. § 102(b) (EX1009)

Grounds of Unpatentability	
1	Claims 1-8, 10-14 are rendered obvious by <i>Bahl</i> in view of <i>Hsu</i> and <i>Weisshaar</i> under 35 U.S.C. § 103.
2	Claim 13 is rendered obvious by <i>Bahl</i> in view of <i>Hsu</i> , <i>Weisshaar</i> , and <i>White</i> under 35 U.S.C. § 103.
3	Claims 9, 15-17 and 19 are rendered obvious by <i>Bahl</i> in view of <i>Hsu</i> , <i>Weisshaar</i> and <i>Ranta</i> under 35 U.S.C. § 103.

IV. OVERVIEW OF THE '436 PATENT

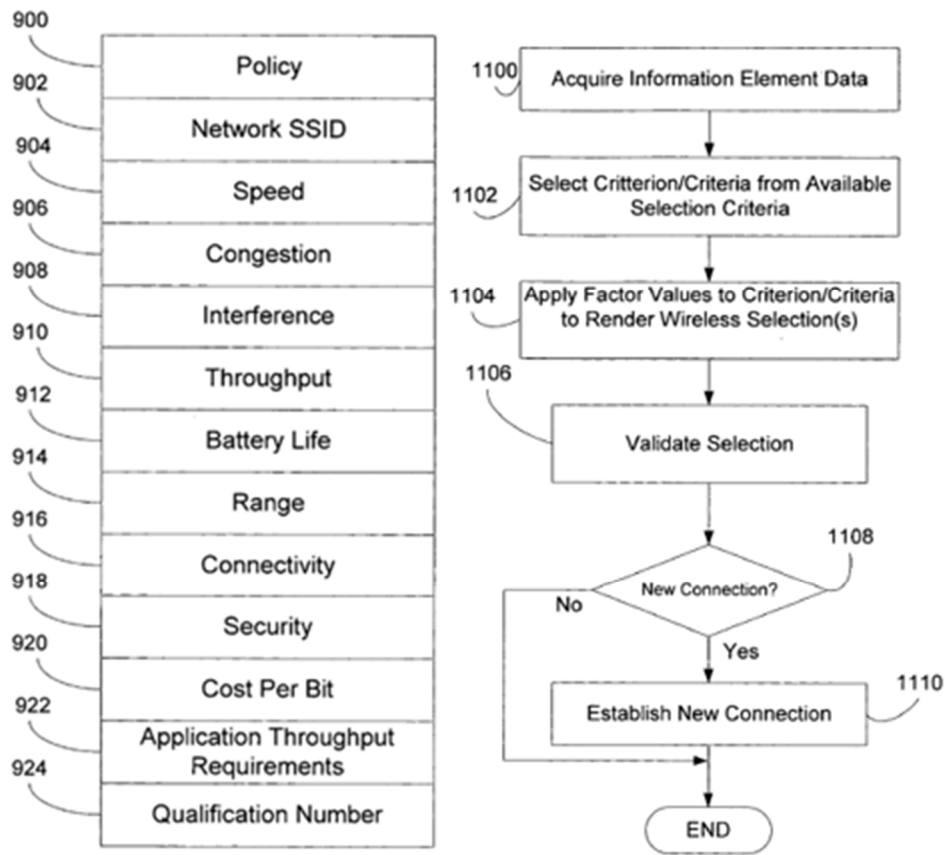
The '436 patent is directed to “systems and methods for improved utilization of silent periods in wireless devices” having multiple network interfaces. *Pat'436*, Abstract, 1:14-16; *Kotzin*, ¶45. The “silent periods” are described as “intervals when

the devices can take a momentary pause (i.e., the [d]evice has no traffic to send or receive).” *Id.*, 2:56-60.

A wireless device uses “silent periods for multiple tasks depending on the nature of application (real-time or non real-time) and on the condition of state/situation (stationary or moving).” *Id.*, 8:27-31. For example, “[i]f the application i[s] non real-time and the device is stationary,” the “[silent periods] can be used to either save the battery life or for indulging in the chat with peer devices to get information of interest.” *Id.*, 8:31-36. In controlling processes, the ’436 patent also considers the wireless device’s “battery health.” *Id.*, 9:16-20, 12:57-59, 13:37-38. For example, if the “[multiple interface device] is stationary, it triggers either [Energy Saving Mode] or [Chat with Devices Mode] depending on the battery health.” *Id.*, 13:37-38; *Kotzin*, ¶¶54-63.

V. OVERVIEW OF THE PRIMARY PRIOR ART REFERENCE

Bahl is directed to “a network interface selection and coexistence driver architecture” for devices having multiple wireless network interfaces. *Bahl*, Abstract, [0090]; *Kotzin*, ¶64. *Bahl* describes a “wireless technology selection scheme” that selects “a wireless technology based upon a variety of factors[.]” *Id.*, [0090]. The following figures describe a set of factors and a summary of a set of steps carried out by *Bahl*’s network selection method in accordance with an exemplary embodiment of the invention.



Bahl, Figs. 9 & 11

An example scenario using *Bahl*'s network selection method is described as follows: “[a] user comes to work. He resumes his laptop running OUTLOOK and INTERNET EXPLORER.... The operating system determines that the throughput requirements of the currently running applications are better met using the underutilized 802.11b than the overburdened and congested 802.11a access point. The operating system therefore utilizes an 802.11b network interface rather than an 802.11a network interface.” *Id.*, [0093]; *Kotzin*, ¶¶66-90.

VI. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art at the time of the alleged invention of the '436 patent ("POSITA"), which for purposes of this proceeding is no earlier than January 31, 2006, would have had a bachelor's degree in electrical engineering, computer science, or a similar field and two years of experience in the design of wireless communication technology. The POSITA could have also obtained similar knowledge and experience through other means. *Kotzin*, ¶34.

VII. CLAIM CONSTRUCTION

Petitioners are unaware of any "prior claim construction determination" related to the '436 patent. *See* 37 C.F.R. § 42.100(b). Given the close correlation and substantial identity between the prior art references and the challenged claims, Petitioners believe that no express constructions of the claims are necessary to assess whether the prior art reads on the challenged claims. Thus, the claims should be given their plain and ordinary meaning.² *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

² Petitioners reserve all rights to raise claim construction arguments and other arguments in any parallel or future litigation concerning the '436 patent. For example, comparing the claims to the accused products in the litigation may raise controversies that require construction of certain claim terms.

**VIII. GROUND 1: *BAHL* IN VIEW OF *HSU* AND *WEISSHAAR*
RENDER OBVIOUS CLAIMS 1-8, 10-14**

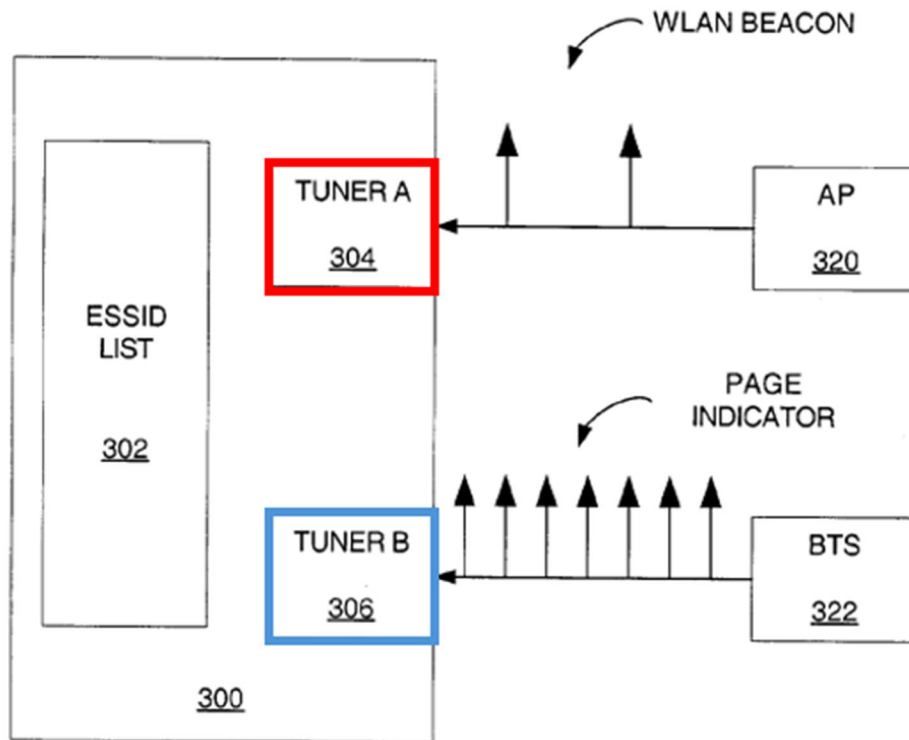
A. *Bahl in View of Hsu and Weisshaar*

1. *Hsu* (EX1006)

Hsu discloses a method and apparatus for “detection and selection of Wireless Local Area Network (WLAN) service.” *Hsu*, Abstract. *Hsu* explains that users desire access to local WLANs to enhance reception and data rates of communications through a wireless device. *Hsu*, [0007]. However, according to *Hsu*, a problem existed in detecting and selecting WLAN systems. *Hsu*, [0007]. “The purpose of system detection is to detect the availability of a wireless access medium (e.g., cdma2000, WLAN, etc.).” *Hsu*, [0007]. Relatedly, “[t]he purpose of system selection is to select an access medium for transporting application contents.” *Hsu*, [0007].

Hsu discloses methods of detecting and selecting WLAN systems through two embodiments: (i) a “Mobile Station (MS)” with one tuner used for communication with both a cellular system and a WLAN system (*Hsu*, [0059]) and (ii) a MS with two tuners that can tune to a cellular frequency and the WLAN frequency simultaneously (*i.e.*, Tuner A is configured for communication with a WLAN and Tuner B 306 is configured for communication with a wireless cellular network). *Hsu*, [0077].

MS 300, shown below, is the two-tuner embodiment. The WLAN interface (Tuner A) is annotated in **red** and the cellular interface (Tuner B) is annotated in **blue**.



Annotated *Hsu*, Fig. 6

In addition to the example embodiment of a two-tuner mobile station shown in Fig. 6, *Hsu* explains that MS 300 may be implemented in any of a variety of physical configurations. *Hsu*, [0078]. For example, MS 300 may be implemented as a single handheld device having a built-in WLAN tuner and a cellular network tuner. *Hsu*, [0078]. Additionally, MS 300 may be implemented as a laptop connected to a cellular handset for cellular communications and having a WLAN tuner card for

WLAN communications. *Hsu*, [0078]. *Hsu* explains that where a wireless device, such as the laptop implementation of MS 300 discussed above, has a tuner and is coupled to another wireless device having a tuner, the combination results in multiple tuners. *Hsu*, [0078]. A POSITA would have understood that regardless of whether MS 300 is implemented as a single handheld device having two-tuners or two devices coupled together, each having a tuner (such as laptop 600 and MS 602), the functionality disclosed by *Hsu* – *i.e.*, network detection and selection – is the same. *Kotzin*, ¶¶106-109.

For example, with respect to network detection, *Hsu* explains that MS 300 “may decide to scan for WLAN coverage based on one or more factors, *e.g.*, user command(s), pre-configured preference(s), application status (*e.g.*, on-going packet data session), WLAN availability advertisement as received from the cellular network, *etc.*” *Hsu*, [0082]; *Kotzin*, ¶108. Relatedly, *Hsu* discloses that laptop 600 may choose to scan for WLAN coverage on receipt of a WLAN availability advertisement. *Id.*

As a further example, with respect to network selection, *Hsu* explains that the “MS 300 may wait for a pending packet data session to go dormant in the cellular network. The MS 300d then performs packet data session handover (*i.e.*, sending Mobile IP registration via WLAN). This may be useful to minimize service interruption.” *Hsu*, [0085]; *Kotzin*, ¶109. Relatedly, *Hsu* discloses that a laptop “may

switch to the WLAN if the packet data session currently has no data pending transfer so as to minimize service interruption (e.g., downloading a file).” *Hsu*, [0096]; *Kotzin*, ¶109.

2. *Weisshaar* (EX1007)

Weisshaar discloses methods for “monitoring a plurality of communication interfaces, determining that a communication interface of the plurality of communication interfaces has become available; informing an application that the communication interface has become available; and transmitting data associated with the application on the communication interface.” *Weisshaar*, Abstract. *Weisshaar* explains that “[a]s telematics communication systems continue to evolve, a telematics communication unit of a vehicle will have a greater number of communication interfaces.” *Weisshaar*, [0007]. Although *Weisshaar* provides examples relating to a “telematics communication unit of a vehicle[,]” *Weisshaar* further explains that “services provided by telematics systems are not restricted to vehicle-based subscribers, and they can also be provided to subscribers at home, at work, or elsewhere.” *Weisshaar*, [0006].

Weisshaar states that “as more applications are vying for communication interfaces to transmit data, it would be useful to inform applications of the availability of a communication interface in the event that the application could use the communication interface to transmit data.” *Weisshaar*, [0007]. “Accordingly,

there is a need for a method of informing an application that a communication interface is available to enable the transmission of data in a wireless communication device.” *Weisshaar*, [0007].

To inform an application that a communication interface is available, *Weisshaar* discloses a “connection manager 336[,]” which “manages connection(s) of the client platform 300 to one or more networks, such as geographically distributed cellular and server networks.” *Weisshaar*, [0051]. Connection manager 336 further “ensures continuity of sessions across physical and/or logical network interfaces” and “can ensure that low bandwidth connections are used efficiently.” *Weisshaar*, [0051]. “More specifically, the connection manager manages multiple interfaces and reports concurrent use of more than one interface, either by the same or different applications.” *Weisshaar*, [0051]. A “communication interface could be any wireless communication interface[.]” *Weisshaar*, [0052].

3. *Bahl, Hsu, and Weisshaar* are Analogous Art to the ’436 Patent

Bahl, Hsu, and Weisshaar are analogous art to the ’436 patent. *Kotzin*, ¶¶116-129.

The ’436 patent explains that “[e]merging mobile devices are being equipped with multiple interfaces allowing users to take advantage of heterogeneous radio technologies.” ’436*Pat*, 2:41-43. For example, Multiple Interface Devices (MIDs)

“may use WLANs for higher data rates and WANs for better coverage.” ’436Pat, 7:13-14. The ’436 patent further states that “more advantage could be reaped if the MID use its network interfaces in response to the Application running on and or Situations they are operating in.” ’436Pat, 7:14-17. The ’436 patent further provides that “how to make use of silent periods based on application’s needs and in a situation awareness manner has not been discussed in prior arts.” ’436Pat, 3:12-14.

Bahl, Hsu, and Weisshaar are from the same field of endeavor because each relates to using one or more network interfaces (such as WLAN or cellular) in response to application needs and sensed operating conditions. *Bahl*, [0013], [0090]; *Hsu*, [0007]; *Weisshaar*, [0055]; *Kotzin*, ¶¶117-125. Likewise, *Bahl, Hsu, and Weisshaar* are reasonably pertinent to the problems purportedly faced by the inventors of the ’436 patent. *Kotzin*, ¶¶126-129. For example, *Bahl* and *Weisshaar* provide a framework for selecting network interfaces according to application needs and sensed operating conditions. *Id.*; *Bahl*, [0090]; *Weisshaar*, [0055]. As a further example, *Hsu* describes using silent periods based on an application’s needs and in a situation awareness manner. *Id.*; *Hsu*, [0096], [0085].

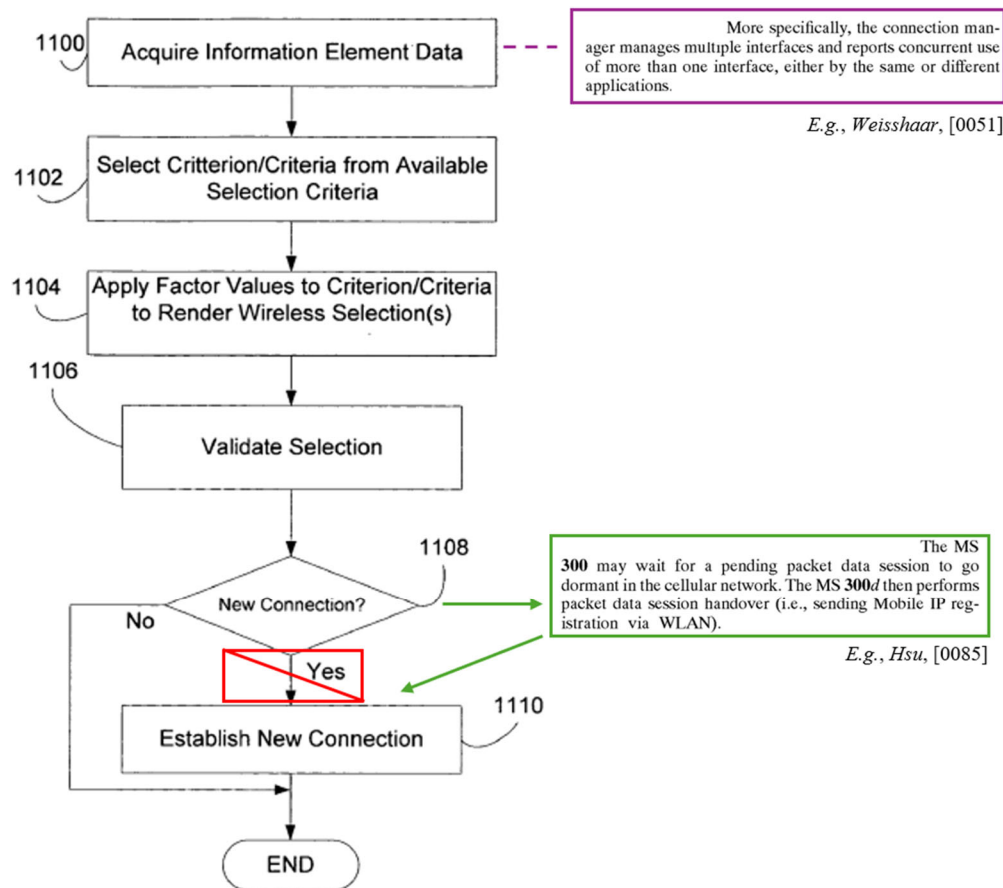
4. Overview of the *Bahl-Hsu-Weisshaar* Combination

Bahl expressly discloses all of the challenged limitations of the claims in Ground 1 except “having said mobile control processes ... during silent periods” and “having said mobile control use of said interfaces by using a second interface, during

a silent period of a second application running on said mobile and using said second interface, to support a first application running on said mobile and using a first interface that is heterogeneous to said second interface such as to use both said first and second heterogeneous interfaces concurrently during said silent period to support said first application.” See Section VIII.B–M, *infra*.

Hsu discloses a method for controlling use of heterogeneous radio interfaces (e.g., WLAN and cellular) during periods where a packet data session has no data pending transfer (*i.e.*, “silent periods”). See Section VIII.B.5.b, *infra*. *Weisshaar* discloses managing multiple interfaces and “report[ing] concurrent use of more than one interface, either by the same or different applications.” See Section VIII.B.6, *infra*.

The combined *Bahl-Hsu-Weisshaar* network selection method would be as follows:



Modified and Annotated *Bahl*, Fig. 11

Kotzin, ¶¶133-148.

5. A POSITA Would Have Found It Obvious to Combine *Bahl*, *Hsu*, and *Weisshaar*

A POSITA would have been motivated to combine the complementary teachings of *Bahl*, *Hsu*, and *Weisshaar* for the reasons explained below and supported by the Declaration of Michael Kotzin.

First, *Bahl*, *Hsu*, and *Weisshaar* relate to the same field of invention, network selection methods for devices containing heterogeneous radio interfaces (*e.g.*,

WLAN and cellular). *Bahl*, Abstract, [0001]; *Hsu*, Abstract; *Weisshaar*, [0055]; *Kotzin*, ¶¶150-158. Specifically, *Bahl*, *Hsu*, and *Weisshaar* disclose factor-based methods for selecting between heterogeneous radio interfaces. *Bahl*, [0090]; *Hsu*, [0007]; *Weisshaar*, [0057] (“[I]nformation related to the characteristics of the communication interface are provided to the application to enable the application to determine whether the communication interface is acceptable for transmitting data. Alternatively, the application could be informed that a particular communication interface is available only if the communication interface is known to be acceptable for the application.”), [0053]; *Kotzin*, ¶¶150-158.

Second, a POSITA would have been motivated to use *Hsu*’s known technique for detecting and selecting networks during periods where a “packet data session currently has no data pending transfer” to improve a similar method (the *Bahl* network selection method) in a similar way to obtain predictable results (minimizing packet loss and service interruption). *Kotzin*, ¶¶159-168.

Bahl explains that a Qualification Number (QN) 924 is measured as part of its network selection framework and the wireless technology with the highest QN is chosen. *Bahl*, [0128]. *Bahl* teaches that a limit is placed upon the frequency with which the device generates a QN. *Bahl*, [0128]-[0129]; *Kotzin*, ¶161. Specifically, *Bahl* teaches that the QN may be determined on the “occurrence of any significant

event,” such as – for example – “*a change to a status of an application currently executing upon the computing device.*” *Id.*, claim 15.

Bahl, however, does not expressly state that the status of an application includes the absence of application traffic to send or receive. *Kotzin*, ¶162. *Hsu* teaches that “application status” includes the absence of application traffic. *Hsu*, [0082], [0085] (“The MS 300 may wait for a pending packet data session to go dormant in the cellular network. The MS 300 d then performs packet data session handover[.]”), [0096] (“[T]he laptop may switch to the WLAN if the packet data session currently has no data pending transfer so as to minimize service interruption (e.g., downloading a file).”), claim 4; *Kotzin*, ¶¶162-165.

A POSITA would have recognized that *Bahl*’s network selection method would be improved by waiting for the status of an application to have “no data pending transfer” prior to handoff to obtain the predictable result of minimizing packet loss and service interruption. *Kotzin*, ¶¶166-168. *Bahl*’s network selection method was ripe for improvement because, as *Bahl* recognized, handoffs between networks can result in packet loss, which, in turn, can impact application performance. *Id.*; *Bahl*, [0123] (also noting that packet loss particularly effects VoIP and A/V applications, which have low limits on packet loss).

Moreover, a POSITA would have had a reasonable expectation of success of implementing *Hsu*’s teachings into *Bahl*’s network selection method because *Bahl*

and *Hsu* implemented their techniques in software. *See Bahl*, [0033] (“The invention may be described in the general context of computer-executable instructions, such as program modules, being executed by a computer.”); *Hsu*, [0101] (“The steps of a method or algorithm described in connection with the embodiments disclosed herein may be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two.”). The programming implementing *Hsu*’s teachings into *Bahl*’s network selection method was within a POSITA’s ordinary skill and would produce predictable results. *Kotzin*, ¶¶169-171.

Third, a POSITA would have been further motivated to combine *Weisshaar* with *Bahl* and *Hsu* to improve a known method ready for improvement (*Bahl* and *Hsu*’s management of multiple heterogeneous interfaces, including the concurrent use of heterogeneous interfaces) to yield predictable results (utilizing a second heterogeneous interface, during a silent period of a second application that is using that second interface, to support a first application that is also using a first heterogeneous interface so as to use both the first and second heterogeneous interfaces concurrently to support the first application during a silent period of the second application). *Kotzin*, ¶¶172-184. *Bahl* and *Hsu* disclose devices making concurrent use of interfaces. *See, e.g., Bahl*, [0097] (disclosing concurrent use of Wi-Fi and GPRS interfaces); *Hsu*, [0077], [0086]. Neither *Bahl* nor *Hsu*, however,

disclose making concurrent use of more than one heterogeneous interface to support a first application during a silent period of a second application.

Weisshaar, however, teaches “report[ing] concurrent use of more than one interface, either by the same or different applications” for managing connections to one or more networks. *Weisshaar*, [0051]. Knowledge of concurrent use of more than one interface by the same or different applications ensures, among other things, “continuity of sessions across physical and/or logical network interfaces” and that “low bandwidth connections are used efficiently.” *Weisshaar*, [0051]; *Kotzin*, ¶¶176-177. A POSITA reviewing *Bahl* and *Hsu* would have been motivated to combine *Weisshaar* with *Bahl-Hsu* to utilize *Weisshaar*’s reporting to allow a first application to concurrently use multiple heterogeneous interfaces during a silent period of a second application using one of those interfaces. *Kotzin*, ¶178. Doing so would lead to improved performance because of the capability of the *Bahl-Hsu-Weisshaar* device to use an un-utilized network interface to provide, for example, increased bandwidth for a first application. See *Kotzin* ’162 (disclosing using an aggregated group of idle interfaces for increased data rate transmissions); *Kotzin* ¶¶179-184.

Moreover, a POSITA would have had a reasonable expectation of success of implementing *Weisshaar*’s teachings into the *Bahl-Hsu* network selection method because *Weisshaar*, *Bahl* and *Hsu* implemented their techniques in software. See

Bahl, [0033]; *Hsu*, [0101] *Weisshaar*, [0025] (“Architecturally, the user node 108 comprises a software-based client platform 300 that supports a wide range of applications and services.”); *Kotzin*, ¶185. The programming implementing *Weisshaar*’s teachings into the *Bahl-Hsu* network selection method was within a POSITA’s ordinary skill and would produce predictable results. *Id.*

B. Claim 1

Bahl in view of *Hsu* and *Weisshaar* renders obvious claim 1. *Kotzin*, ¶186.

1. 1[pre]³

If [1.pre] is limiting, *Bahl* discloses or suggests this feature. *Kotzin*, ¶¶187-192. For example, *Bahl* discloses methods for selecting one or more wireless network interfaces on a “mobile” computing device. *Bahl*, Abstract (“Criteria-driven methods and a framework are disclosed that facilitate configuration/selection of one or more wireless network interfaces/networks for carrying out wireless communications on a computing device.”), [0041], Figs. 9, 11.

Accordingly, *Bahl* discloses or suggests a method for selecting (“a method of controlling”) one or more wireless network interfaces on a mobile computing device (“a wireless mobile having multiple interfaces”).

³ The specific claim language is reproduced above in the Listing of Challenged Claims.

2. 1[a]

Bahl discloses or suggests this feature. *Kotzin*, ¶193-199. *Bahl*'s methods for facilitating selection of one or more wireless network interfaces comprises a set of factors, including the throughput needed by "one or more particular **active applications** on a computing device[.]" *Bahl*, [0127], Fig. 9; *see also Bahl*, [0103] ("[A] set of factor weights are specified for a particular application. When the application is launched, the factor weights are loaded into a criterion shell."). For example, *Bahl* discloses a scenario describing a laptop using the WINDOWS operating system that selects a network based on the needs of currently running applications (OUTLOOK and INTERNET EXPLORER). *Bahl*, [0093]; *WINDOWS Guide* (explaining that the WINDOWS operating system's Task Manager ("provides information about applications currently running on your system"); '436*Pat*, 1:19-22 (identifying a "laptop computer" as a "type[] of mobile device[.]"); *Kotzin*, ¶¶196-198.

Accordingly, *Bahl* discloses or suggests a mobile computing device ("said mobile") using the WINDOWS operating system that is aware of the applications currently running on it ("be aware of its applications running on it").

3. 1[b]

Bahl discloses or suggests this feature. *Kotzin*, ¶¶200-201. As explained in Section VIII.B.2, *Bahl* discloses a network selection method comprising a set of

factors. *Bahl* further discloses that “the particular criterion governing wireless interface/network selections is dynamically configured according to **sensed operating conditions (e.g., battery power high/low).**” *Bahl*, [0103], [0095], Fig. 9; *Kotzin*, ¶200.

Accordingly, *Bahl* discloses or suggests a mobile computing device (“said mobile”) that senses its operating conditions (“be aware of its operating situation.”).

4. 1[c][i]

Bahl discloses or suggests this feature. *Kotzin*, ¶¶202-204. For example, *Bahl* discloses a computing device that is able to maintain “simultaneous wireless network connections[,]” such as Wi-Fi and Bluetooth, “via **distinct network interface cards (NICs)** installed on the computing device.” *Bahl*, [0002], [0003], Figs. 1-3 (showing “NETWORK INTERFACES/MODEMS” and a wireless mobile device utilizing cellular, 802.11a/b, and/or BT technologies); *Kotzin*, ¶203.

Accordingly, *Bahl* discloses a mobile computing device having distinct network interface cards that receive and transmit radio frequency waves for various wireless network interfaces (“said multiple interfaces including heterogeneous radio interfaces”).

5. 1[c][ii]

Bahl in view of *Hsu* discloses or suggests this feature as shown below. *Kotzin*, ¶¶205-221.

a. “having said mobile control processes, including use of said heterogeneous radio interfaces, of said mobile”

Bahl discloses or suggests this feature. *Kotzin*, ¶206. As discussed in Sections VIII.B.1-3, *supra*, *Bahl* discloses methods for facilitating selection (“having said mobile control processes”) of one or more wireless network interfaces (*e.g.*, cellular, 802.11a/b, and/or BT interfaces) that receive and transmit radio frequencies (“including use of said heterogeneous radio interfaces, of said mobile”). *Id.*

b. “during silent periods based on one or more of its application awareness and its operating situation awareness, said silent periods being brief intervals during which an application running on said mobile has no application traffic to send or receive”

Bahl in combination with *Hsu* discloses or suggests this feature. *Kotzin*, ¶¶207-221.

First, *Bahl* discloses having a mobile computing device control use of wireless network interfaces based on both the needs of applications running on it and its sensed operating conditions (“based on one or more of its application awareness and its operating situation awareness”). *Kotzin*, ¶208.

With respect to “application awareness,” *Bahl* discloses, for example, a WINDOWS laptop that determines the throughput requirements of “currently running applications” and selects a network interface based on those requirements. *Bahl*, [0093], [0031]; *Kotzin*, ¶¶209-211. This includes a mobile computing device’s

awareness of whether it is running a real-time or non-real-time application. *See Bahl*, [0121] (“[I]f Audio/Video streaming applications are running, a higher weight than normal should be used.”), [0127], [0146], [0130] (“At step 1102 one or more of the multiple available selection criteria are selected.”); *Kotzin*, ¶210.

With respect to “operating situation awareness,” *Bahl* discloses, for example, a laptop that senses that its battery is running low and, “in response to the low battery power and the congested state of the 802.11a access point, the operating system selects the 802.11b connection to which it will connect.” *Bahl*, [0095], [0103]; *Kotzin*, ¶212.

Second, *Hsu* discloses having a wireless device control use of wireless network interfaces during periods where a packet data session has no data pending transfer and several seconds have passed without detection of any activity of a data transfer (“during silent periods, ... said silent periods being brief intervals during which an application running on said mobile has no application traffic to send or receive”). *Kotzin*, ¶213.

For example, *Hsu* discloses that “[t]he MS 300 may wait for a pending packet data session to go dormant in the cellular network. The MS 300d then performs packet data session handover (i.e., sending Mobile IP registration via WLAN). This may be useful to minimize service interruption.” *Hsu*, [0085], *Kotzin*, ¶214. A POSITA would have understood this disclosure to provide performing network

selection between cellular and WLAN, and thus controlling use of heterogeneous radio interfaces, during a “silent period” because a pending packet data session going dormant is equivalent to a period where an application has no application traffic to send or receive. *Kotzin*, ¶215. As *Hsu* explains, “[t]he purpose of system selection is to select an access medium for **transporting application contents**.” *Hsu*, [0007]. Relatedly, *Hsu* defines “**application** status” as including whether there is an “on-going packet data session.” *Hsu*, [0082]; *Kotzin*, ¶216.

Hsu provides a functionally identical example involving “laptop 600.” *Hsu*, [0096]; *Kotzin*, ¶¶217-218. In this example, *Hsu* discloses that “[u]pon detecting a strong WLAN signal, the laptop 600 waits for a given time period (e.g., several seconds) to detect any activity of data transfer.” *Hsu*, [0096]; *Kotzin*, ¶217; Section VIII.A.1 (explaining that the functionality of MS 300 and laptop 600 is the same). A POSITA would have understood that the “several seconds” laptop 600 waits to “detect any activity of data transfer” prior to switching to WLAN discloses the claimed “brief interval[] during which an application running on said mobile has no application traffic to send or receive.” *Kotzin*, ¶¶219-220.

Accordingly, the *Bahl-Hsu-Weisshaar* network selection method discloses or suggests methods for facilitating selection (“having said mobile control processes”) of one or more wireless network interfaces (e.g., cellular, 802.11a/b, and/or BT interfaces) that receive and transmit radio frequencies (“including use of said

heterogeneous radio interfaces, of said mobile”) during a period (*e.g.*, several seconds) where the status of an application has no data pending transfer (“during silent periods... said silent periods being brief intervals during which an application running on said mobile has no application traffic to send or receive”) based on the requirements of currently running applications and sensed operating conditions (“based on one or more of its application awareness and its operating situation awareness”).

6. 1[d]

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests this feature. *Kotzin*, ¶222-229.

For example, *Weisshaar* discloses managing connections to one or more networks. *Weisshaar*, [0051]. Specifically, *Weisshaar* discloses a connection manager 336 that “manages multiple interfaces and reports concurrent use of more than one interface, either by the same or different applications.” *Weisshaar*, [0051]. Accordingly, a POSITA would have understood that *Weisshaar* discloses both scenarios underlying claim limitation 1[d]: (i) use of more than one interface by different applications (“a second application running on said mobile and using said second interface”/“a first application running on said mobile and using a first interface”) and (ii) concurrent use of more than one interface to support an application (“using a second interface... to support a first application running on

said mobile and using a first interface that is heterogeneous to said second interface such as to use both said first and second heterogeneous interfaces concurrently during said silent period to support said first application.”). *Kotzin*, ¶¶223-224.

Weisshaar, however, does not disclose “using a second interface, during a silent period of a second application[.]” *Kotzin*, ¶225. *Hsu*, on the other hand, expressly discloses that “[s]ystem selection may be based on ... application status.” *Hsu*, [0007]. One such status disclosed by *Hsu* is whether there is an “on-going packet data session.” *Hsu*, [0082]. A POSITA consulting the teachings of *Hsu*, including *Hsu*’s teachings for use of a single tuner to perform network detection and selection, would have understood that “application status” also includes when there is *not* an “on-going packet data session.” *See, e.g.*, [0069] (“At the time the MS is scheduled to monitor the cellular network paging, if the MS is in the middle of transmitting or receiving frames over the WLAN, the MS should stay in the WLAN to complete the data delivery and thus skip a paging cycle.”); [0062] (“The MS may choose not to scan for WLAN while active data session in the cellular network.... Although the MS might not be able to take the advantage of high-speed WLAN access, the MS would not experience service interruption.”); *Kotzin*, ¶¶226-228.

Accordingly, the *Bahl-Hsu-Weisshaar* network selection method discloses or suggests using a second interface during a period where the interface is not being used by a second application (“having said mobile control use of said interfaces by

using a second interface, during a silent period of a second application running on said mobile and using said second interface”) to support a first application using a first interface (“to support a first application running on said mobile and using a first interface that is heterogeneous to said second interface such as to use both said first and second heterogeneous interfaces concurrently during said silent period to support said first application”).

C. Claim 2

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 2 for the reasons discussed in Section VIII.B.5, *supra*. *Kotzin*, ¶¶230-231.

Specifically, *Bahl* discloses having a mobile computing device control use of wireless network interfaces based on both the needs of applications running on it and its sensed operating conditions. For example, *Bahl* describes a network/interface selection scheme that considers a throughput needed by one or more particular active applications and the sensed battery charge of a mobile computing device. *Bahl*, [0090], [0122] (“Battery life (BL) **912**: specifies battery charge available for a STA.”), [0127] (“Application throughput requirements APPTHRPT **922**: specifies a throughput needed by one or more particular active applications on a computing device”); *Kotzin*, ¶231.

D. Claim 3

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 3 for the reasons discussed in Section VIII.B.5, *supra*. *Kotzin*, ¶¶232-233.

Specifically, *Bahl* discloses having a mobile computing device control use of wireless network interfaces based on one or both of the needs of applications running on it and/or its sensed operating conditions. For example, *Bahl* describes a network/interface selection scheme that considers a throughput needed by one or more particular active applications and the sensed battery charge of a mobile computing device. *Bahl*, [0090], [0122], [0127]; *Kotzin*, ¶233.

E. Claim 4

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 4 for the reasons discussed in Section VIII.B.5, *supra*. *Kotzin*, ¶¶234-235.

Specifically, *Bahl* discloses having a mobile computing device control use of wireless network interfaces based on both the needs of applications running on it and its sensed operating conditions. For example, *Bahl* describes a network/interface selection scheme that considers a throughput needed by one or more particular active applications and the sensed battery charge of a mobile computing device. *Bahl*, [0090], [0122], [0127]; *Kotzin*, ¶235.

F. Claim 5

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 5 for the reasons discussed in Section VIII.B.5, *supra*. *Kotzin*, ¶¶236-238.

Specifically, *Bahl* discloses selecting a network/interface based on needs of applications running on a mobile computing device. *See, e.g., Bahl*, [0127] (“Application throughput requirements APPTHRPT 922: specifies a throughput needed by one or more particular active applications on a computing device”); *Kotzin*, ¶237.

Moreover, as discussed in Section VIII.B.5, *supra*, a person of ordinary skill in the art would have been motivated to select a network/interface based on needs of applications running on a mobile computing device during periods where a packet data session has no data pending transfer, as taught by *Hsu*, because doing so would “minimize service interruption.” *Hsu*, [0085]; *Kotzin*, ¶238.

G. Claim 6

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 6 for the reasons discussed in Section VIII.B.5, *supra*. *Kotzin*, ¶¶239-241.

Specifically, *Bahl* discloses selecting a network/interface based on sensed operating conditions of a mobile computing device. *See, e.g., Bahl*, [0103] (“[T]he

particular criterion governing wireless interface/network selections is dynamically configured according to sensed operating conditions (e.g., battery power high/low).”); [0095] (“In response to the low battery power and the congested state of the 802.11a access point, the operating system selects the 802.11b connection to which it will connect.”); *Kotzin*, ¶240.

Moreover, as discussed in Section VIII.B.5, *supra*, a person of ordinary skill in the art would have been motivated to select a network/interface based on the sensed operating conditions of a mobile computing device during periods where a packet data session has no data pending transfer, as taught by *Hsu*, because doing so would “minimize service interruption.” *Hsu*, [0085]; *Kotzin*, ¶241.

H. Claim 7

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 7 for the reasons discussed in Section VIII.B.5, *supra*. *Kotzin*, ¶¶242-244.

Specifically, *Bahl* discloses selecting a network/interface based on needs of applications running on a mobile computing device. *See, e.g., Bahl*, [0127] (“Application throughput requirements APTHRPT 922: specifies a throughput needed by one or more particular active applications on a computing device”); *Kotzin*, ¶243.

Moreover, as discussed in Section VIII.B.5, *supra*, a person of ordinary skill in the art would have been motivated to select a network/interface based on needs of applications running on a mobile computing device during periods where a packet data session has no data pending transfer, as taught by *Hsu*, because doing so would “minimize service interruption.” *Hsu*, [0085]; *Kotzin*, ¶243.

I. Claim 8

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 8. *Kotzin*, ¶¶ 245-249. For example, *Bahl* discloses having a mobile computing device select a network interface based on whether the mobile computing device is running a real-time-application or a non-real-time application. *Bahl*, [0121] (“[I]f Audio/Video streaming applications are running, a higher weight than normal should be used.”), [0127] (discussing “Application throughput requirements”), [0092]-[0095] (discussing application of network selection scenarios where the user is running OUTLOOK or INTERNET EXPLORER); *Kotzin*, ¶245.

As a further example, *Bahl* discusses various scenarios expressly considering network selection where non-real time applications (*i.e.*, OUTLOOK and INTERNET EXPLORER) are in use. *Bahl*, [0093]. Moreover, *Bahl* further contemplates the throughput and application throughput requirements of various networks, which are weighted differently depending on whether the mobile computing device is running a streaming (or real-time) application or a non-real-

time application. *Bahl*, [0121]; *Kotzin*, ¶¶246-247; *see also* [0127], [0146], Section VIII.B.5.b.

Relatedly, as discussed in Section VIII.B.5.b, *Hsu* discloses selecting a wireless network interface during a period where the status of an application has no data pending transfer to minimize packet loss and service interruption. *Kotzin*, ¶248.

Accordingly, the *Bahl-Hsu-Weisshaar* network selection method discloses or suggests having a mobile computing device select a network interface (“having said mobile control processes of said mobile”) during a period where the status of an application has no data pending transfer (“during silent periods”) based on whether the mobile computing device is running a real-time-application or a non-real-time application (“based on said mobile running a non-real-time application thereon or a real-time application thereon”).

J. Claim 10

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 10. *Kotzin*, ¶¶250-255. As discussed, *Bahl* discloses a wireless network interface selection architecture that “facilitates automated selection of a particular mode of network access based upon status information provided by a set of network interface drivers associated with particular network interfaces and wireless technologies.” *Bahl*, Abstract. “The set of parameters potentially used by a wireless technology/network selection criterion includes *information elements*

associated with a wireless network interface card through which a connection is potentially established with a network.” *Bahl*, [0105]. These factors include, among other things, such as “Speed,” “Congestion,” “Interference,” “Throughput,” “Range,” “SSap 816,” “SSsta 818,” “TPap 812,” and “TPsta 822.” *Bahl*, [0104]-[0105], [0118]-[0121], [0123]; *Kotzin*, ¶252.

The PHY (or Physical) layer is a layer in the Open Systems Interconnect model created by the International Standards Organization. *Kotzin*, ¶253; *Frank*, Fig. 1a. The physical layer is the first and lowest layer most closely associated with the physical connection between devices. *Id.* The physical layer provides the mechanical, electronic and operational characteristics for connecting to a physical transmission link. *Id.*; *Vialen*, 6:11-34 Accordingly, a POSITA would have understood that network interface parameters constitute physical layer parameters. *Id.*; *Kotzin*, ¶254. For example, “Throughput” specifies a level of throughput of a particular wireless technology based on measurements of signal strength as seen by the access point and signal strength as seen by the network interface card. *Id.*, *Bahl*, [0105], [0121]. As a further example, “TPsta 822” specifies a transmission power used by the network interface card. *Id.*

Accordingly, the *Bahl-Hsu-Weisshaar* network selection method discloses or suggests having a computing device automatically select a network (“having said mobile switch to a certain process automatically”) based on information elements

associated with a wireless network interface card (*e.g.*, throughput, TPsta 822) (“based on an output from a mobility detector and/or PHY layer parameters”).

K. Claim 11

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 11. *Kotzin*, ¶¶256-263.

As discussed in Section VIII.B.5.b, *supra*, the *Bahl-Hsu-Weisshaar* network selection method discloses or suggests methods for facilitating selection of one or more wireless network interfaces (*e.g.*, cellular, 802.11a/b, and/or BT interfaces) during a period where the status of an application has no data pending transfer based on the requirements of currently running applications. The network selection method comprises a set of factors. One factor is the “Application throughput requirements” factor, which “specifies a throughput needed by one or more particular active applications on a computing device to ensure proper operation of the applications on the device (STA) that will utilize the selected wireless technology.” *Bahl*, [0127].

Another factor is “Congestion,” which considers whether a network is heavily loaded and processing a high number of retries for packets. *Bahl*, [0119]. A POSITA would have understood that congestion relates to data reception, which deteriorates in view of congestion. *Kotzin*, ¶¶259-260; *Bahl*, [0113] (“[A] high value for ‘Congestion’ is bad[.]”), *Tan*, [0029] (explaining how congestion negatively impacts data reception by *inter alia* “greatly delay[ing] packet transfer”).

Relatedly, *Bahl* explains how the “Application throughput requirements” and “Congestion” factors can be utilized, as follows:

The operating system determines that the throughput requirements of the currently running applications are better met using the underutilized 802.11b than the overburdened and congested 802.11a access point. The operating system therefore utilizes an 802.11b network interface rather than an 802.11a network interface.

Bahl, [0093]; *Kotzin*, ¶261.

Moreover, as discussed in Section VIII.B.5.b, *Hsu* discloses selecting a wireless network interface during a period where the status of an application has no data pending transfer to minimize packet loss and service interruption.

Accordingly, the *Bahl-Hsu-Weisshaar* network selection method discloses or suggests selecting a different network interface (“having said mobile activate a secondary interface to offer enhanced bandwidth”) during a period where the status of an application has no data pending transfer (“during said silent period”) when the current network interface does not meet application throughout requirements and/or is congested (“if either an application needs additional bandwidth or data reception is not at a desired level”).

L. Claim 12

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 12. *Kotzin*, ¶¶264-267.

As discussed in Section VIII.B.5.b, *supra*, the *Bahl-Hsu-Weisshaar* network selection method selects a network interface based upon a variety of factors. For example, *Bahl* explains that “[t]he selection framework derives factor values from acquired information elements (e.g., network status/capabilities) relating to multiple combinations of interface/network combinations available to a computing device.” *Bahl*, [0101], [0099] (comparing Wi-Fi to the GPRS network to determine which provides connectivity to the Internet and choosing the network that provides connectivity to the Internet), [0121] (explaining that if Audio/Video streaming applications are running, a higher weight to the throughput factor should be used and comparing the throughput of 802.11b and 802.11a technologies), [0122] (explaining that if battery charge level on a STA is low, then the weight given to the battery life factor is raised and comparing the power drain from 802.11a NIC and 802.11b NIC), [0126] (“[I]f CST for 802.11a is unacceptable and CST for 802.11b is an acceptable value, and no other factor overrides this determination, then the 802.11b interface is selected.”), [0146] (pseudo code showing example network selection algorithm comparing 802.11a and 802.11b); *Kotzin*, ¶¶265-266.

As a further example, *Bahl* explains that the network selection method may include a “Critical Criterion Factor (CWC).” *Bahl*, [0111]. “If a wireless technology does not have an acceptable value for this criterion factor, it is eliminated from consideration.” *Id.*

Accordingly, the *Bahl-Hsu-Weisshaar* network selection method discloses or suggests comparing various factors for two network interfaces (“having said mobile compare one or more parameters for both a primary interface and a secondary interface of said mobile”) and determining whether a network is acceptable (“determining if the secondary interface qualifies to assist”).

M. Claim 13

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 13. *Kotzin*, ¶¶268-274. As discussed in VIII.B.6, *Weisshaar* discloses concurrent use of more than one interface to support an application.

Although *Weisshaar* does not expressly explain that one of the benefits of transmitting packetized application traffic concurrently over both said first and second heterogeneous interfaces is to enhance the bandwidth available for the application, a POSITA consulting *Weisshaar* would have known and understood this to be one of the benefits. *Kotzin*, ¶¶269-273. Stated differently, POSITAs at the time of the invention were aware that a primary reason to transmit packetized application traffic for an application over two or more interfaces was to provide enhanced bandwidth, and this was well-known in the art. *Id.*; *Magalhaes*, 792 (disclosing methods for inverse multiplexing for aggregating bandwidth using heterogeneous network interfaces); *White*, 8:15-23; *Kotzin* ’162 (explaining that multi-mode communication units could be used to exceed the transmission rates of any single

unit by creating a dynamic group that distributes the information for transmission in an aggregated group). Accordingly, a POSITA reviewing *Weisshaar* would have known that enhanced bandwidth would be a result of concurrent use of more than one interface to support packetized application traffic. *Kotzin*, ¶273.

Moreover, as management of application traffic, including by connection manager 336, is implemented using software, a POSITA could have pursued this approach with a reasonable expectation of success. *Kotzin*, ¶274.

N. Claim 14

Bahl in combination with *Hsu* and *Weisshaar* discloses or suggests the features of claim 14 for the reasons discussed in Section VIII.B.6, *supra*. *Kotzin*, ¶¶275-279. Specifically, the *Bahl-Hsu-Weisshaar* network selection method discloses or suggests having a mobile use, *e.g.*, a WLAN tuner to scan for WLAN availability during a period where the WLAN tuner is not in an active packet data session and a cellular tuner is in an active packet data session with a cellular network to support handover of an application from one network interface (*e.g.*, cellular) to another (*e.g.*, WLAN). *See* Section VIII.B.6, *supra*.

Bahl further discloses “if 802.11b is selected as the preferred connectivity technology based on a value for the QN 924, and it is later determined, as indicated by a change in the value of the QN 924, that 802.11a should be used (or vice versa), the computing device *seamlessly transitions* to the selected technology. Regardless

of whether or not the two wireless technologies provide connectivity to the same subnet, the migration process from one wireless technology to another are *transparent to applications running on the computing device.*” *Bahl*, [0127], [0123] (“Fast handoff schemes are employed to make handoff as seamless as possible.”); *Kotzin*, ¶276.

A POSITA would have understood that a “seamless” transition from one network interface to another is a handoff that allows a user’s communication session to remain active without interruptions so that a first application that was using a first interface during network discovery can use a second interface based on the handoff. *Kotzin*, ¶¶277-278. In fact, over a decade before the provisional application for the ’436 patent was filed, *Byrne* explained that a “seamless handover” is a handover that makes “a connection to a new radio telephone system is made before breaking the existing connection with the old system.” *Byrne*, 8:20-22; *Kotzin*, ¶278.

Accordingly, the *Bahl-Hsu-Weisshaar* network selection method discloses or suggests having a mobile scan for and/or measure characteristics of a network interface (“said second interface is used during said silent period to perform network discovery functions”) and perform handoffs between network interfaces seamlessly and transparently to applications running on the computing device (“which network discovery functions are used for handover of said mobile to a new network,

transparent to and without interference to operation of said first application that concurrently uses said first interface during said network discovery”).

IX. GROUND 2: *BAHL* IN VIEW OF *HSU*, *WEISSHAAR* AND *WHITE* RENDER OBVIOUS CLAIM 13

A. *Bahl* in view of *Hsu*, *Weisshaar*, and *White*

As discussed in Section VIII.A, it would have been obvious to a POSITA to combine *Bahl*, *Hsu*, and *Weisshaar*. *Kotzin*, ¶281. To the extent that Patent Owner argues that the *Bahl-Hsu-Weisshaar* combination would not, “during said silent period,” “transmit[] packetized application traffic for said first application concurrently over both said first and second heterogeneous interfaces” “to support application traffic of said first application for enhanced bandwidth,” it would have been further obvious to incorporate the teachings of *White* into multi-interface devices utilizing the *Bahl-Hsu-Weisshaar* network selection method for the reasons discussed below. *Kotzin*, ¶282.

1. *White* (EX1008)

White is directed to “providing a multi-access terminal that automatically and dynamically establishes and maintains simultaneous connections over multiple heterogeneous networks, creating aggregated communications pipes to one or more destinations.” *White*, 3:3-8; *Kotzin*, ¶283.

Of relevance to this Petition, *White* teaches that “the traffic load can be shared across a number of network connections” by transmitting multiple packets to the

same destination over multiple network paths. *White*, 8:15-23. *White* explains that by load sharing in this manner, the network connections can provide “broadband capacity, beyond the capability of any individual network connection.” *White*, 8:15-23; *Kotzin*, ¶284.

As discussed in Section III, *White* constitutes pre-AIA § 102(e) prior art because *White* described its invention in a published patent application – here, U.S. Patent Application No. 11/283,610 (the “’610 App.”). The ’610 App. was filed on November 18, 2005, over two months before the purported earliest effective filing date of the ’436 patent. Accordingly, *White* constitutes pre-AIA § 102(e) prior art at least as of its filing date.

2. *White* is Analogous Art to the ’436 Patent

White is analogous art to the ’436 patent because *White* is from the same field of endeavor as the alleged invention of the ’436 patent and is reasonably pertinent to the problems faced by the inventors of the ’436 patent.⁴ *Kotzin*, ¶¶285-289.

First, like the ’436 patent, *White* relates to using one or more network interfaces in response to application and operating condition factors. For example, *White* provides that “[o]perating system software is provided for dynamically

⁴ *Bahl*, *Hsu*, and *Weisshaar* are likewise analogous art to the ’436 patent for the reasons discussed above in Section VIII.A.3.

establishing and maintaining traffic flow for user applications over multiple communications paths, and for automatically adapting to variations in the networking environment, application traffic flow requirements, end user preferences, or mobility.” *White*, Abstract. Accordingly, *White* is from the same field of endeavor as the alleged invention of the ’436 patent. *Kotzin*, ¶¶286-287.

Second, *White* is reasonably pertinent to addressing the problems with which the inventors of the ’436 patent were involved, namely gaining an advantage from “the mobile us[ing] its network interfaces according to the applications and situations responsiveness.” ’436*Pat*, 2:43-45. As discussed above, *White* also provides a solution by providing a framework for selecting one or more network interfaces in response to application and operating condition factors. *Kotzin*, ¶288, *White*, Abstract. Accordingly, *White* is reasonably pertinent to the problems purportedly with which the inventors of the ’436 patent were involved. *Kotzin*, ¶¶288-289.

**3. A POSITA Would Have Found It Obvious to Combine
*Bahl, Hsu, Weisshaar, and White***

As discussed in Section VIII.A.5, a POSITA would have been motivated to combine the complementary teachings of *Bahl, Hsu, and Weisshaar*. In addition, a POSITA would have been further motivated to combine *Bahl, Hsu, and Weisshaar* with *White* for the following reasons. *Kotzin*, ¶290-298.

First, *White* belongs to the same field of endeavor as *Bahl*, *Hsu*, and *Weisshaar*, network selection methods for devices containing heterogeneous radio interfaces. *White*, Abstract; Section VIII.A.5; *Kotzin*, ¶291.

Second, a POSITA would have been motivated to combine *White* with *Bahl*, *Hsu*, and *Weisshaar* because *White*'s known bandwidth enhancement technique would improve multi-interface devices, such as the multi-interface devices disclosed by *Bahl*, *Hsu*, and *Weisshaar*, in a similar way to obtain predictable results (enhanced bandwidth). *Kotzin*, ¶¶292-293.

Each of *Bahl*, *Hsu*, *Weisshaar*, and *White* are directed to methods of controlling multi-interface devices. *Bahl*, [0045] (“[A] personal computer 214 located proximate to the notebook computer 200 is equipped with multiple wireless network technology interfaces.”); *Hsu*, [0077] (“[T]he Mobile Station (MS) has two tuners that can tune to a cellular frequency and the WLAN frequency simultaneously.”); *Weisshaar*, [0051] (“[T]he connection manager manages multiple interfaces and reports concurrent use of more than one interface, either by the same or different applications.”); *White*, Abstract; *Kotzin*, ¶292. Accordingly, the multi-interface devices disclosed by *Bahl*, *Hsu*, *Weisshaar*, and *White* are each functionally-equivalent base devices for purposes of incorporating *White*'s teachings. *Kotzin*, ¶292.

Moreover, *White* teaches that bandwidth for an application of a multi-interface device can be enhanced by transmitting multiple packets simultaneously to the same destination over multiple networks to “sum” capacity. *Kotzin*, ¶294. For example, *White* teaches that “multiple packets 74 a-74 f can be transmitted simultaneously to the same destination over the multiple network connection paths 72 a-72 f, thereby summing the capacity over the multiple network connection paths 72 a-72 f so as to provide broadband capacity, beyond the capability of any individual network connection.” 8:15-25; *Kotzin*, ¶294. In this way, “users could ‘sum’ capacity across a set of networks to realize the bandwidth needed for high quality images or video, i.e. a mobile terminal can operate over multiple channels at the same time.” *White*, 22:6-9; *Kotzin*, ¶¶295-296.

As each of *Bahl*, *Hsu*, *Weisshaar*, and *White* are directed to controlling similar devices with multiple network interfaces, a POSITA could have applied this improvement in the same way to obtain predictable results (*i.e.*, enhanced bandwidth). *Kotzin*, ¶297. Relatedly, like *Bahl*, *Hsu*, and *Weisshaar*, *White*’s techniques are applied through software. *White*, Abstract (“Operating system software is provided for dynamically establishing and maintaining traffic flow for user applications over multiple communications paths[.]”); *Kotzin*, ¶298. The programming implementing *White*’s teachings were thus within the POSITA’s ordinary skill and would produce predictable results. *Id.*

B. Claim 13

Bahl in combination with *Hsu*, *Weisshaar*, and *White* discloses or suggests the features of claim 13. *Kotzin*, ¶¶299-304.

For example, *White* discloses that “multiple packets 74 a-74 f can be transmitted simultaneously to the same destination over the multiple network connection paths 72 a-72 f, thereby summing the capacity over the multiple network connection paths 72 a-72 f so as to provide broadband capacity, beyond the capability of any individual network connection.” *White*, 8:15-25. In this way, “users could ‘sum’ capacity across a set of networks to realize the bandwidth needed for high quality images or video, i.e. a mobile terminal can operate over multiple channels at the same time.” *White*, 22:6-9; *Kotzin*, ¶300. The multiple network connection paths can be heterogeneous network connection paths. *White*, Abstract (“The mobile terminal can “load-share” traffic, i.e., it can distribute segments of traffic over a full set of heterogeneous networks, significantly improving the reliability and availability of communications.”); *Kotzin*, ¶301. Relatedly, a POSITA would have understood the above disclosures are directed to increasing the bandwidth of a single application, e.g., an application for downloading/streaming “high quality” video. *Kotzin*, ¶302; *White*, 22:6-9.

Moreover, a POSITA would have been motivated to use *White*’s bandwidth enhancement technique during a period in which one of the network connection

paths was not transmitting or receiving application traffic for the reasons discussed in Section VIII.B.6, *supra*; *Kotzin*, ¶303.

Accordingly, the *Bahl-Hsu-Weisshaar-White* method discloses or suggests summing capacity across a set of networks (“wherein said first and second heterogeneous interfaces are used concurrently”) during a period where one of the network connection paths is not transmitting or receiving application traffic (“during said silent period”) to provide increased bandwidth for a currently active application (“to support application traffic of said first application for enhanced bandwidth support by transmitting packetized application traffic for said first application concurrently over both said first and second heterogeneous interfaces”).

X. GROUND 3: *BAHL* IN VIEW OF *HSU*, *WEISSHAAR* AND *RANTA* RENDER OBVIOUS CLAIMS 9, 15-17 AND 19

A. *Bahl* in view of *Hsu*, *Weisshaar*, and *Ranta*

As discussed in Section VIII.A, it would have been obvious to a POSITA to combine *Bahl*, *Hsu*, and *Weisshaar*. For the reasons discussed below, it would have been further obvious to incorporate the teachings of *Ranta* into multi-interface devices utilizing the *Bahl-Hsu-Weisshaar* network selection method. *Kotzin*, ¶¶305-338.

1. *Ranta* (EX1009)

Ranta is directed to “techniques to optimize the power consumption of portable, battery powered mobile stations.” *Ranta*, [0001]; *Kotzin*, ¶308.

Specifically, *Ranta* teaches that “[o]ne significant power consuming operation of mobile stations is a requirement to make measurements of signals received from base stations or base sites of neighboring cells when operating within a currently serving cell.” *Ranta*, [0003]; *Kotzin*, ¶309. Accordingly, *Ranta* discloses a “method for operating a mobile station (100) to reduce the power consumption thereof as a function of a presence or absence of motion, and as a function of a duration of a period over which motion above a motion threshold is not detected.” *Ranta*, Abstract; *Kotzin*, ¶¶309-311.

Ranta explains that its power consumption reduction method may be applied to a “mobile station (MS),” which may be embodied as a “any device capable of bidirectional communication with a wireless network,” including a “handheld cellular telephone,” “a vehicle-installed cellular telephone,” “a personal data assistant (PDA) device having wireless communication capabilities,” and a “laptop.” *Ranta*, [0018]; *Kotzin*, ¶312. Relatedly, *Ranta* explains that the mobile station transmits data in accordance with a predetermined “air interface standard,” which can “conform to any standard that enables voice and/or packet data transmissions to occur to and from the mobile station 100, such as packet data transmissions enabling Internet 70 access and web page downloads.” *Ranta*, [0019], [0021]; *Kotzin*, ¶313.

Ranta’s power consumption reduction method has “two major aspects.” *Ranta*, [0029]; *Kotzin*, ¶314. “The first aspect pertains to the calculation of a motion

indicator that is descriptive of an amount of motion, if any, of the MS 100, and that takes into account an amount of time that the MS 100 is motionless.” *Id.* “The second aspect of these teachings relates to the optimization of the power consumption of various systems, subsystems and operations of the MS 100 in accordance with the calculated motion indicator.” *Id.*; *Ranta*, [0030].

2. *Ranta* is Analogous Art to the ’436 Patent

Ranta is analogous art to the ’436 patent because *Ranta* is from the same field of endeavor as the alleged invention of the ’436 patent and is reasonably pertinent to the problems faced by the inventors of the ’436 patent.⁵ *Kotzin*, ¶¶315-320.

First, like the ’436 patent, *Ranta* relates to using network interfaces in response to sensed operating conditions. For example, *Ranta* discloses entering into a “‘reduced’ operating mode,” which means using a “minimal set of positioning functions when there is a high probability that the MS 100 is stationary.” *Ranta*, [0057]. Accordingly, *Ranta* is from the same field of endeavor as the alleged invention of the ’436 patent. *Kotzin*, ¶¶316-317.

Second, the ’436 patent explains that “more advantage could be reaped if the mobile uses its network interfaces according to the applications and situations

⁵ *Bahl*, *Hsu*, and *Weisshaar* are likewise analogous art to the ’436 patent for the reasons discussed above in Section VIII.A.3.

responsiveness.” ’436*Pat*, 2:43-45. *Ranta* is reasonably pertinent to this problem. For example, *Ranta* provides a solution by teaching that network interfaces could be used more efficiently when “there is a high probability that the MS 100 is stationary.” *E.g.*, *Ranta*, [0057]. Accordingly, *Ranta* is reasonably pertinent to the problems purportedly faced by the inventors of the ’436 patent. *Kotzin*, ¶¶318-320.

3. A POSITA Would Have Found It Obvious to Combine *Bahl*, *Hsu*, *Weisshaar*, and *Ranta*

As discussed in Section VIII.A.5, a POSITA would have been motivated to combine the complementary teachings of *Bahl*, *Hsu*, and *Weisshaar*. *Kotzin*, ¶321. In addition, a POSITA would have been further motivated to combine *Bahl*, *Hsu*, and *Weisshaar* with *Ranta* for the following reasons. *Kotzin*, ¶¶322-338.

First, each of *Bahl*, *Hsu*, *Weisshaar*, and *Ranta* share a common concern for optimizing power consumption of mobile devices. *Bahl*, [0117] (“[I]n an energy conservation mode of operation, a criterion specifies that if the throughput requirements of the applications can be satisfied by 802.11b and there is no other factor, such as CST for instance, overriding this factor, then the 802.11b wireless technology is selected.”); *Hsu*, [0008] (“As the mobile station often has little information as to the location and accessibility of a WLAN, the mobile station may scan for the WLAN periodically expending considerable power. There is a need therefore for an efficient, accurate method of system detection and selection.”);

Weisshaar, [0047] (disclosing that power manager 338 “can enforce a low-power mode in emergency situations, reserving power to the highest priority functions.”); *Ranta*, [0001] (“These teachings ... more specifically relate to techniques to optimize the power consumption of portable, battery powered mobile stations.”); *Kotzin*, ¶¶323-327.

Second, a POSITA would have been motivated to combine *Ranta* with *Bahl*, *Hsu*, and *Weisshaar* because *Ranta*’s known power conservation technique would improve the mobile devices disclosed by *Bahl*, *Hsu*, and *Weisshaar* in a similar way to obtain predictable results (*i.e.*, optimized power consumption). *Kotzin*, ¶¶328-329.

Each of *Bahl*, *Hsu*, *Weisshaar*, and *Ranta* are directed to methods of controlling network-connected devices, including mobile devices. *Bahl*, [0041]; *Hsu*, [0077]; *Weisshaar*, [0057]; *Ranta*, [0001]; *Kotzin*, ¶328. Accordingly, the network-connected devices disclosed by *Bahl*, *Hsu*, *Weisshaar*, and *Ranta* are each functionally equivalent base devices for purposes *Ranta*’s teachings. *Kotzin*, ¶329.

Moreover, *Ranta* teaches that power consumption of a mobile station can be optimized by controlling use of network interfaces, such as by “selectively decreasing the usage of the mobile station cellular system reception circuitry, the cellular system positioning function and the satellite-based positioning function” when “an absence of motion is detected[.]” *Ranta*, [0011]; *Kotzin*, ¶330. As *Bahl*, *Hsu*, *Weisshaar*, and *Ranta* are directed to network connected devices, a POSITA

could have applied this improvement in the same way to obtain predictable results (*i.e.*, optimized power consumption). *Kotzin*, ¶331.

A POSITA would have understood that at least two alternative implementations of *Ranta*'s power conservation technique could be made to the *Bahl-Hsu-Weisshaar* network selection method with a reasonable expectation of success. *Kotzin*, ¶332. The first implementation would be to incorporate *Ranta*'s teaching of measuring whether a mobile station is moving or stationary into the variety of factors used by *Bahl*, *Hsu*, and *Weisshaar* for network selection. *Kotzin*, ¶¶333-334. The second implementation would be to incorporate *Ranta*'s teaching of making efficient use of network interfaces as a complementary means for conserving power on devices applying the *Bahl-Hsu-Weisshaar* network selection method. *Kotzin*, ¶¶335-336.

Either of these implementations would have had a reasonable expectation of success because, like *Bahl*, *Hsu*, and *Weisshaar*, *Ranta*'s techniques are applied through software. *Ranta*, [0023] ("The ROM is assumed, for the purposes of this invention, to store a program enabling the MCU 120, in cooperation with a DSP 180 described below, to execute the software routines, layers and protocols required to implement an improved mobile station motion determination function in accordance with the teachings herein."); *Kotzin*, ¶337. The programming

implementing *Ranta*'s teachings were within the POSITA's ordinary skill and would produce predictable results. *Kotzin*, ¶338.

B. Claim 9

Bahl in combination with *Hsu*, *Weisshaar*, and *Ranta* discloses or suggests the features of claim 9. *Kotzin*, ¶¶339-344.

For example, *Ranta* discloses that a mobile station can be optimized by controlling use of network interfaces, such as by “selectively decreasing the usage of the mobile station cellular system reception circuitry, the cellular system positioning function and the satellite-based positioning function” when “an absence of motion is detected[.]” *Ranta*, [0011]; [0057], [0048]-[0049] (disclosing a “power conservation algorithm” that includes the variable MOTION_THRESHOLD, which is the “limit between the decision as to whether the MS 100 is stationary or is moving”); *Kotzin*, ¶¶340-341. A POSITA would have understood that a “mobile station cellular system reception circuitry” refers to a network interface. *Kotzin*, ¶342.

Moreover, a POSITA would have been motivated to use *Ranta*'s optimized power consumption technique during a period in the network interface was not transmitting or receiving application traffic for the reasons discussed in Section VIII.B.6, *supra*. *Kotzin*, ¶343.

Accordingly, the *Bahl-Hsu-Weisshaar-Ranta* method discloses or suggests decreasing network interface usage (“having said mobile control processes of said mobile”) during a period in the network interface was not transmitting or receiving application traffic (“during silent periods”) when an absence of motion is detected (“based on said mobile moving or not moving”).

C. Claim 15

Bahl in view of *Hsu*, *Weisshaar* and *Ranta* renders obvious claim 15. *Kotzin*, ¶¶345-357.

1. 15[pre]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 15[pre] for the reasons discussed in Section VIII.B.1, *supra*, with respect to claim 1’s preamble. *Kotzin*, ¶346.

2. 15[a]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 15[a] for the reasons discussed in Section VIII.B.2, *supra*, with respect to claim 1. *Kotzin*, ¶347.

3. 15[b]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 15[b] for the reasons discussed in Section VIII.B.3, *supra*, with respect to claim 1. *Kotzin*, ¶348.

4. 15[c]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 15[c] for the reasons discussed in Section VIII.B.5, *supra*, with respect to claim 1. *Kotzin*, ¶349.

5. 15[d]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 15[d] for the reasons discussed in Section VIII.I, *supra*, with respect to claim 8. *Kotzin*, ¶350.

6. 15[e]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 15[d]. *Kotzin*, ¶¶351-357.

First, as discussed in Sections VIII.B.5 and I, *supra*, *Bahl* discloses having a mobile computing device select a network interface based on whether the mobile computing device is running a real-time-application or a non-real-time application. *Bahl*, [0121]; *Kotzin*, ¶¶352-354.

Second, as discussed in Section X.A.3, *supra*, a POSITA would have found it obvious to further incorporate *Ranta*'s teaching of measuring whether a device is moving or stationary into the variety of factors used by *Bahl*, *Hsu*, and *Weisshaar* in determining whether to select a network interface. *Kotzin*, ¶355.

Third, *Bahl* discloses having a mobile computing device select a network interface based on whether power consumption is an issue. For example, *Bahl* discloses that:

A user opens a laptop in a packed airline lounge with many people using the lounge's 802.11a wireless network access point. The lounge also has an 802.11b network access point. Both network access points are free for the use by people in the lounge and provide the same kind of connectivity. The user is running OUTLOOK and IE on the laptop machine. The operating system senses that the 802.11a network/access point is overloaded and congested. Also, *the battery on the Patrick's laptop is running low. In response to the low battery power and the congested state of the 802.11a access point, the operating system selects the 802.11b connection to which it will connect.* At some later time, the airline lounge empties, and the 802.11a network access point is no longer overloaded or congested. Furthermore, *the battery has been charged, and power is no longer an issue because the user has plugged the laptop into a power socket. The operating system senses the changed environment, decides that 802.11a network offers the best service, and so changes wireless technology usage from 802.11b to 802.11a to take advantage of the higher bandwidth offered by the 802.11a connection.*

Bahl, [0095]; *Kotzin*, ¶356.

Accordingly, the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests selecting a network interface (“having said mobile perform

certain processes”) based on combinations of whether a mobile computing device is running a real-time or non-real-time application, is moving or stationary, and if power consumption is an issue (“based on: a) if it is running a real-time application and it is stationary; b) if it is running a non-real-time application and it is moving; c) if it is running a non-real-time application and it is stationary; and d) if it is stationary and power consumption is not an issue.”).

D. Claim 16

Bahl in view of *Hsu*, *Weisshaar*, and *Ranta* renders obvious claim 16. *Kotzin*, ¶¶358-380.

1. 16[a]

Bahl in view of *Hsu*, *Weisshaar*, and *Ranta* renders obvious claim limitation 16[a]. *Kotzin*, ¶¶359-364.

Bahl discloses performing QoS enhancement as part of its network selection method. *Kotzin*, ¶360. For example, *Bahl* discloses that “[t]he STA determines the throughput requirements of the applications running on it based on *quality of service attributes set by the applications*.” *Bahl*, [0127], [0123]. A POSITA would have understood that selection of an interface based on the quality of service attributes set by an application constitutes QoS enhancement. *Kotzin*, ¶¶361-362. This is at least because such information ensures that throughput of a newly selected network is

acceptable for applications running on a mobile device. *See Kotzin '968* (explaining use of quality of service requirement data for acceptable communication bit rate).

Moreover, as discussed in Section X.C.6, *supra*, the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests selecting a network interface based on combinations of whether a mobile computing device is running a real-time or non-real-time application, is moving or stationary, and if power consumption is an issue. A POSITA would thus have understood that the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests selecting a network interface based on if a mobile computing device is running a real-time application and it is stationary. *Kotzin*, ¶363.

Accordingly, the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests performing QoS enhancement by selecting a network interface based on the quality of service attributes set by an application running on a mobile computing device (“having said mobile perform: e) QoS enhancement”), whether the mobile computing device is running a real-time application (“if it is running a real-time application”), and whether the mobile computing device is stationary (“and it is stationary”).

2. 16[b]

Bahl in view of *Hsu*, *Weisshaar* and *Ranta* renders obvious claim limitation 16[b]. *Kotzin*, ¶¶365-371.

Hsu discloses performing network discovery functions. *Kotzin*, ¶¶365-367. For example, *Hsu* discloses that “the MS 300 detects WLAN coverage and performs system selection between WLAN and the cellular system using one tuner for each access medium.” *Id.*; *Hsu*, [0077]. *Hsu* further discloses that the “MS 300 may decide to scan for WLAN coverage based on one or more factors, e.g., user command(s), pre-configured preference(s), application status (e.g., on-going packet data session), WLAN availability advertisement as received from the cellular network, etc.” *Id.*, *Hsu*, [0082].

Relatedly, the '436 patent explains that part of the disclosed “Network Discovery/Proactive Handoff Mode (NDM)” is “select[ing] a target network to which the MID may switch to next.” '436*Pat.*, 11:43-45. Accordingly, a POSITA would have understood that determining which network to select constitutes “network discovery.” *Kotzin*, ¶¶368-369.

As discussed in Section X.C.6, *supra*, the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests determining a network to select based on combinations of whether a mobile computing device is running a real-time or non-real-time application, is moving or stationary, and if power consumption is an issue. A POSITA would thus have understood that the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests selecting a network based on

if a mobile computing device is running a non-real-time application and it is moving.
Kotzin, ¶370.

Accordingly, the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests performing network scanning and/or selection (“network discovery”) if the mobile computing device is running a non-real-time application and it is moving (“if it is running a non-real-time application and it is moving”).

3. 16[c]

Bahl in view of *Hsu*, *Weisshaar* and *Ranta* renders obvious claim limitation 16[c]. *Kotzin*, ¶¶372-375.

For example, *Bahl* discloses a scenario in which a user’s laptop switches to a lower power consuming network when the laptop battery is low and the laptop is running two non-real-time applications. *Bahl*, [0095], [0122], [0127] (“[I]n an energy conservation mode of operation, a criterion specifies that if the throughput requirements of the applications can be satisfied by 802.11b and there is no other factor, such as CST for instance, overriding this factor, then the 802.11b wireless technology is selected.”); *Kotzin*, ¶373.

Moreover, *Ranta* discloses that “[t]he controller compares the value to a motion threshold and, ***when an absence of motion is detected***, the controller is responsive for reducing the power consumption of the mobile station by selectively decreasing the usage of the mobile station cellular system reception circuitry, the

cellular system positioning function and the satellite-based positioning function.”

Ranta, Abstract; *Kotzin*, ¶374.

Accordingly, the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests performing energy conservation (“energy conservation”) if the mobile computing device is running a non-real-time application and is stationary (“if it is running a non-real-time application and it is stationary”).

4. 16[d]

Bahl in view of *Hsu*, *Weisshaar* and *Ranta* renders obvious claim limitation 16[c]. *Kotzin*, ¶¶376-380.

Bahl discloses information sharing using an ad hoc network connection between devices. *See Bahl*, [0097] (“[T]hey form an ad hoc group over a Wi-Fi network to share presentation material.”); *Kotzin*, ¶377. A POSITA would have understood that sharing presentation materials constitutes “information sharing,” including in view of the ’436 patent’s specification, which provides that types of information shared between devices in a “Chat with Devices Mode” include information of “Device” or “Human” interest. *Kotzin*, ¶378.

Relatedly, as discussed in Section X.C.6, *supra*, the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests determining a network to select based on combinations of whether a mobile computing device is running a real-time or non-real-time application, is moving or stationary, and if power

consumption is an issue. A POSITA would thus have understood that the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests selecting a network based on if a mobile computing device is stationary and power consumption is not an issue. *Kotzin*, ¶379.

Accordingly, the *Bahl-Hsu-Weisshaar-Ranta* network selection method discloses or suggests making ad hoc connections between devices where devices may share information (“information sharing”) if the mobile computing device is stationary and power consumption is not an issue (“if it is stationary and power consumption is not an issue”).

E. Claim 17

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim 17 for the reasons discussed in Sections VIII.B.5.b, VIII.J, *supra*. *Kotzin*, ¶381.

F. Claim 19

Bahl in view of *Hsu*, *Weisshaar* and *Ranta* renders obvious claim 19. *Kotzin*, ¶¶382-402.

1. 19[pre]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 19[pre] for the reasons discussed in Section VIII.B.1, *supra*, with respect to claim 1’s preamble. *Kotzin*, ¶383.

2. 19[a]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 19[a] for the reasons discussed in Section VIII.B.1, *supra*, with respect to claim 1's preamble. *Kotzin*, ¶384.

3. 19[b]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 19[b]. *Kotzin*, ¶¶385-387. For example, *Bahl* describes “a suitable operating environment 100 for a computing device (e.g., a notebook computer, an appliance such as access point, etc.)” that contains a processing unit, as shown below in Fig. 1. *Bahl*, [0032].

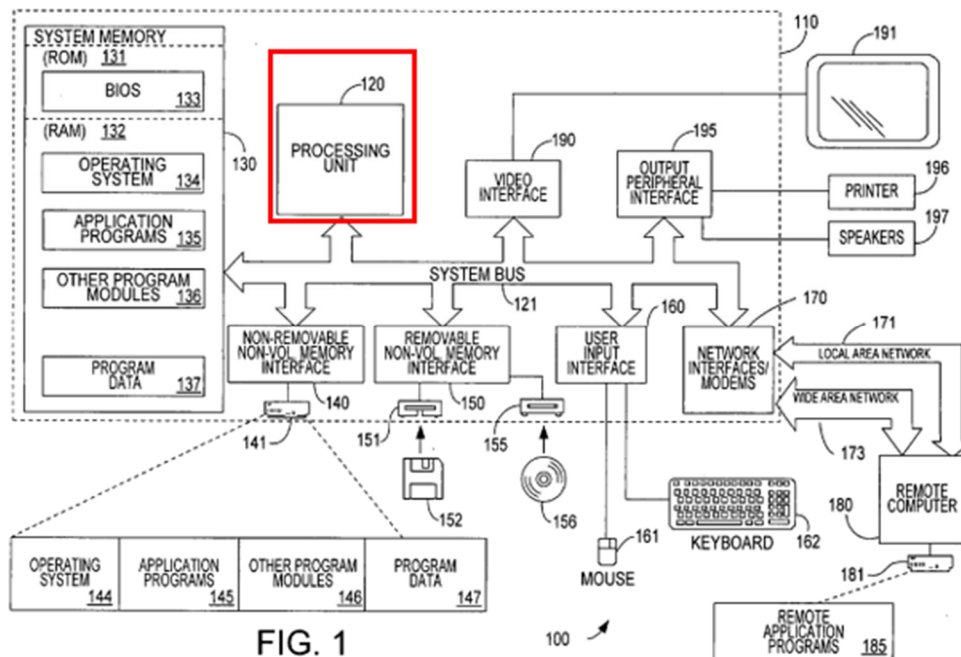


FIG. 1

Annotated *Bahl*, Fig. 1

Accordingly, *Bahl* discloses a computing device with a processing unit (“a processor”).

4. 19[c]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 19[c] for the reasons discussed in Sections VIII.B.2, VIII.I, *supra*, with respect to claims 1 and 8. *Kotzin*, ¶388.

5. 19[d]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 19[d] for the reasons discussed in Sections VIII.B.3, X.B, *supra*, with respect to claims 1 and 9. *Kotzin*, ¶389.

6. 19[e]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 19[e] for the reasons discussed in Section VIII.B.5, *supra*, with respect to claim 1. *Kotzin*, ¶390.

7. 19[f]

Bahl in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests the features of claim limitation 19[f]. *Kotzin*, ¶¶391-402.

For example, *Bahl* discloses an energy conservation mode (“energy saving mode”). *Kotzin*, ¶392. Specifically, *Bahl* discloses that in an “energy conservation mode of operation,” if “a criterion specifies that [] the throughput requirements of

the applications can be satisfied by 802.11b and there is no other factor, such as CST for instance, overriding this factor, then the 802.11b wireless technology is selected.” *Id.*; *Bahl*, [0127].

Moreover, *Bahl* discloses switching into an energy conservation mode based on the needs of the applications running on a mobile computing device and its sensed operating conditions (“said mobile is configured to switch between modes of operation of based on said application awareness and said situation awareness, including to switch between one or more of the following modes of operation ... energy saving mode”). *Kotzin*, ¶393. For example, *Bahl* describes a scenario where a user’s laptop switches to a lower power consuming network when the laptop battery is low and the laptop is running two non-real-time applications. *See Bahl*, [0095]; *Kotzin*, ¶¶394-395.

A POSITA reviewing the above disclosures would have understood that the laptop switches into an energy conservation mode based on application awareness and situation awareness for at least the following reasons. *Kotzin*, ¶396.

First, the above disclosure expressly identifies that the laptop is running OUTLOOK and IE. *Kotzin*, ¶397; *Bahl*, [0095].

Second, a POSITA would have understood that reference to the congested state of the access point and the laptop’s decision that “802.11a network offers the best service” contemplates the applications running on the laptop. *Kotzin*, ¶398;

Bahl, [0095]. For example, *Bahl* discloses that this scenario “highlight[s] the advantages provided by the proposed selection scheme when incorporated into a computing device capable of communicating via multiple differing interfaces with potentially multiple, differing networks.” *Bahl*, [0091]; *Kotzin*, ¶399. As a further example, *Bahl*’s network selection scheme considers throughput as well as an application’s throughput requirements. *Bahl*, [0121], [0127]; *Kotzin*, ¶400.

Third, *Bahl* expressly discloses that “the particular criterion governing wireless interface/network selections is dynamically configured according to sensed operating conditions (e.g., battery power high/low).” *Bahl*, [0103]; *Kotzin*, ¶401.

Accordingly, *Bahl* in combination with *Hsu*, *Weisshaar* and *Ranta* discloses or suggests a mobile computing device that switches into an energy conservation mode (“wherein said mobile is configured to switch between modes of operation ... including to switch between one or more of the following modes of operation ... energy saving mode”) based on the needs of currently running applications and sensed operating conditions (“wherein said mobile is configured to switch between modes of operation of based on said application awareness and said situation awareness”).

XI. THE DISCRETIONARY FACTORS FAVOR INSTITUTING TRIAL

A. 35 U.S.C. § 314(a)

To the extent the patent owner asks the Board to exercise its discretion to deny institution despite the strong invalidity showing on the merits, the Board should decline to do so because the weight of the factors articulated in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (PTAB Mar. 20, 2020) (precedential), favors institution.⁶

1. *Potential for a District Court Stay.* Factor 1 is neutral. Petitioners have not requested a stay but intend to do so. The PTAB has explained that it will not speculate on how any such motion would be resolved, before one is filed. *Google LLC v. Parus Holdings, Inc.*, IPR2020-00847, Paper 9 at 12 (PTAB Oct. 21, 2020); *see also Hulu LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00298, Paper 11 at 10-11 (PTAB May 19, 2021) (concluding that without evidence of a requested stay or consideration by the district court in the parallel litigation, this factor does not significantly impact the Board’s exercising discretion to deny institution of the IPR).

⁶ The *Fintiv* framework should not be followed because it is legally invalid as (1) exceeding the Director’s authority, (2) arbitrary and capricious, and (3) adopted without notice-and-comment rulemaking.

2. Trial Date Relative to Final Written Decision (FWD) Due Date. The district court in the parallel litigation held a scheduling conference on July 18, 2024, and set jury selection for February 9, 2026, approximately 13 months away. EX1019. Any comparison of a projected FWD date against the scheduled trial date is speculative. *See Dish Network LLC v. Broadband iTV, Inc.*, IPR2020-01280, Paper 17 at 16 (PTAB Feb. 4, 2021) (“We cannot ignore the fact that the currently scheduled trial date is more than nine months away and much can change during this time”).

Setting that aside, this Petition is filed on January 30, 2025, so a FWD would be expected by July 2026. Although this is approximately five months after the currently scheduled (speculative) trial date, this factor is not determinative or considered in isolation. *Facebook, Inc. v. USC IP P’Ship*, IPR2021-00034, Paper 13 at 11 (PTAB Apr. 13, 2021) (“[T]his factor is not considered in isolation, but holistically along with other factors”) (citation omitted). Moreover, the Board has instituted IPR and found, on similar facts, that this factor weighs only minimally in favor of denial. *See, e.g., Google LLC, et al. v. Multimodal Media LLC*, IPR2024-00056, Paper 9 at 8 (PTAB Apr. 12, 2024) (a period of about six months between trial and the expected FWD “weighs only marginally in favor” of denial); *NetNut Ltd. v. Bright Data Ltd.*, IPR2021-01492, Paper 12 at 9-16 (PTAB Mar. 21, 2022) (instituting IPR without stipulation and co-pending trial date six months before

FWD); *Facebook*, IPR2021-00034, Paper 13 at 11 (a period of five months between trial and expected FWD “slightly favors denial”); *CoolIT Systems, Inc. v. Asetek Danmark A/S*, IPR2021-01195, Paper 10 at 11 (PTAB Dec. 28, 2021) (a period of five months between trial and expected FWD “weighs slightly in favor” of denial); *Equipmentsshare.com Inc. v. Ahern Rentals, Inc.*, IPR2021-00834, Paper 19 at 13 (PTAB Nov. 16, 2021) (a period of seven months between trial and expected FWD “weighs somewhat in favor” of denial).

3. *Investment in the Parallel Proceeding.* Factor 3 weighs strongly against discretionary denial. No substantive orders have been issued by the court in the underlying litigation, and investment in the parallel litigation will have remained low at the time of institution. *See, e.g., Hulu LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00298, Paper 11 at 12-14 (PTAB May 19, 2021) (holding that this factor supports instituting IPR given the early stage of the district court proceedings, the lack of substantial discovery related to invalidity claims, and the petitioner’s diligent filing of the petition after receiving preliminary infringement contentions). Assuming that a Decision on Institution is issued by July 2025, much work in district court will remain. *Id.* The *Markman* hearing is scheduled for August 11, 2025, opening expert reports are due September 24, 2025, and dispositive motions are due November 3, 2025. *Id.*

4. *Overlap of Issues.* Although the Challenged Claims are currently the same as those asserted in the litigation, Factor 4 should nevertheless be weighed as neutral, particularly given the early stage of the underlying litigation, because Patent Owner is likely to reduce the number of asserted claims before trial with the result that claims challenged in this proceeding will not be addressed by the district court. In fact, the Docket Control Order requires the Patent Owner to elect which claims it will pursue prior to trial. EX1019.

5. *Parties.* Petitioners and PO are also parties to the parallel litigation.

6. *Other Considerations.* Even if the *Fintiv* factors favor discretionary denial (which they do not), the merits are compelling here. The Office did not consider a wealth of prior art during prosecution that discloses and/or suggests the alleged invention.

Petitioners therefore respectfully submit that the *Fintiv* factors favor institution and that discretionary denial of this Petition would be neither appropriate nor equitable.

B. 35 U.S.C. § 325(d)

Considering the two-part framework discussed in *Advanced Bionics, LLC v. Med-El Elektromedizinische Gerate GMBH*, IPR2019-01469, Pap. 6, *8-9, the Board should not exercise its § 325(d) discretion to deny institution because the

grounds raised by this Petition are not the same or substantially the same as the art and arguments raised during prosecution (step one of *Advanced Bionics*). *Id.*

First, the Examiner did not consider or otherwise cite *Bahl*, which Samsung relies on as a primary reference for each ground.

Second, *Bahl* is not the substantially the same as any primary reference relied upon by the Examiner during the prosecution of the '436 patent.

During the prosecution of the '436 patent, the Examiner applied U.S. Patent No. 7,068,623 (“Barany”) and U.S. Patent Publication No. 2005/0245292 A1 (“Bennett”) as primary references. Applicant argued during prosecution that Barany does not disclose “having said mobile control processes, including use of said heterogeneous radio interfaces ... based on one or more of its application awareness and its operating situation awareness.” EX1004, 157-158.

Moreover, the '436 patent states that “[t]he present inventors have found that if a [Multiple Interface Device] becomes aware of the applications running on it, and also the situation it is operating in, most of the complex processes, circuitries, and algorithms running in the device, including radio interfaces, can be either run more efficiently or used for watchful multitasking.” ’436*Pat.*, 9:9-14; EX1004, 229. Directing the Examiner to this disclosure, the applicant argued that “Bennett does **not** even remotely contemplate these advantages.” EX1004, 229.

Bahl, on the other hand, is directed to controlling use of heterogeneous radio interfaces based on the needs of its currently running applications and sensed operating conditions to provide, among other things, “better connectivity,” (*Bahl*, [0124]) “energy conservation” (*Bahl*, [0127]), etc. See Section VIII.B.5, *supra*.

Third, the Examiner did not consider or otherwise cite to any reference relied upon in Grounds 1 or 2.⁷ As the Board must grant or deny institution on all three of Samsung’s grounds, the Board should decline to exercise discretionary denial over the limited use of a secondary reference in one of the three grounds. See *Ericsson Inc., et al., v. Active Wireless Techs., LLC*, IPR2024-00986, Pap. 13, *23-24 (declining to exercise discretion to deny institution where one of two grounds included a secondary reference considered during prosecution in view of the benefits of resolving the other ground).

⁷ The only reference Examiner considered is *Ranta*, a secondary reference, which is used only in Ground 3 for a limited purpose (disclosing monitoring moving or non-moving status). Moreover, for the reasons explained above, *Ranta* in combination with *Bahl*, *Hsu* and *Weisshaar* does not present the same or substantially the same art or arguments presented by the Examiner.

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

A. Real Parties-in-Interest

Petitioners identify themselves as the real parties-in-interest.

B. Related Matters

To the best of Petitioners' knowledge, the '436 patent has only been involved in the following district court litigation: *Four Batons Wireless, LLC v. Samsung Electronics Co., Ltd. et al.*, 2:24-cv-00284 (E.D. Tex.), filed April 26, 2024 ("District Court Litigation").

To the best of Samsung's knowledge, the '436 patent has not been challenged in any *inter partes* review prior to this proceeding.

Petitioners have also challenged Patent Owner's U.S. Patent No. 7,502,348 (IPR2025-00493), U.S. Patent No. 8,798,006 (IPR2025-00494), and U.S. Patent No. 8,239,671 (IPR2025-00495).

C. Lead and Backup Counsel

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D. Service Information

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E. Fees

Petitioners concurrently electronically submit the required fees for this Petition. The Board is authorized to charge Arnold & Porter Kaye Scholer LLP's deposit account, No. 50-2387, for any fee deficiency.

Date: January 30, 2025

Respectfully submitted,

/David A. Caine/

David A. Caine (Reg. No. 52,683)
Counsel for Petitioners

CERTIFICATE OF COMPLIANCE

The undersigned hereby certifies that the foregoing Petition for *Inter Partes* Review contains 13,897 words, excluding those portions identified in 37 C.F.R. §42.24(a), as measured by the word-processing system used to prepare this paper.

/David A. Caine/
David A. Caine (Reg. No. 52,683)
Counsel for Petitioners

CERTIFICATE OF SERVICE

I certify that on January 30, 2025, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 8,239,671 and supporting exhibits to be served via overnight delivery on the Patent Owner at the following correspondence address of record as listed on PAIR:

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