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 IPR2025-00493

U.S. Patent No. 7,502,348

Petition for *Inter Partes* Review of

U.S. Patent No. 7,502,348

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PETITIONERS' EXHIBIT LIST

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LISTING OF CHALLENGED CLAIMS

Reference	Claim Limitation
Claim 1	
1[pre]	A method for performing silent proactive handoff of a mobile device to a target network while the mobile device is using a current network, comprising:
1[a]	while the mobile device is using the current network to transport application traffic and the current network satisfies the mobile device's requirements,
1[b]	having the mobile device use at least one silent period of an application to temporarily connect to at least one target network
1[c]	to proactively perform at least one handoff action for potential later handoff to the target network.
Claim 2	
[2]	The method of claim 1, wherein said mobile device sends or receives substantially no traffic over the current access network during the at least one silent period.
Claim 3	
[3]	The method of claim 1, further including having the mobile device use the at least one silent period to connect to the target network so that the mobile device receives advertisement messages from the target network.
Claim 4	
[4]	The method of claim 1, further including having the mobile device use the at least one silent period to establish a layer-2 connection or association with the target network for receiving IP-layer or high layer advertisements from the target network.

Reference	Claim Limitation
Claim 5	
[5]	The method of claim 1, further including having the mobile device use the at least one silent period to perform layer-2, layer-3 or application layer authentication with the target network.
Claim 6	
[6]	The method of claim 1, further including having the mobile device perform the following handoff actions during the at least one silent period: a) discovering neighboring network information; b) obtaining a local IP address from the target network; and c) performing authentication with the target network.
Claim 7	
[7]	The method of claim 1, further including having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action.
Claim 8	
[8]	The method of claim 1, further including having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action by comparison to a pre-set or a dynamically determined threshold.
Claim 10	
[10]	The method of claim 1, further including the mobile device monitoring time periods between packets entering and/or leaving the mobile device over the current access network that the mobile device currently uses to transport its application traffic.

Reference	Claim Limitation
Claim 11	
[11]	The method of claim 1, further including having the mobile device predict an actionable silence period based on said monitoring of time periods and a prediction model.
Claim 13	
[13]	The method of claim 1, further including having said mobile device select a target network to which the mobile may switch to.
Claim 14	
[14]	The method of claim 13, further including when a target network is selected and an actionable silent period is detected, switching the mobile device's layer-2 connection to the target network.
Claim 15	
15[a]	The method of claim 1, further including having the mobile device connect successfully to the target network
15[b]	and before a current actionable silent period expires, having the mobile device enter an information discovery phase to listen to the target network's advertisement messages to learn information needed to perform handoffs at different protocol layers to the target network,
15[c]	and if the current actionable silent period has not expired after the information discovery phase, having the mobile device start at least one handoff action.
Claim 16	
[16]	The method of claim 15, further including after having the mobile device start said at least one handoff action, in the event that the current network continues to satisfy the mobile device's requirements, having the mobile device switch its network connection back to the current network.

Reference	Claim Limitation
Claim 17	
[17]	The method of claim 15, further including after having the mobile device start said at least one handoff action, in the event that the current network does not continue to satisfy the mobile device's requirements, having the mobile device perform the remaining handoff steps to finish a handoff.
Claim 18	
[18]	The method of claim 1, further including having said mobile device make a determination as to whether to utilize a silent proactive handoff based on an estimation of the time that the mobile device will be within a candidate network.
Claim 19	
[19]	The method of claim 18, further including having said mobile device make said determination based on one or more of the following parameters: types of user applications; relative speed at which the mobile device is moving; and a predicted size of a candidate network.
Claim 20	
20[pre]	A mobile device having silent proactive handoff capability, comprising:
20[a]	a) a traffic monitor component configured to monitor time periods between packets transmitted to or from the mobile device over a current access network;
20[b]	b) a target network selector component configured to select a target network to which the mobile device may potentially switch to when an actionable silence period is detected;
20[c]	c) a silence predictor component configured to predict the actionable silence period of an application; and

Reference	Claim Limitation
20[d]	d) a silent handoff controller configured to control a silent proactive handoff to a target network during the actionable silent period.
Claim 21	
[21]	The mobile device of claim 20, wherein said silent handoff controller is configured to establish connections to a target network, to discover network information about a target network, to obtain a local IP address for the mobile device from the target network, and to perform authentication with the target network.

I. INTRODUCTION

Petitioners Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. ("Samsung" or "Petitioners") request *inter partes* review of claims 1-8, 10, 11, and 13-21 of U.S. Patent No. 7,502,348 ("the '348 patent").

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

Petitioners certify that the '348 patent is available for *inter partes* review and that Petitioners are 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 and amended 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.) (Samsung Electronics Co., Ltd. served April 26, 2024). *See* EX1020.

III. STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED

Petitioners respectfully request review and cancellation under 35 U.S.C § 311 of claims 1-8, 10, 11, and 13-21 ("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
U.S. Patent Application Publication 2004/0165563 ("*Hsu*"), filed on February 24, 2003, and published August 26, 2004; prior art under 35 U.S.C. §§ 102(a) and 102(e) (EX1005)
U.S. Patent Application Publication 2004/0198302 ("*Hutchison*"), filed on January 24, 2003, and published October 7, 2004; prior art under 35 U.S.C. §§ 102(a) and 102(e) (EX1006)
U.S. Patent Application Publication 2003/0193910 ("*Shoaib*"), published October 16, 2003; prior art under 35 U.S.C. § 102(b) (EX1007)
U.S. Patent No. 5,457,810 ("*Ivanov*"), issued October 10, 1995; prior art under 35 U.S.C. § 102(b) (EX1008)

Grounds of Unpatentability	
1	Claims 1-8 and 13-15 are rendered obvious by *Hsu* under 35 U.S.C. § 103.
2	Claims 10, 11, 20, and 21 are rendered obvious by *Hsu* in view of *Hutchison* under 35 U.S.C. § 103.
3	Claims 16 and 17 are rendered obvious by *Hsu* in view of *Shoaib* under 35 U.S.C. § 103.
4	Claims 18 and 19 are rendered obvious by *Hsu* in view of *Ivanov* under 35 U.S.C. § 103.

IV. OVERVIEW OF THE '348 PATENT

A. The Specification

The '348 patent is generally directed to "methods of improving handoff of a mobile device between neighboring networks and/or the like." *'348Pat.*, 1:7-

9. Specifically, the '348 patent describes an approach referred to as "Silent Proactive Handoff" in which a mobile device that is using one network to transport its application traffic will use "silent periods to connect to one or more target neighboring network(s) temporarily (*i.e.*, only during these silent periods) and use[] this temporary connectivity to perform actions needed for handoff into the target network." *Id.*, 7:47-58. The '348 patent explains that a "silent period" may comprise time periods "during which the mobile [device] has no traffic to send or receive over the current access network," "during which the mobile [device] has substantially no traffic to send or receive," during which the mobile device "would not be expecting incoming traffic at the IP and higher protocol layers," during which the mobile device "does not need to send or receive IP or higher layer traffic (*e.g.*, not just application layer traffic)," and/or during which the mobile device "may send or receive only certain IP layer or higher layer traffic (such as, *e.g.*, application layer traffic) which, when temporarily interrupted (*e.g.*, delayed or discarded), will substantially not cause undesirable or unexpected effects to the user of a mobile device." *Id.*, 7:59-8:13.

The '348 patent also explains that "handoff actions" may include discovering neighboring network information, obtaining a local IP address from a target network, and/or performing authentication with the target network. *Id.*, 8:47-9:5.

B. The Prosecution History

The ’348 patent issued on March 10, 2009, from U.S. Patent Application No. 11/096,721 filed April 1, 2005.

On July 3, 2008, the Patent Office issued a rejection based on U.S. Patent No. 7,215,958 in view of U.S. Patent Application Publication No. 2006/0085552. *FileHistory*, 100. In response, Patent Owner amended the claims (*id.* at 119-124) and argued that the claims were distinguishable over the prior art references because neither reference disclosed nor suggested using a silent period of an application to perform handoff processing (*id.* at 125-129). The claims were then allowed. *Id.* at 137.

V. OVERVIEW OF THE PRIOR ART

The prior art references analyzed in the grounds below are analogous to the ’348 patent because they are within the same field of endeavor as the ’348 patent and reasonably pertinent to at least one problem with which the inventors of the ’348 patent were involved. *Kotzin*, ¶¶47-51. For example, like the ’348 patent, *Hsu* is directed to techniques for detecting and selecting potential networks to which a mobile station (or device) may connect and handing over the mobile station (or device) from one network to another. *Id.* ¶48. *Hutchison* relates to terminals in wireless communication systems and techniques performed in consideration of (or in conjunction with) pertinent events, including hand-offs. *Id.* ¶49. *Shoaib* relates to

the field of wireless networks and is directed to a method of performing a handover from one network to another. *Id.* ¶50. And *Ivanov* is directed to a handover decision process for a mobile station potentially moving from one cell (or network) to a neighboring cell (or network). *Id.* ¶51; *see also id.* ¶¶48-51 (further describing how each of the prior art references are also reasonably pertinent to at least one problem with which the inventors of the '348 patent were involved).

Hsu discloses a method and apparatus for detection and selection of WLAN service by a mobile in a cellular communication system. *Hsu*, Abstract, ¶[0005]; *see also Kotzin*, ¶¶52-55. *Hsu* explains that "users desire access to local WLANs to enhance reception and data rates of communications through a wireless device." *Hsu*, ¶[0007]. However, "[a]s 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." *Id.* ¶[0008]. Accordingly, *Hsu* explains that there is "a need therefore for an efficient, accurate method of system detection and selection." *Id.*

Hsu teaches techniques for detecting and selecting a WLAN with respect to a one-tuner embodiment, in which a mobile device may only tune to one system (WLAN or cellular) at a given time, and a two-tuner embodiment, in which a mobile station can tune to a cellular frequency and the WLAN frequency simultaneously. *See generally id.* ¶¶[0058]-[0075] (describing the one-tuner

embodiment); *id.* ¶¶[0076]-[0090] (describing the two-tuner embodiment). With respect to each embodiment, and addressing the need for an "efficient" detection system discussed above, *Hsu* teaches that the mobile station may not scan for WLAN coverage when the mobile station has an active packet data session with the cellular network. *See id.* ¶[0062]; *see also id.* ¶[0082] ("The MS 300 may decide to scan for WLAN coverage based on one or more factors, e.g., … application status (e.g., on-going packet data session)."). Rather, *Hsu* explains that the mobile station waits until the mobile station becomes idle in the cellular network to tune away from the cellular network to scan for WLAN coverage. *Id.* ¶[0062].

Hsu further discloses that, after detecting WLAN coverage, the mobile station "perform[s] WLAN access authentication and optionally Mobile IP registration to handover its packet data session to WLAN." *Hsu*, ¶[0064]. *Hsu* also teaches that, after detecting WLAN coverage, the mobile station may determine whether to proceed to handover its packet data session from the cellular network to the WLAN based on certain criteria, including "whether the MS is idle in cellular network (i.e., no dedicated channel)." *Id.* ¶[0085]; *see also id.* ¶[0096] ("Upon 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. If no activity is detected, the laptop 600 performs WLAN access authentication, followed by Mobile IP registration via the WLAN, and finally release of the cellular packet data service option, as described above.").

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 '348 patent ("POSITA"), which for purposes of this proceeding is no earlier than April 1, 2005, 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 '348 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.

[2] Petitioners reserve all rights to raise claim construction arguments and other arguments in any parallel or future litigation concerning the '348 patent. For example, comparing the claims to the accused products in the litigation may raise controversies that require construction of certain claim terms.

Cir. 2005) (en banc).

VIII. DETAILED EXPLANATION OF GROUNDS

A. Ground 1: *Hsu* Renders Obvious Claims 1-8 and 13-15

1. Claim 1

a. 1[pre][3]

To the extent the preamble is limiting, *Hsu* discloses or suggests this feature. *Kotzin*, ¶¶75-81. For example, *Hsu* discloses a mobile station that performs system detection and selection in a number of scenarios, including when "the MS has an active packet data session with the cellular network, having a dedicated channel, and desires to scan for WLAN." *See Hsu*, ¶¶[0059]-[0060]; *Kotzin*, ¶76. *Hsu* explains, however, that the mobile station may not scan for WLAN coverage when the mobile station has an active packet data session with the cellular network. *Id*. ¶[0062]. Instead, *Hsu* discloses that the mobile station may wait for a pending packet data session to become idle in the cellular network to scan for WLAN coverage: "After the MS becomes idle in the cellular network, the MS tunes away from the cellular network to scan for the WLAN." *Id*.; *Kotzin*, ¶77. After the mobile station detects WLAN coverage, Hsu discloses that the mobile station "performs access

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

authentication and optionally Mobile IP registration to handover its packet data session to WLAN." *Id.* ¶[0064]; *see also Kotzin*, ¶78 (discussing *Hsu*'s Figure 10B and accompanying description in ¶[0074]).

For the reasons provided below in Section VIII.A.1.c, a POSITA would have understood that a period in *Hsu* "[a]fter the MS becomes idle in the cellular network" comprises "at least one silent period of an application." *Kotzin*, ¶79; *see also id.* ¶¶99-102. And, as provided below in Section VIII.A.1.d, a POSITA would have understood *Hsu* to disclose a "proactive" handoff technique at least because *Hsu* discloses performing handoff actions based on factors aside from the connection with the cellular network degrading, and thus requiring handoff. *Id.* ¶79; *see also id.* ¶¶108-114.

Additionally, for the reasons provided below in Section VIII.A.1.b**Error! Reference source not found.**, a POSITA would have understood that *Hsu*'s mobile station tunes away from the cellular network to scan for WLAN coverage (when the mobile station is idle in the cellular network) and performs access authentication and Mobile IP registration if WLAN coverage is detected ***while*** the mobile station has a packet data session with the cellular network that the mobile station would use to transport data were the mobile station no longer idle in the cellular network. *Id.* ¶80; *see also id.* ¶¶83-88.

Accordingly, *Hsu* discloses or suggests a mobile station proactively scanning

for WLAN coverage when the mobile station is idle in the cellular network and, if WLAN coverage is detected, performing access authentication and Mobile IP registration to handover a packet data session to a WLAN ("performing silent proactive handoff of a mobile device to a target network") while the mobile station has a packet data session with a cellular network ("while the mobile device is using a current network"). *Id.* ¶81.

b. 1[a]

Hsu discloses or suggests these features. *Kotzin*, ¶¶82-95.

Hsu discloses a mobile station that performs system detection and selection in a number of scenarios, including when "the MS has an active packet data session with the cellular network, having a dedicated channel, and desires to scan for WLAN." *Hsu*, ¶[0060]. A POSITA would have understood that, when *Hsu*'s mobile station has a packet data session with the cellular network that is "active," *Hsu*'s mobile station is currently using the cellular network to communicate (or send and receive data). *Kotzin*, ¶¶83-84 (discussing *Hsu*, ¶¶[0029], [0060]). Moreover, unless and until the mobile station's packet data session is handed over to another network, a POSITA would understand that any data sent or received by *Hsu*'s mobile station would be sent or received via the cellular network. *Kotzin*, ¶¶85-87 (discussing *Hsu*, ¶¶[0059], [0064]-[0067], [0086], [0095]). As such, a POSITA would have understood *Hsu* to disclose or suggest the mobile station tuning away from the

cellular network to scan for WLAN coverage (*i.e.*, when the mobile station is idle in the cellular network) and performing access authentication and Mobile IP registration if WLAN coverage is detected ***while*** the mobile station has a packet data session with the cellular network that the mobile station would otherwise use to transport data (*i.e.*, when the packet data session is active). *Kotzin*, ¶88; *see also id*, ¶¶89-91 (discussing Figure 3 of the '348 patent and accompanying description).

Hsu also discloses that the mobile station may not scan for WLAN when the mobile station is active in the cellular network (*i.e.*, has an ***active*** packet data session). *Hsu*, ¶[0062]. Rather, *Hsu* explains that the mobile station waits to scan for WLAN or perform handover of a packet data session until the mobile station is idle in the cellular network to ensure there is no service interruption or that any service interruption is minimized. *Id.*; *see also Kotzin*, ¶92 (further citing ¶¶[0085], [0096]). A POSITA would also have understood that the mobile station waiting for an active packet data session to become idle in the cellular network indicates that the cellular network satisfies the mobile station's requirements. *See Kotzin*, ¶93. Indeed, if the cellular network did not satisfy the mobile device's requirements, a POSITA would have understood that the mobile station would not wait to scan for WLAN or perform handover of a packet data session to find or utilize a network that does satisfy the mobile station's requirements. *Id.* ¶¶93-94 (also discussing *Hsu*, ¶¶[0062]-[0063]).

Accordingly, *Hsu* discloses or suggests a mobile station tuning away from the

cellular network to scan for WLAN coverage when the mobile station is idle in the cellular network and performing access authentication and Mobile IP registration if WLAN coverage is detected while the mobile station has a packet data session with the cellular network ("while the mobile device is using the current network to transport application traffic") and that the cellular network satisfies the mobile station's requirements. *Kotzin*, ¶95.

c. 1[b]

Hsu discloses or suggests this feature. *Kotzin*, ¶¶96-106. *Hsu* discloses that the mobile station does not switch from the cellular network to a WLAN while the mobile station is active in the cellular network. *Hsu*, ¶[0062]. Instead, *Hsu* discloses that the mobile station may wait until the mobile station becomes idle in the cellular network (or until the packet data session is no longer active) to scan for WLAN coverage: "After the MS becomes idle in the cellular network, the MS tunes away from the cellular network to scan for the WLAN." *Id. Hsu* further discloses that, "[i]f the MS detects WLAN coverage, the MS tunes back to the cellular network to notify the WLAN search result." *Id.* ¶[0064]; *see also Kotzin*, ¶¶96-97.

A POSITA would have understood that a period in *Hsu* "[a]fter the MS becomes idle in the cellular network" comprises "at least one silent period of an application." *Kotzin*, ¶¶98-102 (citing *'348Pat.*, 7:59-8:13). Indeed, a POSITA would have understood *Hsu* to equate a period of time when a mobile station is idle

in the cellular network to a period when the mobile station is "not active in communication" (*Hsu*, ¶[0060]) or a period when the current packet data session with the cellular network is not "an *active* packet data session in the cellular network" (*id.* ¶[0062]). *Kotzin*, ¶¶98-99 (citing *Hsu*, ¶¶[0029], [0060]-[0062], [0064]-[0067]). A POSITA would also have thus understood that, when the mobile station is "idle," the mobile station is "not *active* in communication" and is thus not "sending/receiving data." *See Hsu*, ¶[0029] (equating "active" with "sending/receiving data"); *Kotzin*, ¶99. Accordingly, *Hsu*'s idle period comprises a "silent period" as recited in the '348 patent for at least the reason that *Hsu*'s idle period is "a time period during which the mobile has no traffic to send or receive over the current access network." *'348Pat.*, 7:59-64; *see also Kotzin*, ¶100 (citing *Hsu*, ¶¶0062], [0085], [0096]). Moreover, a POSITA would have understood the time period when *Hsu*'s mobile station is idle in the cellular network to comprise a time period when an application operating on the mobile station is idle in the cellular network. *Kotzin*, ¶¶101-102 (discussing *Hsu*, ¶¶[0029], [0035], [0060], [0082]).

A POSITA would also have understood *Hsu*'s mobile station tuning away from the cellular network to scan for WLAN coverage to comprise the mobile station temporarily connecting to the WLAN. *Kotzin*, ¶103. *Hsu* explains that, to scan for WLAN coverage, the mobile station "tunes to WLAN frequencies and actively or passively scans for the WLAN beacon." *Hsu*, ¶[0064]. *Hsu* further discloses that,

"[i]f the MS detects WLAN coverage, the MS tunes back to the cellular network to notify the WLAN search result." *Id.*; *see also id.* ¶[0074] ("Upon detection of the WLAN, the MS 702 notifies the cell network of the result"). A POSITA would have understood *Hsu* to disclose that the connection to the WLAN frequency is temporary at least because *Hsu* describes tuning back to the cellular network if WLAN coverage is detected. *Kotzin*, ¶103; *see also id.* ¶104 (discussing *'348Pat.*, 7:55-57); *id.* ¶105 (discussing *'348Pat.*, 8:41-45).

Accordingly, *Hsu* discloses or suggests waiting until the mobile station becomes idle in the cellular network ("use at least one silent period of an application") to tune to a WLAN to scan for WLAN coverage ("to temporarily connect to at least one target network"). *Kotzin*, ¶106.

d. 1[c]

Hsu discloses or suggests this feature. *Kotzin*, ¶¶107-117. After the mobile station detects WLAN coverage, *Hsu* discloses the mobile station performs access authentication and Mobile IP registration to handover a packet data session to the WLAN. *See Hsu*, ¶¶[0062], [0064]; *see also Kotzin*, ¶107.

A POSITA would have understood *Hsu* to disclose "proactively" scanning for WLAN coverage because *Hsu* discloses scanning for WLAN coverage based on factors aside from the status of the connection with the cellular network. *Id.* ¶¶108-

110 (citing *Chaskar* & *Dorenbosch*).[4] For example, *Hsu* discloses a mobile station tuning away from a cellular network to scan for WLAN coverage when a mobile station becomes idle in the cellular network (*Hsu*, ¶[0062]) or, alternatively, when instructed by a network, for example, "when the network is overloaded or when the MS has low power strength" (*id.* ¶[0063]). *Kotzin*, ¶111. *Hsu* also discloses determining whether to scan for WLAN coverage independently of determining whether to handover a packet data session. *Compare, e.g.*, *id.* ¶[0061] ("[I]f the MS is idle in the cellular network (i.e., no dedicated channel), the MS may decide to scan for WLAN coverage based on one or more factors, e.g., user command, pre-configured preference, WLAN availability advertisement as received from the cellular network, etc."), *with id.* ¶[0059] ("The MS detects WLAN coverage and performs system selection between WLAN and cellular system, wherein the MS may only tune to one system (WLAN or cellular) at a given time."), *and id.* ¶[0085] ("After the MS 300 detects WLAN coverage, receives the WLAN beacon, the MS 300 uses certain criteria to handover a packet data session from the cellular network to the WLAN."); *see also Kotzin*, ¶¶112-113 (additionally citing *Hsu*,

[4] *Chaskar* and *Dorenbosch* demonstrate a POSITA's knowledge and the state of the art; they are not part of the unpatentability ground.

¶¶[0064], [0082]). Put another way, a POSITA would have understood that deciding to scan for WLAN coverage based on one or more factors, and then, if WLAN is coverage is detected, determining whether to handover a packet data session to the WLAN, indicates that the scan for WLAN coverage is "proactive," as the packet data session may not necessarily be handed over, or at least not right away, if WLAN coverage is detected. *Kotzin*, ¶114.

A POSITA would also have understood scanning for WLAN coverage to constitute a "handoff action" at least because a POSITA would have understood that "scanning" is an essential part of the handoff process. *Id.* ¶115 (citing *Waharte & Li*).[5] A POSITA would also have recognized that the '348 patent identifies three examples of handoff actions—"a) discovering neighboring network information; b) obtaining a local IP address from the target network; and c) performing authentication with the target network" (*'348Pat.*, 5:64-6:2; *see also id.*, 8:47-9:5)—and that scanning for WLAN coverage comprises "discovering neighboring network information" as it comprises "listen[ing] to advertisements at layer-2, the IP-layer and/or the application layer from the target network to obtain information regarding

[5] *Waharte* and *Li* demonstrate a POSITA's knowledge and the state of the art; they are not part of the unpatentability ground.

the target network" (*id.*, 8:50-61). *See Kotzin*, ¶116 (additionally discussing *'348Pat.*, 9:3-5); *see also infra* Sections VIII.A.3 (discussing dependent claim 3) and VIII.A.6 (discussing dependent claim 6).

Accordingly, *Hsu* discloses or suggests a mobile station proactively scanning for WLAN coverage ("proactively perform at least one handoff action") and, if WLAN coverage is detected, performing access authentication and Mobile IP registration to handover its packet data session to the WLAN ("for potential later handoff to the target network"). *Kotzin*, ¶117.

2. Claim 2

Hsu discloses or suggests the features of claim 2. *Kotzin*, ¶¶118-120. *Hsu* discloses that the mobile station may not scan for or switch to a WLAN while the mobile station has an active data session in the cellular network. *See Hsu*, ¶[0062]. Instead, *Hsu* discloses that the mobile station may wait for an active packet data session to become idle in the cellular network to scan for WLAN coverage. *Id.* As provided in Section VIII.A.1.c, a POSITA would have understood that a period in *Hsu* "[a]fter the MS becomes idle in the cellular network" comprises "at least one silent period of an application." *Kotzin*, ¶118; *see also id.* ¶¶99-102. A POSITA would also have understood that a period of time in which a mobile station is "not active in communication" and has no "active packet data session in the cellular network" comprises a period of time in which the mobile station is not sending or

receiving data via the cellular network. *Kotzin*, ¶119.

Accordingly, *Hsu* discloses or suggests a mobile station using a period of time when the mobile station is not active in communication and has no active packet data session in the cellular network ("sends or receives substantially no traffic over the current access network during the at least one silent period") to scan for WLAN coverage. *Id.* ¶120.

3. Claim 3

Hsu discloses or suggests the features of claim 3. *Kotzin*, ¶¶121-123. For example, *Hsu* discloses tuning away from the cellular network to scan (passively or actively) for WLAN coverage when a mobile station becomes idle in the cellular network. *See Hsu*, ¶[0062]. *Hsu* describes that passively or actively scanning for WLAN coverage includes the mobile station scanning for the WLAN beacons sent by the access point of a WLAN network (*see id.*, ¶¶[0064], [0082]), and that WLAN beacons "advertise" the WLAN (*see id.* ¶¶[0008], [0040]). *Kotzin*, ¶¶121-122. A POSITA would thus have understood *Hsu* to disclose the mobile station scanning for WLAN beacons comprising advertisement messages from the target network. *Id.* ¶122.

Accordingly, *Hsu* discloses or suggests waiting until the mobile station becomes idle in the cellular network ("use the at least one silent period") to tune to a WLAN to scan for WLAN coverage ("to connect to the target network") to receive

WLAN beacons advertising the WLAN that are sent by an access point of the WLAN ("so that the mobile device receives advertisement messages from the target network"). *Kotzin*, ¶123.

4. Claim 4

Hsu discloses or suggests the features of claim 4. *Kotzin*, ¶¶124-128. *Hsu* discloses that the mobile station may wait for an active packet data session to become idle in the cellular network to scan for WLAN coverage: "After the MS becomes idle in the cellular network, the MS tunes away from the cellular network to scan for the WLAN." *Id*. ¶[0062]; *see also id.* ¶[0064] (explaining that, to scan for the WLAN, "[t]he MS tunes to WLAN frequencies and actively or passively scans for the WLAN beacon"). After the mobile station detects WLAN coverage, *Hsu* discloses that the mobile station "performs access authentication and optionally Mobile IP registration to handover its packet data session to WLAN." *Id.* ¶[0064]; *see also Kotzin*, ¶124.

A POSITA would have understood that *Hsu*'s mobile station tuning away from the cellular network and tuning to a WLAN to scan for a WLAN beacon would comprise establishing a layer-2 connection or association with the WLAN. *Id.* ¶125. For example, a POSITA would have understood that scanning for WLAN coverage occurs at the medium access control (MAC) layer—*i.e.*, layer-2. *Id.* (citing *Trossen*,

Gwon, *Mishra*, *Waharte*, and *Li*)[6]; *see also '348Pat.*, 2:5-14 (describing the MAC layer as part of the layer-2). A POSITA would also have understood that a mobile station performing Mobile IP registration to handover a packet data session to a network includes obtaining a "care-of-address" (CoA) from agent advertisements sent by a foreign agent of the new network so that the mobile station may register the new CoA with its home agent. *Kotzin*, ¶126 (citing *Gwon*).[7] A POSITA would also have understood that a layer-2 connection or association with the new network would be needed to receive agent advertisements sent by the foreign agent of the new network. *Kotzin*, ¶127. Finally, a POSITA would have understood that agent advertisements sent by a foreign agent constitute IP-layer advertisements. *Id.* A POSITA would have thus understood that *Hsu*'s mobile station would establish a layer-2 connection or association with the WLAN to scan for WLAN coverage and perform Mobile IP registration, and that *Hsu*'s mobile station would receive IP-layer advertisements from the WLAN to perform Mobile IP registration. *Id.*

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[6] *Trossen*, *Gwon*, *Mishra*, *Waharte*, and *Li* demonstrate a POSITA's knowledge and the state of the art; they are not part of the unpatentability ground.

[7] *Gwon* demonstrates a POSITA's knowledge and the state of the art; it is not part of the unpatentability ground.

Accordingly, *Hsu* discloses or suggests the mobile station waiting for an active packet data session to become idle in a cellular network ("having the mobile device use the at least one silent period") to scan for WLAN coverage and perform Mobile IP registration ("to establish a layer-2 connection or association with the target network for receiving IP-layer or high layer advertisements from the target network") to handover its packet data session to the WLAN. *Id.* ¶128.

5. Claim 5

Hsu discloses or suggests the features of claim 5. *Kotzin*, ¶¶129-134. For example, *Hsu* discloses that, after detecting WLAN coverage, the mobile station performs WLAN access authentication. *Hsu*, ¶[0064]; *see also id.* ¶¶[0065], [0067], [0074], FIG. 10B (describing performing access authentication (and/or mobile IP registration) to handover the mobile station's packet data session); *Kotzin*, ¶129. A POSITA would have understood that *Hsu* performing access authentication to hand over its packet data session to the WLAN would comprise performing at least one of layer-2 or layer-3 authentication with the WLAN. *Id.* ¶130.

As provided above in Section VIII.A.1.d, *Hsu* discloses a mobile station detecting WLAN coverage when the mobile station becomes idle in the cellular network (*see Hsu*, ¶[0062]), and then performing access authentication (*see id.* ¶[0064]). A POSITA would have understood that, when the mobile station remains idle within the cellular network after detecting WLAN coverage, the mobile station

would perform access authentication while idle in the cellular network (*i.e.*, using the at least one silent period). *Kotzin*, ¶131. Indeed, *Hsu* expressly contemplates that a mobile station may consider whether the mobile station is idle in the cellular network (and even waits until the mobile station is idle) before handing over a packet data session. *Id.* ¶132. For example, *Hsu* discloses using certain criteria to determine whether to handover a packet data session from a cellular network to a WLAN, including "whether the MS is idle in cellular network (*i.e.,* no dedicated channel)" (*id*. ¶[0085]), and that handing over a packet data session includes performing access authentication (*see id.* ¶[0064] ("The MS tunes to WLAN and performs access authentication and optionally Mobile IP registration to handover its packet data session to WLAN."); *id.* ¶[0065] ("[T]he MS proceeds to perform WLAN access authentication and optionally Mobile IP registration to handover its packet data session to WLAN."). *Kotzin*, ¶¶132-133 (additionally discussing *Hsu*, ¶[0096]). A POSITA would thus have understood that *Hsu* expressly discloses that access authentication may be performed when a mobile station is idle in the cellular network. *Kotzin*, ¶133.

Accordingly, *Hsu* discloses or suggests the mobile station using a period of time when the mobile station is idle in the cellular network ("having the mobile device use the at least one silent period") to perform access authentication necessary to handover its packet data session to the WLAN ("to perform layer-2, layer-3 or

application layer authentication with the target network"). *Id.* ¶134.

6. Claim 6

Hsu discloses or suggests the features of claim 6. *Kotzin*, ¶¶135-140.

Hsu discloses that, "[a]fter the MS becomes idle in the cellular network, the MS tunes away from the cellular network to scan for the WLAN." *Hsu*, ¶[0062]. A POSITA would have understood scanning for WLAN coverage to comprise "discovering neighboring network information." *Kotzin*, ¶136. Indeed, for the reasons provided above in Section VIII.A.3, a POSITA would have understood the beacons described in *Hsu* to comprise advertisement messages, and for the reasons provided above in Section VIII.A.4, a POSITA would have understood scanning for a WLAN beacon to comprise a layer-2 function performed by establishing a layer-2 connection or association with the WLAN. *See also Kotzin*, ¶136 (discussing *'348Pat.*, 8:45-9:2). A POSITA would have thus recognized that scanning for WLAN coverage comprises listening to advertisements at layer-2 from the target network to obtain information regarding the target network. *Kotzin*, ¶136 (citing *'348Pat.*, 8:50-61). Accordingly, *Hsu* discloses or suggests waiting until the mobile station is idle in the cellular network ("during the at least one silent period") to scan for WLAN coverage ("a) discovering neighboring network information"). *Kotzin*, ¶137.

Hsu also discloses that, after detecting WLAN coverage, the mobile station

"performs WLAN access authentication and optionally Mobile IP registration to handover its packet data session to WLAN." *Hsu*, ¶[0064]. As discussed above in Section VIII.A.5, a POSITA would have understood that, when the mobile station remains idle within the cellular network, the mobile station would perform access authentication while idle in the cellular network (*i.e.*, using the at least one silent period). *Kotzin*, ¶138. For the same reasons, a POSITA would have understood that, when the mobile station remains idle within the cellular network, the mobile station would perform Mobile IP registration while idle in the cellular network (*i.e.*, using the at least one silent period). *Id.* ¶¶138-139 (discussing *Hsu*, ¶¶[0062], [0064]-[0065], [0085], [0096]).

Accordingly, *Hsu* discloses or suggests using a period in which the mobile station is idle in the cellular network ("during the at least one silent period") to perform access authentication ("c) performing authentication with the target network") and Mobile IP registration ("b) obtaining a local IP address from the target network"). *Kotzin*, ¶140.

7. Claim 7

Hsu discloses or suggests the features of claim 7. *Kotzin*, ¶¶141-159. For example, *Hsu* discloses an embodiment in which a laptop (or other computing device) operates together with a cellular handset (hereinafter the "laptop embodiment"). *See generally Hsu*, ¶¶[0092]-[0097]; *Kotzin*, ¶142. With respect to

that embodiment, *Hsu* discloses that "the 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]. *Hsu* discloses further 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." *Id.* "If no activity is detected, the laptop 600 performs WLAN access authentication, followed by Mobile IP registration via the WLAN, and finally release of the cellular packet data service option, as described above." *Id.*; *Kotzin*, ¶143.

A POSITA would have recognized that, with respect to the laptop embodiment, *Hsu* discloses the mobile station waiting a "given time period (*e.g.*, several seconds)" as part of a determination whether to handover a packet data session to a WLAN. *Id.* ¶144. A POSITA would also have recognized that *Hsu* disclosing waiting "given time period (*e.g.*, several seconds)" during a silent period before proceeding to handover a packet data session (*e.g.*, by performing WLAN access authentication and Mobile IP registration) comprises *Hsu*'s mobile station determining whether the silent period is a silent period sufficient to complete one or more handoff actions or simply a momentary pause in activity. *Id.* ¶¶145-147

(discussing *Douglis* & *Moshiri-Tafreshi*).[8]

Hsu discloses that, after detecting WLAN coverage and tuning back to the cellular network to notify the cellular network of the scan result, the mobile station may then proceed to handover its packet data session to the WLAN (*e.g.*, by performing WLAN access authentication and Mobile IP registration). *See Hsu*, ¶[0064]; *Kotzin*, ¶148. *Hsu* explains that the determination to handover a packet data session may be based on a signaling message received from the cellular network. *Hsu*, ¶[0064]. Alternatively, *Hsu* explains that the mobile station may determine whether to handover a packet data session from the cellular network to a WLAN, including in the one-tuner embodiment and in the scenario discussed and relied upon above (*i.e.*, when the mobile station has an active packet data session with a cellular network and desires to scan for WLAN coverage). *See Hsu*, ¶¶[0059], [0060]; *see also Kotzin*, ¶¶148-149. With respect to the one-tuner embodiment, *Hsu* does not provide implementation details for the mobile station selecting between a WLAN and cellular network after WLAN coverage is detected and, in turn, determining whether to handover a packet data session from a cellular network to a

[8] *Douglis* and *Moshiri-Tafreshi* demonstrate a POSITA's knowledge and the state of the art; they are not part of the unpatentability ground.

WLAN. *See Kotzin*, ¶149. However, *Hsu* does provide such implementation details with respect to the two-tuner embodiment. *See Hsu*, ¶¶[0085]; *Kotzin*, ¶¶150-151 (additionally discussing *Hsu*, ¶¶[0077], [0082]).

In view of *Hsu*'s disclosure with respect to the one-tuner embodiment and scenario (2) that the mobile station performs system detection and selects between a WLAN and cellular network after WLAN coverage is detected, a POSITA would have been motivated to incorporate—in the one-tuner embodiment—*Hsu*'s disclosure regarding the manner in which the mobile station may determine whether to handover a packet data session based on a number of factors, as explained with respect to the two-tuner embodiment. *Kotzin*, ¶152. A POSITA would have found it obvious to combine the disclosure of *Hsu*'s separate embodiments in this manner because doing so would have amounted to the mere application of a known technique (a mobile station using certain criteria to determine whether to handover a packet data session) to a known method (*Hsu*'s mobile station performing both system detection and selection) ready for improvement to yield a predictable result. *Id.* ¶153. In addition, a POSITA would have known that it would amount to the use of a known technique (a mobile station using certain criteria to determine whether to handover a packet data session) to improve similar devices (*Hsu*'s mobile station with one tuner) in the same way. *Id.*

Moreover, a POSITA would also have been motivated to utilize the same

technique described with respect to *Hsu*'s laptop embodiment for determining whether a period when no data transfer activity exists is expected to be a silent period long enough to perform WLAN access authentication (and possibly Mobile IP registration) with respect to *Hsu*'s one-tuner embodiment. *Id.* ¶154. Indeed, incorporating this teaching with respect to *Hsu*'s laptop embodiment in *Hsu*'s one-tuner embodiment would have been obvious to a POSITA because it would have amounted to merely applying a known technique (*Hsu*'s technique for determining whether a period when no data transfer activity exists is expected to be a silent period long enough to perform WLAN access authentication and Mobile IP registration) to a known device (the mobile station described in *Hsu*'s one-tuner embodiment) ready for improvement to yield predictable results (improving the process by which handoff to the WLAN is triggered). *Id.*

Accordingly, *Hsu* discloses or suggests the mobile station determining whether a period when there is no activity of data transfer is expected to be a long enough silent period to perform WLAN access authentication and Mobile IP registration ("having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action"). *Id.* ¶155; *see also id.* ¶¶156-159 (explaining that a POSITA would have understood *Hsu* to disclose, with respect to the one-tuner embodiment and the scenario relied upon herein, the mobile station both tuning back to the cellular network to provide the scan result and making the

determination to proceed to handoff a packet data session).

8. Claim 8

Hsu discloses or suggests the features of claim 8. *Kotzin*, ¶¶160-162. As provided above in Section VIII.A.7, a POSITA would have understood *Hsu* to disclose, with respect to its laptop embodiment, waiting for a given time period when no data transfer activity exists to determine whether no data transfer activity still exists before performing WLAN access authentication (and possibly Mobile IP registration). *Kotzin*, ¶160 (citing *Hsu*, ¶[0096]). As also discussed above in Section VIII.A.7, a POSITA would have been motivated to utilize the same technique for determining whether a period when no data transfer activity exists is expected to be a silent period of sufficient length to perform WLAN access authentication (and possibly Mobile IP registration) with respect to *Hsu*'s one-tuner embodiment. *Id.*

A POSITA would also have understood *Hsu* to disclose determining whether a period when no data transfer activity exists is expected to be a silent period of sufficient length to perform WLAN access authentication (and possibly Mobile IP registration) by comparing a measured length of a time with no data transfer activity to a given time period and that the given time period amounts to a pre-set threshold. *Id.* ¶161.

Accordingly, a POSITA would have understood *Hsu* to disclose or suggest determining whether a period when no data transfer activity exists is expected to be

a silent period of sufficient length to perform WLAN access authentication (and possibly Mobile IP registration) ("having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action") by comparing a measured length of a time when no data transfer activity exists to a given time period ("by comparison to a pre-set … threshold"). *Id.* ¶162.

9. Claim 13

Hsu discloses or suggests the features of claim 13. *Kotzin*, ¶¶163-165. *Hsu* discloses that "[t]he MS detects WLAN coverage and performs system selection between WLAN and cellular system, wherein the MS may only tune to one system (WLAN or cellular) at a given time." *Hsu*, ¶[0059]; *see also id.*, ¶[0060] (describing the mobile station performing system detection and selection when the mobile station has an active packet data session with a cellular network and desires to scan for WLAN coverage); *Kotzin*, ¶¶163-164 (also discussing *Hsu*'s FIG. 1 and accompanying description in ¶¶[0026]-[0035]).

Accordingly, *Hsu* discloses or suggests the mobile station selecting a system to tune (or connect) to from between WLAN and cellular systems ("having said mobile device select a target network to which the mobile may switch to"). *Kotzin*, ¶165.

10. Claim 14

Hsu discloses suggests the features of claim 14. *Kotzin*, ¶¶166-169. For the

reasons provided in Section VIII.A.7, *Hsu* discloses performing system detection and selection by the mobile station in the one-tuner embodiment (including with respect to scenario (2)), and it would have been obvious to a POSITA to incorporate *Hsu*'s technique for determining whether to proceed to handover a packet data session (*e.g.*, by performing access authentication and Mobile IP registration) based on various criteria (as described with respect to *Hsu*'s two-tuner embodiment) in *Hsu*'s one-tuner embodiment. *See Kotzin*, ¶167 (citing *Hsu*, ¶¶[0059]-[0060], [0085]). A POSITA would also have recognized that determining whether to proceed to handover a packet data session amounts to selecting a network to which the mobile station may switch to (or cause a packet data session to be handed off to). *Kotzin*, ¶167.

For the reasons provided above in Section VIII.A.7, a POSITA would have been motivated to wait for a given time period when no data transfer activity exists to determine whether no data transfer activity still exists, as taught by *Hsu*, before performing WLAN access authentication and Mobile IP registration. *Kotzin*, ¶168. A POSITA would have understood that such a silent period constitutes an actionable silent period. *Id.* And as provided above in Section VIII.A.4, a POSITA would have understood that *Hsu*'s mobile station would establish a layer-2 connection or association with the WLAN to scan for WLAN coverage and perform Mobile IP registration. *Id.* ¶168.

Accordingly, a POSITA would have understood *Hsu* to disclose or suggest performing system selection between WLAN and cellular systems ("when a target network is selected") and, when the mobile station is idle in the cellular network for a period of sufficient length ("and an actionable silent period is detected"), scan for WLAN coverage and, if WLAN coverage is detected, perform access authentication and Mobile IP registration ("switching the mobile device's layer-2 connection to the target network") to handover its packet data session to the WLAN. *Id.* ¶169.

11. Claim 15

Hsu discloses or suggests the features of claim 15. *Kotzin*, ¶¶170-176.

a. 15[a]

Hsu discloses or suggests this feature. *Kotzin*, ¶¶170-171. For example, *Hsu* discloses tuning away from the cellular network to scan (passively or actively) for WLAN coverage when a mobile station becomes idle in the cellular network. *See Hsu*, ¶[0062]; *see also id.* ¶[0082] (describing "passive scanning" and "active scanning"). For the reasons discussed above in Section VIII.A.4, a POSITA would have understood that *Hsu*'s mobile station tuning away from the cellular network and tuning to a WLAN to scan for a WLAN beacon would comprise establishing a layer-2 connection or association with the WLAN. *Kotzin*, ¶170.

Accordingly, *Hsu* discloses or suggests a mobile station tuning away from the cellular network to a WLAN to scan for WLAN coverage ("having the mobile device

connect successfully to the target network"). *Id.* ¶171.

b. 15[b]

Hsu discloses or suggests this feature. *Kotzin*, ¶¶172-174. For example, *Hsu* discloses that, "[a]fter the MS becomes idle in the cellular network, the MS tunes away from the cellular network to scan for the WLAN." *Hsu*, ¶[0062]. *Hsu* describes that passively or actively scanning for WLAN coverage includes the mobile station scanning for the WLAN beacons sent by the access point of a WLAN network (*see id.* ¶¶[0064], [0082]), and that WLAN beacons "advertise" the WLAN (*see id.* ¶¶[0008], [0040]). Thus, and for the reasons discussed above in Section VIII.A.1.d and Section VIII.A.3, a POSITA would have understood scanning for WLAN coverage to comprise listening to advertisement messages from the target network. *Kotzin*, ¶172.

Hsu also discloses that, after the mobile station detects WLAN coverage, the mobile station "performs access authentication and optionally Mobile IP registration to handover its packet data session to WLAN." *Hsu*, ¶[0064]; *see also id.* ¶[0065]. For the reasons discussed above in Section VIII.A.7, a POSITA would have been motivated to wait for a given time period when no data transfer activity exists to determine whether no data transfer activity still exists, as taught by *Hsu*, before performing WLAN access authentication and Mobile IP registration. *Kotzin*, ¶173. As discussed above in Section VIII.A.4, a POSITA would also have understood that

a mobile station performing Mobile IP registration to handover a packet data session to a network includes obtaining a "care-of-address" (CoA) from agent advertisements sent by a foreign agent of the new network so that the mobile station may register the new CoA with its home agent. *Id.* (citing *Gwon*).[9]

Accordingly, a POSITA would have understood *Hsu* to disclose or suggest that, after the MS becomes idle in the cellular network and remains idle for a period of sufficient length ("before a current actionable silent period expires"), the mobile station scans for WLAN coverage and, if WLAN coverage is detected, proceeds to obtain a CoA from an agent advertisement sent by a foreign agent ("having the mobile device enter an information discovery phase to listen to the target network's advertisement messages") so that the mobile station may perform access authentication and Mobile IP registration to handover its packet data session to the WLAN ("to learn information needed to perform handoffs at different protocol layers to the target network"). *Kotzin*, ¶174.

c. 15[c]

Hsu discloses or suggests this feature. *Kotzin*, ¶¶175-176. For example, *Hsu*

[9] *Gwon* demonstrates a POSITA's knowledge and the state of the art; it is not part of the unpatentability ground.

discloses that, after the mobile station detects WLAN coverage, the mobile station "performs access authentication and optionally Mobile IP registration to handover its packet data session to WLAN." *Hsu*, ¶[0064]; *see also id.* ¶[0065]. For the reasons discussed above in Section VIII.A.6, a POSITA would have understood that, when the mobile station remains idle within the cellular network after detecting WLAN coverage, the mobile station would perform access authentication and Mobile IP registration while idle in the cellular network (*i.e.*, using the at least one silent period). *Kotzin*, ¶175. Indeed, *Hsu* explains that the mobile station may use certain criteria to determine whether to handover a packet data session from a cellular network to a WLAN, including "whether the MS is idle in cellular network" (*Hsu*, ¶[0085]), and that handing over a packet data session includes performing access authentication and Mobile IP registration (*see id.* ¶[0064] ("The MS tunes to WLAN and performs access authentication and optionally Mobile IP registration to handover its packet data session to WLAN.")). *Kotzin*, ¶175.

Accordingly, a POSITA would have understood *Hsu* to disclose or suggest that, if the mobile station remains idle within the cellular network after detecting WLAN coverage ("if the current actionable silent period has not expired after the information discovery phase"), the mobile station proceeds to perform access authentication and Mobile IP registration to handover its packet data session to the WLAN ("having the mobile device start at least one handoff action"). *Id.* ¶176.

B. Ground 2: *Hsu* and *Hutchison* Render Obvious Claims 10, 11, 20, and 21

1. Claim 10

Hsu in combination with *Hutchison* discloses or suggests the features of claim 10. *Kotzin*, ¶¶178-191. As discussed in Section VIII.A.1.c, *Hsu* discloses waiting until the mobile station becomes idle in the cellular network to tune to a WLAN to scan for WLAN coverage. *Kotzin*, ¶179 (citing *Hsu*, ¶[0062]). Thus, *Hsu* discloses monitoring the sending and receiving of packets via the cellular network, which a POSITA would readily understand comprises a current access network that the mobile station uses to transport its application traffic until a current packet data session is handed over to the WLAN. *Kotzin*, ¶179. As discussed in Section VIII.A.7, *Hsu* also discloses waiting for a given time period when there is no activity of data transfer to determine whether there is still no activity before performing WLAN access authentication (and possibly Mobile IP registration). *Kotzin*, ¶180 (citing *Hsu*, ¶[0096]).

Hutchison is directed to techniques for performing timer-based sleep to extend battery life for a terminal in a wireless communication system. *See Hutchison*, Abstract, ¶[0023]. *Hutchison* discloses a process for performing timer-based sleep by a terminal that includes estimating the probability of data traffic for the terminal. *See id.* ¶¶[0057]-[0058]; *see also Kotzin*, ¶181 (discussing *Hutchison* Fig.

5). *Hutchison* explains that "the probability of data traffic may be estimated based on (1) the time since last activity and (2) a particular function defining probability of data traffic versus time since last activity." *Id.* ¶[0058]. *Hutchison* discloses that "[t]he estimated probability of data traffic is then mapped to an initial timer value." *Id.* ¶[0059]; *see also Kotzin*, ¶182.

Notably, *Hutchison* explains that "[t]he initial timer value is determined based on the probability of data traffic for the terminal, which may be estimated based on a particular function such as the one shown in FIG. 4" (*id.* ¶[0045]), which Hutchison explains may be based on "usage modeling" (*id.* ¶[0041]). *Kotzin*, ¶183. *Hutchison*'s FIG. 4 is reproduced below:

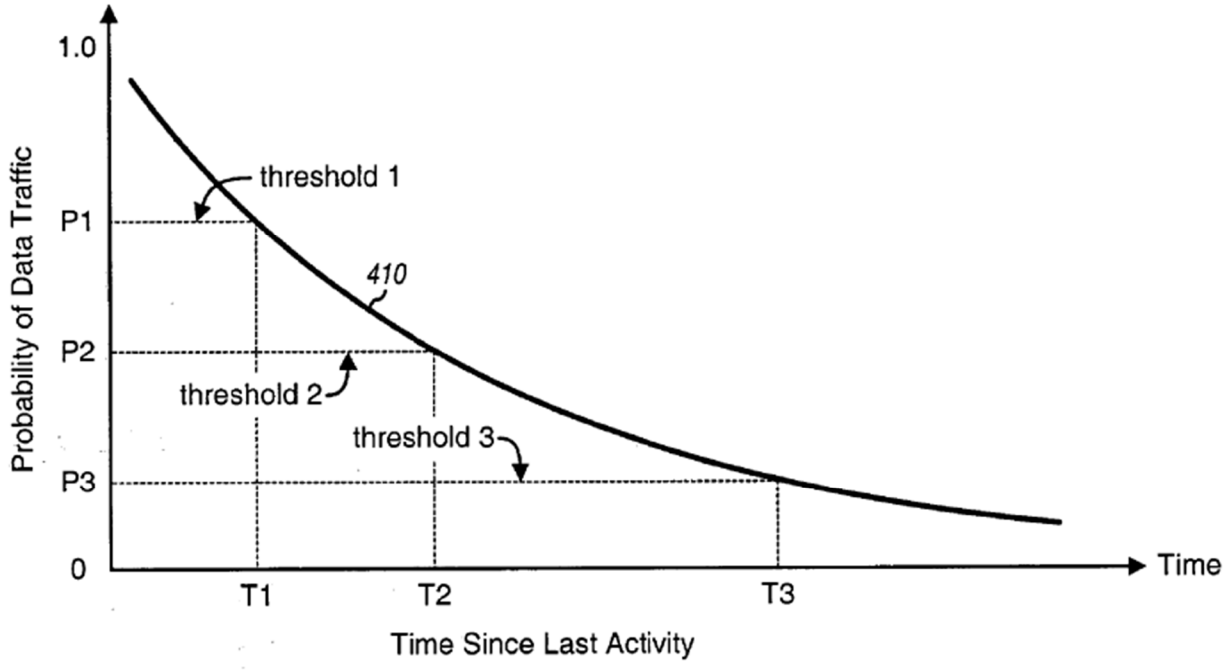

FIG. 4

Hutchison, FIG. 4

Hutchison further discloses that, once the estimated probability is mapped to an initial timer value, the initial timer value may "may be modified due to one or a combination of pertinent events (e.g., required for link maintenance)." *Id.* ¶[0060]. *Hutchison* explains such that pertinent events may include events related to a hand-off. *Id.* ¶[0052]; *see also Kotzin*, ¶184. "The terminal then performs a sleep for the duration of time corresponding to the final value loaded into the timer." *Id.* ¶[0061].

Hutchison discloses that, for an HDR system such as in *Hsu* (*see Hsu*, ¶[0025]), "the timer may be enabled if the terminal has an opened session but a closed connection (*i.e.*, the timer may be enabled if the terminal is in the Idle state). *Hutchison*, ¶[0043]. *Hutchison* explains that, "[i]f enabled, the timer is loaded with a particular value prior to entering sleep. The duration of the sleep is then determined by the value loaded into the timer." *Id.*; *see also Kotzin*, ¶185. Ultimately, *Hutchison* explains that "the final timer value is selected so that the link can be maintained and acceptable data traffic monitoring can be achieved. That is, the sleep time is selected such that undesirable sleep through of data traffic and/or required link maintenance events is limited to within an acceptable level." *Id.* ¶[0056]; *see also id.* ¶[0052] (describing link maintenance events as including "hand-off from one access point to another access point," "hand-off from one system to another system," and "hand-off from one subnet (or access point) to another

subnet," among others); *see also Kotzin*, ¶186.

A POSITA would have understood *Hutchison*'s technique for performing timer-based sleep that involves using the time since last activity to estimate the probability of data traffic to teach or suggest monitoring time periods between packets entering and/or leaving the mobile device over the current access network that the mobile device currently uses to transport its application traffic. *Id.*¶187 (additionally citing *Hutchison*, ¶¶[0037]-[0039], [0070]). Indeed, a POSITA would have understood *Hutchison* to disclose the terminal monitoring signals from the system (e.g., "while in the Idle state") and recognized that doing so would allow the terminal to monitor usage (for the purposes of "usage modeling") and determine a time since last activity based at least on the last signal entering the terminal from the system. *Kotzin*, ¶187. As such, in *Hutchison*'s technique for performing timer-based sleep, a POSITA would have understood *Hutchison* to disclose a terminal monitoring time periods between packets entering and/or leaving the terminal over an access network that the terminal currently uses to transport its application traffic. *Id.*

A POSITA would have readily recognized that *Hutchison* describes implementing its process for performing timer-based sleep in a system similar to *Hsu*'s. *Kotzin*, ¶188 (comparing *Hutchison*, ¶[0039], *with Hsu*, ¶[0025]). Additionally, *Hsu* discloses that "it is desirable to maximize a sleep mode

for MS 300. In other words, it is desirable to maximize the time when MS 300 is using reduced power, or is in a sleep mode." *Hsu*, ¶[0083]; *see also Kotzin*, ¶189 (additionally citing *Hsu*, ¶¶[0040], [0081]). In view of *Hsu*'s stated desire to maximize a sleep mode, a POSITA would have been motivated to modify *Hsu*'s mobile station to utilize *Hutchison*'s techniques for performing timer-based sleep. *Kotzin*, ¶190. Incorporating this technique into *Hsu*'s mobile station would have been obvious to a POSITA because it amounts to applying a known technique (using *Hutchison*'s technique for performing timer-based sleep) to a known device (*Hsu*'s mobile station) ready for improvement (to maximize a sleep mode for the mobile station while also ensuring a sleep time is selected such that undesirable sleep through data traffic and/or required link maintenance events is limited to within an acceptable level). *Id.* Additionally, it would amount to the use of a known technique (using *Hutchison*'s technique for performing timer-based sleep) to improve similar devices (*Hsu*'s mobile station) in the same way. *Id.*

Accordingly, the *Hsu-Hutchison* discloses or suggests monitoring time periods between packets entering and/or leaving the mobile station ("the mobile device monitoring time periods between packets entering and/or leaving the mobile device") to track usage and a time since last activity over a current network ("over the current access network that the mobile device currently uses to transport its application traffic") to perform timer-based sleep, and thus *Hsu* in view of

Hutchinson renders obvious claim 10. *Kotzin*, ¶191.

2. Claim 11

Hsu in combination with *Hutchison* discloses or suggests the features of claim 11. *Kotzin*, ¶¶192-197. As discussed above in Section VIII.B.1, *Hutchison* discloses a process for performing timer-based sleep by a terminal that includes estimating the probability of data traffic for the terminal "based on (1) the time since last activity and (2) a particular function defining probability of data traffic versus time since last activity." *Hutchison*, ¶¶[0057]-[0058]; *see also id.* ¶¶[0041], [0049] (explaining that the "particular function" is "based on a specific usage model"); *Kotzin*, ¶192. *Hutchison* explains that the probability of data traffic is used to determine an initial timer value, and that "[t]his initial timer value may then be modified by pertinent events to obtain a final timer value." *Id.* ¶[0044]. *Hutchison* further explains that the final timer value is "indicative of the duration of the next sleep by the terminal." *Id.* ¶[0060]; *see also Kotzin*, ¶193.

As also provided above in Section VIII.B.1, a POSITA would have understood *Hutchison* to disclose the terminal monitoring signals from the system (e.g., "while in the Idle state") and recognized that doing so would allow the terminal to determine a time since last activity based at least on the last signal entering the terminal from the system. *Kotzin*, ¶194 (citing *Hutchison*, ¶¶[0023], [0070]). A POSITA would also have understood a particular function defining a probability of

data traffic versus time since last activity to comprise a prediction model. *Kotzin*, ¶195 (citing *Hutchison*, ¶¶[0013], [0041], [0049]). A POSITA would also have understood *Hutchison*'s final timer value indicative of the duration of a next sleep by the terminal to comprise a prediction of an actionable silent period of the terminal. *Kotzin*, ¶195 (citing *Hutchison*, ¶[0060]). Indeed, by modifying the initial timer value to account for pertinent events (such as the performance of a handoff (*see Hutchison*, ¶¶[0051]-[0052])), a POSITA would have understood *Hutchison* to disclose or suggest ensuring a next sleep coincides with a time of no activity of sufficient length to perform a handoff. *Kotzin*, ¶195.

Furthermore, a POSTIA would have understood *Hutchison* to disclose determining a duration of a next sleep by first determining an initial timer value amounting to a period of time where there is likely not data traffic and then subtracting from that timer value the time needed to perform one or more actions related to a link maintenance event (such as one or more actions related to a "hand-off"). *Kotzin*, ¶196 (citing *Hutchison*, ¶¶[0052], [0056]). As such, a POSITA would have recognized that the initial timer value is indicative of a period of time where there is likely not data traffic and that is at least long enough to perform the one or more actions related to a link maintenance event. *Id.*

Accordingly, *Hutchison* discloses or suggests determining an initial timer value indicative of a period of time where there is likely not data traffic and that is

at least long enough to perform the one or more actions related to a link maintenance event ("having the mobile predict an actionable silent period"), and that such an initial timer value is determined based on the time since last activity ("based on said monitoring of time periods") and a particular function defining probability of data traffic versus time since last activity ("and a prediction model"), and thus *Hsu* in view of *Hutchinson* renders obvious claim 11. *Kotzin*, ¶197.

3. Claim 20

a. 20[pre]

To the extent the preamble is limiting, *Hsu* discloses or suggests this feature. *Kotzin*, ¶¶198-200. For example, as discussed above in Section VIII.A.1.a, *Hsu* discloses or suggests a mobile station configured to wait for an active packet data session to become idle in the cellular network to scan for WLAN coverage and, after detecting WLAN coverage, proceeding to perform access authentication and Mobile IP registration to handover its packet data session to a WLAN. *Kotzin*, ¶199; *see also supra* Sections VIII.A.1.b-d (addressing similar claim recitations in independent claim 1).

For the reasons discussed above in Section VIII.A.1.c, a POSITA would have understood that a period in *Hsu* "[a]fter the MS becomes idle in the cellular network" comprises "at least one silent period of an application." *Id.* And, for the reasons discussed above in Section VIII.A.1.d, a POSITA would have understood *Hsu* to

disclose a "proactive" handoff technique at least because *Hsu* discloses performing handoff actions based on factors aside from the connection with the cellular network degrading, and thus requiring handoff. *Id.*

Accordingly, *Hsu* discloses or suggests a mobile station ("a mobile device") proactively scanning for WLAN coverage and performing handover of a packet data session to a WLAN when the mobile station is idle in the cellular network ("having silent proactive handoff capability"). *Id.* ¶200.

b. 20[a]

Hsu in combination with *Hutchison* discloses or suggests this feature. *Kotzin*, ¶¶201-203. As discussed above in Section VIII.B.1, *Hutchison* discloses a process for performing timer-based sleep by a terminal that includes estimating the probability of data traffic for the terminal based on the time since last activity and a particular function defining a probability of data traffic versus time since last activity. *Kotzin*, ¶201 (citing *Hutchison*, ¶¶[0023], [0057]-[0058]). For the reasons discussed above in Section VIII.B.1, a POSITA would have understood *Hutchison*'s technique for performing timer-based sleep that involves using the time since last activity to estimate the probability of data traffic to teach or suggest monitoring time periods between packets entering and/or leaving the mobile device over the current access network that the mobile device currently uses to transport its application traffic. *Kotzin*, ¶201. For example, a POSITA would have understood *Hutchison* to

disclose the terminal monitoring time periods between packets entering and/or leaving the terminal to obtain data for the purposes of usage modeling and to determine a time since last activity based at least on the last signal entering the terminal from the system. *Id.* And finally, for the reasons discussed above in Section VIII.B.1, a POSITA would have been motivated to modify *Hsu*'s mobile station to implement *Hutchison*'s techniques for performing timer-based sleep. *Id.*

Notably, the '348 patent explains that "the various functional components of the mobile device can be implemented in a variety of ways, as would be understood by those in the art based on this disclosure. For example, some or all of the functional components can be implemented in software at the application layer and/or at the kernel layer. In addition, some or all of the functional components can be implemented in hardware, firmware and/or on micro-chips." *'348Pat.*, 15:22-29; *see also id.*, 9:48-54 (referring to the "Traffic Monitor" as a "functional component" of the mobile device). A POSITA would therefore have understood claim 20 to require that the mobile device include "a traffic monitor component" or simply otherwise be configured to monitor time periods between packets transmitted to or from the mobile device. *Kotzin*, ¶203.

Accordingly, a POSITA would have understood the *Hsu-Hutchison* device to disclose or suggest a mobile station configured to ("a mobile device … comprising: … a) a traffic monitor component configured to") determine a time since last activity

("monitor time periods between packets transmitted to or from the mobile device") by monitoring signals received from the system ("over a current access network"). *Id.* ¶202.

c. 20[b]

Hsu in combination with *Hutchison* discloses or suggests this feature. *Kotzin*, ¶¶204-206. For example, as discussed above in Section VIII.A.9, *Hsu* discloses that "[t]he MS detects WLAN coverage and performs system selection between WLAN and cellular system, wherein the MS may only tune to one system (WLAN or cellular) at a given time." *Hsu*, ¶[0059]; *see also Kotzin*, ¶204 (discussing *Hsu*'s FIG. 1 and accompanying description in ¶¶[0026]-[0035] and further citing ¶¶[0009], [0060]).

Accordingly, a POSITA would have understood the *Hsu-Hutchison* device to disclose or suggest a mobile station configured to ("a mobile device … comprising: … b) a target network selector component configured to") select a system to tune (or connect) to as between WLAN and cellular systems ("select a target network to which the mobile device may potentially switch to when an actionable silence period is detected"). *Kotzin*, ¶205; *see also supra* Section VIII.B.3.b (discussing *'348Pat.*, 15:22-29); *'348Pat.*, 10:29-41 (referring to the "Target Network Selector" as a "functional component" of the mobile device); *Kotzin*, ¶206.

d. 20[c]

Hsu in combination with *Hutchison* discloses or suggests this feature. *Kotzin*, ¶¶207-209. For example, as discussed above in Section VIII.B.2, *Hutchison* explains that a probability of data traffic is used to determine an initial timer value, and that "[t]his initial timer value may then be modified by pertinent events to obtain a final timer value." *Hutchison*, ¶[0044]. *Hutchison* further explains that the final timer value is "indicative of the duration of the next sleep by the terminal." *Id.* ¶[0060]. For the reasons discussed above in Section VIII.B.2, a POSITA would have understood *Hutchison* disclosing determining a final timer value indicative of the duration of a next sleep by the terminal to comprise predicting an actionable silent period of the terminal. *Kotzin*, ¶207.

Accordingly, a POSITA would have understood the *Hsu-Hutchison* device to disclose or suggest a mobile station configured to ("a mobile device … comprising: … c) a silence predictor component configured to") determine a final timer value indicative of the duration of a next sleep by the terminal ("predict the actionable silence period of an application"). *Kotzin*, ¶208; *see also supra* Section VIII.B.3.b (discussing *'348Pat.*, 15:22-29); *'348Pat.*, 9:55-59 (referring to the "ASP Predictor" as a "functional component" of the mobile device); *Kotzin*, ¶209.

e. 20[d]

Hsu in combination with *Hutchison* discloses or suggests this feature. *Kotzin*,

¶¶210-213. For example, as discussed above in Section VIII.A.1.a and Section VIII.B.3.a, *Hsu* discloses or suggests a mobile station configured to wait for an active packet data session to become idle in the cellular network to scan for WLAN coverage and, after detecting WLAN coverage, proceeding to perform access authentication and Mobile IP registration to handover its packet data session to a WLAN. *Kotzin*, ¶210; *see also supra* Sections VIII.A.1.b-d (addressing similar claim recitations in independent claim 1).

For the reasons discussed above in Section VIII.A.1.c, a POSITA would have understood that a period in *Hsu* "[a]fter the MS becomes idle in the cellular network" comprises "at least one silent period of an application." *Kotzin*, ¶211. And, as discussed above in Section VIII.A.1.d, a POSITA would have understood *Hsu* to disclose a "proactive" handoff technique at least because *Hsu* discloses performing handoff actions based on factors aside from the connection with the cellular network degrading, and thus requiring handoff. *Id.*

Accordingly, a POSITA would have understood the *Hsu-Hutchison* device to disclose or suggest a mobile station configured to ("a mobile device … comprising: … d) a silent handoff controller configured to") proactively scan for WLAN coverage and perform handover of a packet data session to a WLAN when the mobile station is idle in the cellular network ("control a silent proactive handoff to a target network during the actionable silent period"). *Kotzin*, ¶212; *see also supra*

Section VIII.B.3.b (discussing *'348Pat.*, 15:22-29); *'348Pat.*, 9:35-39 (referring to the "SPH Processor" as a "functional component" of the mobile device); *Kotzin*, ¶213.

4. Claim 21

Hsu in combination with *Hutchison* discloses or suggests the features of claim 21. *Kotzin*, ¶¶214-216. For example, *Hsu* discloses that the mobile station may wait for an active packet data session to become idle in the cellular network to scan for WLAN coverage: "After the MS becomes idle in the cellular network, the MS tunes away from the cellular network to scan for the WLAN." *Hsu*, ¶[0062]. After the mobile station detects WLAN coverage, *Hsu* discloses that the mobile station "performs WLAN access authentication and optionally Mobile IP registration to handover its packet data session to WLAN." *Id.* ¶[0064]; *see also supra* Sections VIII.A.1.d, VIII.A.4, and VIII.A.6; *Kotzin*, ¶214.

For the reasons discussed in Section VIII.A.1.c, a POSITA would have understood the mobile station in *Hsu* tuning away from the cellular network to scan for WLAN coverage to comprise the mobile station establishing a connection to the WLAN. *Kotzin*, ¶215. And for the reasons discussed in Section VIII.A.1.d, a POSITA would have understood scanning for WLAN coverage to comprise discovering network information about the WLAN. *Id.*

Accordingly, the *Hsu-Hutchison* device discloses or suggests *Hsu*'s mobile

station configured to tune away from the cellular network to scan for the WLAN ("wherein said silent handoff controller is configured to establish connections to a target network), and, after detecting WLAN coverage by receiving a beacon from the WLAN ("to discover network information about a target network"), perform both Mobile IP registration and access authentication ("to obtain a local IP address for the mobile device from the target network, and to perform authentication with the target network"). *Kotzin*, ¶216.

C. Ground 3: *Hsu* and *Shoaib* Render Obvious Claims 16 and 17

1. Claim 16

Hsu in combination with *Shoaib* discloses or suggests the features of claim 16. *Kotzin*, ¶¶218-233. For the reasons provided in Section VIII.A.7, *Hsu* discloses performing system detection and selection by the mobile station in the one-tuner embodiment (including with respect to scenario (2)), and it would have been obvious to a POSITA to incorporate *Hsu*'s technique for determining whether to proceed to handover a packet data session (*e.g.*, by performing access authentication and Mobile IP registration) based on various criteria (as described with respect to *Hsu*'s two-tuner embodiment) in *Hsu*'s one-tuner embodiment. *See Kotzin*, ¶219 (citing *Hsu*, ¶¶[0059]-[0060], [0085]).

With respect to the two-tuner embodiment, *Hsu* discloses that, after detecting WLAN coverage, "the MS 300 uses certain criteria to handover a packet data session

from the cellular network to the WLAN." *Hsu*, ¶[0085]. For example, *Hsu* explains that "[t]he criteria may include whether the MS is idle in cellular network (i.e., no dedicated channel) or whether the WLAN signal strength is stable, etc." *Id. Hsu* does not disclose additional criteria. However, in view of *Hsu*'s open-ended disclosure regarding the use of various criteria to determine whether to handover a packet data session from the cellular network to the WLAN, it would have been obvious to a POSITA to look to identify additional criteria that could be used to determine whether to handover a packet data session from the cellular network to the WLAN. *Kotzin*, ¶220.

Shoaib discloses "a method of handing over from a first network to a second network that includes operating a mobile terminal via a first network, evaluating at least one criteria of either the first network or a second network and initiating a trigger that causes a handover from the first network to the second network so that the mobile terminal operates via the second network." *Shoaib*, ¶[0014]. *Shoaib* further discloses that at least one such criteria is a "local signal criteria," which "look[s] at signal strength of the current point of attachment" and determines whether the signal strength is satisfactory. *Id.* ¶¶[0072]-[0073]. *Shoaib* explains that the various criteria it identifies, including the local signal criteria, may be continuously evaluated and used to separately trigger one of more operations, including pre-authentication and/or handover. *See id.* ¶¶[0080], [0090]; *see also id.*,

claims 1 & 9 (together claiming a method that includes evaluating a local signal level and initiating a trigger that causes a handover from one network to another network); *Kotzin*, ¶¶221-226.

A POSITA would have been motivated to modify *Hsu*'s mobile station to consider a local signal level when determining whether to handover a packet data session from the cellular network to the WLAN. *Kotzin*, ¶227. When considering the signal strength of a current network before proceeding to handover a packet data session from a cellular network to a WLAN, it would have been obvious to a POSITA to switch back to (or continue using) a current network if the current network continues to satisfy the mobile device's requirements. *Kotzin*, ¶228 (citing *Shoaib*, ¶[0072]. A POSITA would also have recognized that it was well known in the art to check whether a current network satisfies a mobile device's requirements before initiating the final steps to handover a packet data session to another network. *Kotzin*, ¶¶229-231 (citing *Chaskar* and *Jagadeesan*)[10]

It would have been obvious to a POSITA to apply a known technique (describing considering a local signal level when determining whether to handover

[10] *Chaskar* and *Jagadeesan* demonstrate a POSITA's knowledge and the state of the art; they are not part of the unpatentability ground.

a packet data session from the cellular network to the WLAN as taught by *Shoaib*) to a known device (*Hsu*'s mobile station) ready for improvement (*Hsu* already discloses using criteria to determine whether to handover a packet data session). *Kotzin*, ¶232. In addition, a POSITA would have known that it would amount to the use of a known technique (using the signal level of a current network to determine whether to switch back to the current network) to improve similar devices (*Hsu*'s mobile station) in the same way. *Id.*

Accordingly, a POSITA would have understood the *Hsu-Shoaib* device to disclose or suggest the mobile station, after detecting WLAN coverage ("after having the mobile device start said at least one handoff action"), considering a local signal level of a cellular network when determining whether to handover a packet data session to the WLAN, and if the cellular network continues to satisfy the mobile device's requirements ("in the event that the current network continues to satisfy the mobile device's requirements") switching back to (or continuing to use) the cellular network ("having the mobile device switch its network connection back to the current network"). *Kotzin*, ¶233.

2. Claim 17

Hsu in combination with *Shoaib* discloses or suggests the features of claim 17. *Kotzin*, ¶¶234-236. For the reasons discussed above in Section VIII.C.1, a POSITA would have been motivated to modify *Hsu*'s mobile station to consider a

signal strength of a current point of attachment when determining whether to handover a packet data session from a cellular network to a WLAN after WLAN coverage is detected. *Kotzin*, ¶235. It would also have been obvious to a POSITA, when utilizing a local signal level as a criteria for determining whether to handover a packet data session from the cellular network to the WLAN, to proceed to handoff a packet data session if the cellular network no longer satisfies the mobile device's requirements. *Id.*

Accordingly, a POSITA would have understood the *Hsu-Shoaib* device to disclose or suggest the mobile station, after detecting WLAN coverage ("after having the mobile device start said at least one handoff action"), considering the signal strength of a current point of attachment when determining whether to handover a packet data session to the WLAN, and if the cellular network does not continue to satisfy the mobile device's requirements ("in the event that the current network does not continue to satisfy the mobile device's requirements"), proceeding to handover a current packet data session (or continuing to use) the cellular network ("having the mobile device perform the remaining handoff steps to finish a handoff"). *Kotzin*, ¶236.

D. Ground 4: *Hsu* and *Ivanov* Render Obvious Claims 18 and 19

1. Claim 18

Hsu in combination with *Ivanov* discloses or suggests the features of claim

18. *Kotzin*, ¶¶238-247. As discussed above in Section VIII.C.1, having reviewed *Hsu*, it would have been obvious to a POSITA to look to identify additional criteria that could be used to determine whether to handover a packet data session from the cellular network to the WLAN. *Kotzin*, ¶239.

Ivanov discloses a mobile speed-sensitive handover method for a mixed cell structure. *See Ivanov*, Abstract. *Ivanov* discloses "a hand over from the radio coverage domain of a macro cell into one or more further micro cells that takes the speed of a mobile radio subscriber into consideration and is implemented in addition to the static hand over decisions." *Id.*, 2:51-56. Specifically, *Ivanov* discloses a method that utilizes a timer or time interval, whereby if a mobile station is still located in the domain of a microcell after the time interval, a handover for the mobile station into the microcell is requested. *Id.*, 3:10-17; *see also Kotzin*, ¶240.

Ivanov describes, as an example, the implementation of the speed-sensitive handover method with respect to a micro cell having a size of 500 meters. *Id.*, 7:10-29. Given the size of the micro cell, *Ivanov* explains that a mobile station having an average speed of 10 km/h would require approximately 180 seconds to traverse the cell, a mobile station having an average speed of 30 km/h would require approximately 60 seconds to traverse the cell, and a mobile station having an average speed of 60 km/h would require approximately 30 seconds to traverse the micro cell. *Id.*, 7:15-20. Assuming the micro cell has a time interval of 60 seconds, *Ivanov*

explains that mobile stations that travel into the cell at speeds less than 30 km/h will request a handover into the cell (because the mobile stations will be within the cell for more than 60 seconds), whereas mobile stations that travel into the cell at speeds greater than 30 km/h will not request a handover into the cell (because the mobile stations will not be within the cell for at least 60 seconds). *Id.*, 7:21-29; *see also Kotzin*, ¶241.

Having reviewed the foregoing passages of *Ivanov*, a POSITA would have understood *Ivanov* to disclose determining whether to handover a packet data session from one network (or cell) to another based on an estimated time the mobile station will be within the network, which may be calculated using the speed at which the mobile station is moving. *Kotzin*, ¶242.

A POSITA would have been motivated to modify *Hsu*'s mobile station to consider the speed at which the mobile station is moving and, in turn, an estimated time the mobile station will be within a network when determining whether to handover a packet data session from the cellular network to the WLAN. *Kotzin*, ¶¶243-244 (citing *Shoaib* & *Jabbari*).[11] It would have been obvious to a POSITA to

[11] *Shoaib* and *Jabbari* demonstrate a POSITA's knowledge and the state of the art; they are not part of the unpatentability ground.

apply a known technique (using a speed-sensitive handover method that considers the speed at which the mobile station is moving and, in turn, an estimated time the mobile station will be within a network) to a known device (Hsu's mobile station) ready for improvement (to reduce the frequency of handovers for mobile stations when moving). *Kotzin*, ¶¶245-246 (citing *Hsu*, ¶[0085]; *Ivanov*, 2:48-50). In addition, a POSITA would have known that it would amount to the use of a known technique (using speed-sensitive handover techniques) to improve similar devices (Hsu's mobile station) in the same way. *Kotzin*, ¶246.

Accordingly, a POSITA would have understood the *Hsu-Ivanov* device to disclose or suggest the mobile station determine whether to handover a packet data session from the cellular network to the WLAN ("having said mobile device make a determination as to whether to utilize a silent proactive handoff") based on the speed at which the mobile station is moving and, in turn, an estimated time the mobile station will be within a network ("based on an estimation of the time that the mobile device will be within a candidate network"). *Kotzin*, ¶247.

2. Claim 19

Hsu in combination with *Ivanov* discloses or suggests the features of claim 19. *Kotzin*, ¶¶248-249. Indeed, for the reasons discussed above in Section VIII.D.1, a POSITA would have understood the *Hsu-Ivanov* device to disclose or suggest the mobile station determine whether to handover a packet data session from the cellular

network to the WLAN ("having said mobile device make said determination") based on the speed at which the mobile station is moving ("based on … relative speed at which the mobile device is moving") and, in turn, an estimated time the mobile station will be within a network. *Kotzin*, ¶250.

IX. 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.[12]

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);

[12] 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.

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).

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. EX1021. 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); *Equipmentshare.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*. Factor 4 weighs against discretionary denial. Petitioners challenge claims 1-8, 10, 11, and 13-21, whereas Patent Owner has alleged infringement of only claims 1-6 and 13-17. EX1022. Accordingly, a material number of the challenged claims will not be addressed by the district court. *See, e.g.*, *Precision Planting LLC v. Maschio Gaspardo S.p.A.*, IPR2024-00008, Paper 12 at 18 (PTAB Mar. 26, 2024) (holding that despite substantial overlap in issues between the IPR petition and parallel district court action, the inclusion of claims in the petition not contested in court argues against discretionary denial due to incomplete overlap).

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)

The Board should likewise not exercise its discretion under §325(d) to deny institution of Petitioner's petition. There are no references presented in the unpatentability grounds that were previously considered by the Office.

X. 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 '348 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.

To the best of Petitioners' knowledge, the '348 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. 8,073,436 (IPR2025-00494), U.S. Patent No. 8,239,671 (IPR2025-00495), and U.S. Patent No. 8,798,006 (IPR2025-00496).

C. Lead and Backup Counsel

Lead Counsel	Back-Up Counsel
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D. Service Information

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Date: January 30, 2025

Respectfully submitted,

/David A. Caine/
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CERTIFICATE OF COMPLIANCE

The undersigned hereby certifies that the foregoing Petition for *Inter Partes* Review contains 13,775 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/
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CERTIFICATE OF SERVICE

I certify that on January 30, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 7,502,348 and supporting exhibits to be served via overnight delivery on the Patent Owner at the following correspondence address of record as listed on Patent Center:

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

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