IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SAMSUNG ELECTRONICS AMERICA, INC.,

SAMSUNG ELECTRONICS CO., LTD.,

Petitioners,

v.

KONINKLIJKE KPN N.V.,

Patent Owner.

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Case No. IPR2025-00503

U.S. Patent No. 8,660,560

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DECLARATION OF KEVIN C. ALMEROTH, PH.D. IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 8,660,560

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I. INTRODUCTION

1. I have been retained by Samsung Electronics America, Inc. and Samsung Electronics Co., Ltd. ("Petitioner") as an independent expert consultant in this proceeding before the United States Patent and Trademark Office ("PTO") against Koninklijke KPN N.V. ("Patent Owner") regarding U.S. Patent No. 8,660,560 ("the '560 patent") (Ex. 1001).[1] I have been asked to submit this Declaration on behalf of Petitioner.

2. I have been asked to consider whether certain references disclose or render obvious the features recited in claims 2-9, 13-18, 20, and 23 (collectively, the "Challenged Claims") of the '560 patent. My opinions are set forth below. Based on my experience and expertise, it is my opinion that the prior art renders obvious all limitations of the Challenged Claims, as I discuss in detail below.

3. I am being compensated at a rate of $850 per hour for my work in this proceeding. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other interest in this proceeding.

[1] Where appropriate, I refer to exhibits that I understand are to be attached to the petition for *Inter Partes* Review of the '560 patent.

4. All of my opinions stated in this Declaration are based on my own personal knowledge and professional judgment. I am over 18 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth in this Declaration.

II. BACKGROUND AND QUALIFICATIONS

5. I am currently a Professor Emeritus in the Department of Computer Science at the University of California, Santa Barbara (UCSB). While at UCSB, I held faculty appointments and was a founding member of the Computer Engineering (CE) Program, Media Arts and Technology (MAT) Program, and the Technology Management Program (TMP). I also served as the Associate Director of the Center for Information Technology and Society (CITS) from 1999 to 2012. I have been a faculty member at UCSB since July 1997.

6. I hold three degrees from the Georgia Institute of Technology: (1) a Bachelor of Science degree in Information and Computer Science (with minors in Economics, Technical Communication, and American Literature) earned in June 1992; (2) a Master of Science degree in Computer Science (with specialization in Networking and Systems) earned in June 1994; and (3) a Doctor of Philosophy (Ph.D.) degree in Computer Science (Dissertation Title: Networking and System Support for the Efficient, Scalable Delivery of Services in Interactive Multimedia System, minor in Telecommunications Public Policy) earned in June 1997. During

my education, I took a wide variety of courses as demonstrated by my minor. My undergraduate degree also included a number of courses more typical of a degree in electrical engineering including digital logic, signal processing, and telecommunications theory.

7. One of the major concentrations of my research over the past 30+ years has been the delivery of multimedia content and data between computing devices, including through various network architectures. In my research, I have studied large-scale content delivery systems, and the use of servers located in a variety of geographic locations to provide scalable delivery to hundreds or thousands of users simultaneously. I have also studied smaller-scale content delivery systems in which content is exchanged between individual computers and portable devices. My work has emphasized the exchange of content more efficiently across computer networks, including the scalable delivery of content to many users, mobile computing, satellite networking, delivering content to mobile devices, and network support for data delivery in wireless networks.

8. In 1992, the initial focus of my research was on the provision of interactive functions (e.g., VCR-style functions like pause, rewind, and fast-forward) for near video-on-demand systems in cable systems; in particular, how to aggregate requests for movies at a cable head-end and then how to satisfy a multitude of requests using one audio/video stream broadcast to multiple receivers

simultaneously. This research has continually evolved and resulted in the development of techniques to scalably deliver on-demand content, including audio, video, web documents, and other types of data, through the Internet and over other types of networks, including over cable systems, broadband telephone lines, and satellite links.

9. An important component of my research has been investigating the challenges of communicating multimedia content, including video, between computers and across networks including the Internet. Although the early Internet was used mostly for text-based, non-real time applications, the interest in sharing multimedia content, such as video, quickly developed. Multimedia-based applications ranged from downloading content to a device to streaming multimedia content to be instantly used. One of the challenges was that multimedia content is typically larger than text-only content, but there are also opportunities to use different delivery techniques since multimedia content is more resilient to errors. I have worked on a variety of research problems and used a number of systems that were developed to deliver multimedia content to users. One content-delivery method I have researched is the one-to-many communication facility called "multicast," first deployed as the Multicast Backbone, a virtual overlay network supporting one-to-many communication. Multicast is one technique that can be used on the Internet to provide streaming media support for complex applications like video-on-demand,

distance learning, distributed collaboration, distributed games, and large-scale wireless communication. The delivery of media through multicast often involves using Internet infrastructure, devices and protocols, including protocols for routing and TCP/IP.

10. Starting in 1997, I worked on a project to integrate the streaming media capabilities of the Internet together with the interactivity of the web. I developed a project called the Interactive Multimedia Jukebox (IMJ). Users would visit a web page and select content to view. The content would then be scheduled on one of a number of channels, including delivery to students in Georgia Tech dorms delivered via the campus cable plant. The content of each channel was delivered using multicast communication.

11. In the IMJ, the number of channels varied depending on the capabilities of the server including the available bandwidth of its connection to the Internet. If one of the channels was idle, the requesting user would be able to watch their selection immediately. If all channels were streaming previously selected content, the user's selection would be queued on the channel with the shortest wait time. In the meantime, the user would see what content was currently playing on other channels, and because of the use of multicast, would be able to join one of the existing channels and watch the content at the point it was currently being transmitted.

12. The IMJ service combined the interactivity of the web with the streaming capabilities of the Internet to create a jukebox-like service. It supported true Video-on-Demand when capacity allowed, but scaled to any number of users based on queuing requested programs. As part of the project, we obtained permission from Turner Broadcasting to transmit cartoons and other short-subject content. We also connected the IMJ into the Georgia Tech campus cable television network so that students in their dorms could use the web to request content and then view that content on one of the campus's public access channels.

13. More recently, I have also studied issues concerning how users choose content, especially when considering the price of that content. My research has examined how dynamic content pricing can be used to control system load. By raising prices when systems start to become overloaded (i.e., when all available resources are fully utilized) and reducing prices when system capacity is readily available, users' capacity to pay as well as their willingness can be used as factors in stabilizing the response time of a system. This capability is particularly useful in systems where content is downloaded or streamed on-demand to users.

14. As a parallel research theme, starting in 1997, I began researching issues related to wireless devices and sensors. In particular, I was interested in showing how to provide greater communication capability to "lightweight devices," i.e., small form-factor, resource-constrained (e.g., CPU, memory, networking, and

power) devices. Starting in 1998, I published several papers on my work to develop a flexible, lightweight, battery-aware network protocol stack. The lightweight protocols we envisioned were similar in nature to protocols like Bluetooth, Universal Plug and Play (UpnP) and Digital Living Network Alliance (DLNA).

15. From this initial work, I have made wireless networking—including ad hoc, mesh networks and wireless devices—one of the major themes of my research. My work in wireless networks spans the protocol stack from applications through to the encoding and exchange of data at the data link and physical layers.

16. At the application layer, even before the large-scale "app stores" were available, my research looked at building, installing, and using apps for a variety of purposes, from network monitoring to support for traditional computer-based applications (e.g., content retrieval) to new applications enabled by ubiquitous, mobile devices. For example, my research has looked at developing applications for virally exchanging and tracking "coupons" through "opportunistic contact" among mobile wireless devices (i.e., communication among devices moving into communication range with each other). In many of the courses I have taught there is a project component. Through these projects I have supervised numerous efforts to develop new "apps" for download and use across a variety of mobile platforms.

17. Toward the middle of the protocol stack, my research has also looked to build wireless infrastructure support to enable communication among a set of

mobile devices unaided by any other kind of network infrastructure. These kinds of networks are useful either in challenged network environments (e.g., when a natural disaster has destroyed existing infrastructure) or when suitable support for network communication never existed. The deployment of such networks (or even the use of traditional network support) are critical to support services like disaster relief, catastrophic event coordination, and emergency services deployment.

18. Yet another theme is monitoring wireless networks, in particular different variants of IEEE 802.11 compliant networks, to (1) understand the operation of the various protocols used in real-world deployments, (2) use these measurements to characterize use of the networks and identify protocol limitations and weaknesses, and (3) propose and evaluate solutions to these problems. I have successfully used monitoring techniques to study wireless data link layer protocol operation and to improve performance by enhancing the operation of such protocols. For wireless protocols, this research includes functions like network acquisition and channel bonding.

19. One theme in my wireless network research has been cross-layer solutions and innovations. As mentioned above, with greater wireless device use and network support, we envisioned new application paradigms and services, for example, when mobile devices come into contact with each other. Instead of relying on existing infrastructure to relay communication, the devices are able to discover

each other and communicate directly. Other examples include discovering and using location information to enhance users' experiences. Network support and novel applications span use a variety of network architectures supporting users on foot, in vehicles, and across varying terrains and environments. Finally, we studied how communication efficiency can be supported through intelligent handoffs as well as location and movement prediction.

20. Protecting networks, including their operation and content, has been an underlying theme of my research almost since the beginning of my research career. Starting in 2000, I have been involved in several projects that specifically address security, network protection, and firewalls. After significant background work, a team on which I was a member successfully submitted a $4.3M grant proposal to the Army Research Office (ARO) at the Department of Defense to propose and develop a high-speed intrusion detection system. Key aspects of the system included associating streams of packets and analyzing them for viruses and other malware. Once the grant was awarded, we spent several years developing and meeting the milestones of the project. A number of my students worked on related projects and published papers on topics ranging from intrusion detection to developing advanced techniques to be incorporated into firewalls. I have also used firewalls, including their associated malware detection features, in developing techniques for the classroom to ensure that students are not distracted by online content.

21. My recent work ties some of the various threads of my past research together. I have investigated content delivery in online social networks and proposed reputation management systems in large-scale social networks and marketplaces. On the content delivery side, I have looked at issues of caching and cache placement, especially when content being shared and the cache has geographical relevance. We were able to show that effective caching strategies can greatly improve performance and reduce deployment costs. Our work on reputation systems showed that reputations have economic value, and as such, creates a motivation to manipulate reputations. In response, we developed a variety of solutions to protect the integrity of reputations in online social networks. The techniques we developed for content delivery and reputation management were particularly relevant in peer-to-peer communication and recommendations for downloadable "apps."

22. As an important component of my research program, I have been involved in the development of academic research into available technology in the market place. One aspect of this work is my involvement in the Internet Engineering Task Force (IETF). The IETF is a large and open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. I have been involved in various IETF groups including many content delivery-related working

groups like the Audio Video Transport (AVT) group, the MBone Deployment (MBONED) group, Source Specific Multicast (SSM) group, the Inter-Domain Multicast Routing (IDMR) group, the Reliable Multicast Transport (RMT) group, the Protocol Independent Multicast (PIM) group, etc. I have also served as a member of the Multicast Directorate (MADDOGS), which oversaw the standardization of all things related to multicast in the IETF. Finally, I was the Chair of the Internet2 Multicast Working Group for seven years.

23. My involvement in the research community extends to leadership positions for several academic journals and conferences. I am the co-chair of the Steering Committee for the ACM Network and System Support for Digital Audio and Video (NOSSDAV) workshop and on the Steering Committees for the International Conference on Network Protocols (ICNP), ACM Sigcomm Workshop on Challenged Networks (CHANTS), and IEEE Global Internet (GI) Symposium. I have served or am serving on the Editorial Boards of IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, IEEE Network, ACM Computers in Entertainment, AACE Journal of Interactive Learning Research (JILR), and ACM Computer Communications Review. I have co-chaired a number of conferences and workshops including the IEEE International Conference on Network Protocols (ICNP), IEEE Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON), International Conference on

Communication Systems and Networks (COMSNETS), IFIP/IEEE International Conference on Management of Multimedia Networks and Services (MMNS), the International Workshop On Wireless Network Measurement (WiNMee), ACM Sigcomm Workshop on Challenged Networks (CHANTS), the Network Group Communication (NGC) workshop, and the Global Internet Symposium, and I have served on the program committees for numerous conferences.

24. Furthermore, in the courses I taught at UCSB, a significant portion of my curriculum covered aspects of the Internet and network communication including the physical and data link layers of the Open System Interconnect (OSI) protocol stack, and standardized protocols for communicating across a variety of physical media such as cable systems, telephone lines, wireless, and high-speed Local Area Networks (LANs). The courses I have taught also cover most major topics in Internet communication, including data communication, multimedia encoding, and mobile application design. My research and courses have covered a range of physical infrastructures for delivering content over networks, including cable, Integrated Services Digital Network (ISDN), Ethernet, Asynchronous Transfer Mode (ATM), fiber, and Digital Subscriber Line (DSL). For a complete list of courses I have taught, see my curriculum vitae (CV).

25. In addition, I co-founded a technology company called Santa Barbara Labs that was working under a sub-contract from the U.S. Air Force to develop very

accurate emulation systems for the military's next generation internetwork. Santa Barbara Labs' focus was in developing an emulation platform to test the performance characteristics of the network architecture in the variety of environments in which it was expected to operate, and, in particular, for network services including Ipv6, multicast, Quality of Service (QoS), satellite-based communication, and security. Applications for this emulation program included communication of a variety of multimedia-based services, including video conferencing and video-on-demand.

26. In addition to having co-founded a technology company myself, I have worked for, consulted with, and collaborated with companies for nearly 30 years. These companies range from well-established companies to start-ups and include IBM, Hitachi Telecom, Turner Broadcasting System (TBS), Bell South, Digital Fountain, RealNetworks, Intel Research, Cisco Systems, and Lockheed Martin.

27. Through my graduate education, leadership with CITS, involvement in TMP, role in the development of the Internet2 infrastructure, and consulting with ISPs, I have gained a strong understanding in the role of the Internet in our society and the challenges of deploying large-scale production networking infrastructure. CITS, since its inception, has looked at the role of the Internet in society, including how the evolution of technology have created communication opportunities and challenges, including, for example through disruptive technologies like P2P. TMP

looks to focus on non-purely technical issues, including, for example, state-of-the-art business methods, strategies for successful technology commercialization, new venture creation, and best practices for fostering innovation. Through my industry collaborations and Internet2 work, I have developed significant experience in the challenges of deploying, monitoring, managing, and scaling communication infrastructure to support evolving Internet services like streaming media, conferencing, content exchange, social networking, and e-commerce.

28. I am a Member of the Association of Computing Machinery (ACM) and a Fellow of the Institute of Electrical and Electronics Engineers (IEEE).

29. Additional details about my employment history, fields of expertise, courses taught, and publications are further included in my CV attached as Ex. 1004.

30. Based on my professional experience, I believe I am qualified to testify as an expert on matters related to the patent at issue.

III. LEGAL STANDARDS

31. Petitioner' attorneys have explained to me the legal standards that apply in this case. My understanding of those standards is described below. I am not an attorney, and I do not have formal training in the law regarding patents. I have used my understanding of the following legal principles set forth in this section in reaching my opinions.

32. I understand that, in this proceeding, Petitioner have the burden of proving that the challenged claims are invalid by a preponderance of the evidence.

A. Obviousness

33. I have been informed that a claim is invalid as obvious under 35 U.S.C. § 103 (pre-AIA) if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time of the invention to a person of ordinary skill in the art. I have been informed that the following matters are relevant to determining whether the claimed invention would have been obvious: (1) the scope and content of the prior art, (2) the difference or differences between the patent claim and the prior art, (3) the level of ordinary skill in the art at the time the invention of the patent, and (4) any secondary considerations or objective indicia of non-obviousness.

34. I have been informed that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. When a claim simply arranges prior art elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, then such a combination is obvious. When a patent claims a structure already known in the prior art altered by the mere substitution of one element for another known in the field, the combination is likely to be obvious unless the combination yields an unpredictable result.

35. I have been informed that when a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill in the art can implement a predictable variation, such a variation is likely unpatentable. For the same reason, if a technique has been used to improve one device, and one of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. One question to consider is whether the improvement is more than predictably using prior art elements according to their established functions.

36. I have been informed that it may often be necessary, in a validity analysis, to consider whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. This can be accomplished by looking to interrelated teachings of multiple patents or other publications or pieces of prior art; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by one of ordinary skill in the art.

37. I have been informed that a validity analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim; it is appropriate to take account of the inferences and creative steps that a person of

ordinary skill in the art would employ. I have been informed that a person of ordinary skill in the art is a person of ordinary creativity, not an automaton.

38. I have been informed that a claim composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art. I have been informed that it can be important to identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does. I am told that one way that subject matter can be proved obvious is by noting there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims. I have been informed that any need or problem known in the field of endeavor at the time of the claimed invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

39. I have been informed that one should not assume that a person of ordinary skill in the art attempting to solve a problem will be led only to those elements of prior art designed to solve the same problem. Instead, I have been informed that since familiar items may have obvious uses beyond their primary purposes, in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple prior art references together like pieces of a puzzle.

40. I have been informed that, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable

solutions, persons of ordinary skill in the art have good reason to pursue the known options within their technical grasp. If this leads to the anticipated success, the product was likely not accomplished by innovation but by using ordinary skill and common sense. I have been informed that, in such an instance, the fact that the combination was obvious to try may show that the combination was obvious.

41. I have been informed that, when determining whether a claimed combination would have been obvious, the correct analysis is not whether a person of ordinary skill in the art, writing on a blank slate, would have chosen the particular combination of elements described in the claim. Instead, I have been informed that the correct analysis considers whether one of ordinary skill, facing the wide range of needs created by developments in the field of endeavor, would have seen a benefit to selecting the combination claimed.

42. I have been informed that, when determining whether a claimed invention is obvious, any "secondary considerations" of non-obviousness identified by the patentee should also be considered. These secondary considerations can include:

- commercial success of the invention, causally related to the invention itself rather than to companion factors, such as advertising or attractive packaging;

- the invention taught away from the technical direction followed by those skilled in the art;
- a long-felt but unsatisfied need for the invention while the needed implementing arts and elements had long been available;
- the invention achieves results unexpected to those skilled in the art;
- copying of the invention by competitors as distinguished from their independent development
- unsuccessful attempts by those skilled in the art to make the invention;
- acquiescence by the industry to the patent's validity by honoring the patent through taking licenses or not infringing the patent, or both; and
- skepticism, disbelief in or incredulity by those skilled in the art that the patentee's approach worked.

43. I have been informed that, for the above information to impact the obviousness of a patent claim, there must be a nexus between the alleged secondary

considerations and the claims. In addition, I have been informed that the burden of introducing evidence of secondary considerations generally is on the Patent Owner. If the Patent Owner or its expert should assert secondary considerations of non-obviousness, I reserve the right to provide a Declaration addressing assertions of non-obviousness due to secondary considerations.

B. Claim Construction

44. I have been informed that claim terms are typically given their plain and ordinary meanings, as would have been understood by a person of ordinary skill in the art at the time of the earliest alleged priority date. I have further been informed that when considering the meaning of any terms in the Challenged Claims of the '560 patent, I should apply the plain and ordinary meaning of those terms. I have further been informed that in considering the meaning of the claims, one must consider the language of the claims, the specification, and the prosecution history of record.

45. I have been informed that in general, a preamble limits the invention if it recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim. I have further been informed that a preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention. I have further been informed that dependence on a particular disputed preamble phrase for antecedent basis may limit claim scope because it indicates a reliance on both the

preamble and claim body to define the claimed invention. I have further been informed that clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention.

IV. PERSON OF ORDINARY SKILL IN THE ART AND THE TIME OF THE ALLEGED INVENTION

46. I have been asked to assume that the ’560 patent is entitled to its earliest alleged priority date of October 7, 2009. *See* Ex. 1001. Beyond this assumption, I have not undertaken an analysis to determine the earliest priority date to which the ’560 patent is entitled.

47. Based on the materials and information I have reviewed and based on my experience in the technical areas relevant to the ’560 patent, a person of ordinary skill in the art at the time of the alleged invention of the ’560 patent would have had at least a Bachelor’s degree in Electrical Engineering, Computer Engineering, Computer Science or equivalent, and at least two years of experience with computer networking technology. More education can supplement practical experience and vice versa. Based on my knowledge and experience, including as discussed above in Section II, I exceeded the level of skill of a person of ordinary skill in the art at the time of the alleged invention of the ’560 patent and can provide opinions regarding the knowledge of a person of ordinary skill in the art as of that time. My opinions

herein are, where appropriate, based on my understandings as to a person of ordinary skill in the art at that time. I myself had more than these capabilities at the time of the alleged invention of the ’560 patent.

V. THE ’560 PATENT

A. Background of Technology

48. Below I provide a summary of the technology at issue, which is the updating of a base station’s neighbor cell list.

49. All cellular telecommunication systems implement some type of mobility management. When a mobile moves from one part of a network towards or into another, it needs to stop communicating with one cell and begin communicating with the next cell. This is accomplished through two different mechanisms, “handover” for mobiles that are in an active voice and/or data connection and “cell reselection” for mobiles that are in a standby mode. When handover occurs, the mobile’s connection is handed over from the cell to which it is currently connected (serving base station) to another cell’s coverage area that is controlled by a different candidate or target base station.

50. Performing handovers is fundamental to the functionality and execution of a cellular network. The main objective of performing a handover is to keep the voice or data connection active while making the procedure imperceptible (seamless) to the user.

51. The handover procedure associated with each generation varies in lower-level details, however there are high-level aspects that are applicable to 2G, 3G, 4G, and 5G cellular networks. While the lower-level details vary, they all use similar concepts that were established in 2G networks beginning in the early 1990s.

52. To facilitate the handover process, the base station to which a mobile device is currently connected (called the "serving base station") receives measurement reports from the mobile device regarding the signal quality of neighboring cells (called the "candidate base station"). Ex. 1005, ¶13, Ex. 1009, 2:1-17. The network uses these measurement reports to determine whether a given mobile device should be transferred to a neighboring cell. Ex. 1005, ¶¶13, 17-20. If the candidate neighbor was on a different carrier or type of wireless network, this was called an "inter-RAT [radio access technology] handover." *Id.*, ¶10.

53. Before the '560 patent, it was well-known that base stations maintained a list of known neighbors called the "neighbor cell list." Ex. 1009, 2:1-5. In GSM (*i.e.*, a 2G network) and WCDMA (*i.e.*, a 3G network), "the neighbour cell list is broadcasted from the base station to the mobile terminal" because "[t]he purpose of neighbour cell lists is to allow the base stations to give their connected mobile terminals a defined set of cells to measure on." Ex. 1009, 2:5-10; Ex. 1001, 1:37-41 ("The cell-specific list of surrounding cells that are considered for cell reselection or

handover is called the neighbour cell list (NCL), which is stored in each base station and broadcast within the cell.").

54. The list of neighboring cells for a given base station was typically populated using planning tools before installing a new base station. Ex. 1005, ¶13. This process was costly and susceptible to prediction errors, and may result in out-of-date lists as new cells were installed or old cells removed. Ex. 1005, ¶¶24-25. Engineers working for Ericsson recognized that new methods for automatically deriving and updating neighbor relation lists would benefit network operators. *Id*. These methods involved automatically updating neighbor cell lists, including solutions for systems that support multiple types of radio access technology (*e.g*., 4G LTE base stations with 2G or 3G neighbors). Ex. 1005, ¶¶26-31. During this time, 3GPP was in the process of finalizing the LTE standard and introduced "automatic neighbor relation" to the standard, which updated "neighbor relation lists" or "neighbor relation tables" that, like neighbor cell lists, contained a list of neighboring cells. Ex. 1015.

B. Description of the '560 Patent's Specification

55. The '560 patent to Oostveen *et al*. was filed October 5, 2010 as a PCT application and claims priority to a European application filed October 7, 2009.

56. The '560 patent is titled "System for updating a neighbour cell list (NCL) of a wireless access node of a telecommunications architecture and method

therefore." It is directed to updating a neighbor cell list of a base station. Ex. 1001 at Abstract.

57. The '560 patent admits that "3GPP TS 36.300, V8.9.0"—a prior art technical specification for the 4G LTE standard—"discloses an automatic neighbour relation (ANR) function to relieve an operator from the burden of manually managing neighbour relations." Ex. 1001, 1:56–58; *see also id.*, 7:14-18 ("Currently, automated configuration and optimisation of intra-network NCLs and inter-network NCLs is based on e.g. actual measurement feedback from user terminals 3 as disclosed in 3GPP TS 36.300, V8.9.0."). I note that the '560 Patent says that most claim elements were known in the prior art. *See id.*, 1:49–2:7 (admitting that the prior art teaches "automated configuration and optimisation of … inter-network NCLs" based on "actual measurement feedback from user terminals" and "handover statistics," including a selector configured to select "a user terminal from a serving cell to look for neighbour cells of other networks by scanning all cells," a request generator configured to request "the Cell Global Identifier (CGI) and further cell information from the neighbouring cells," and an updating means configured to update the "NRT [i.e., neighbor relation table] using the information reported from the user terminals").

58. The '560 patent says it improves upon the admitted prior art by selecting "a part" of the mobile devices to participate in the updating process, thus

"filter[ing] an appropriate portion the user terminals for which cell reselection or handover is about [sic] in order to reduce unnecessary signalling over the first and/or second wireless access network." *Id*., 7:37–52. As I explain below, such functionality was disclosed in the prior art. Ex. 1002, ¶¶66, 86–93.

C. The '560 patent's Prosecution History

59. I have reviewed the prosecution history of the '560 patent and summarize it below.

60. During prosecution of the '560 patent, the examiner issued a single rejection, finding that the independent claims were anticipated by WO 2009/119699 to Serravalle. Ex. 1002, 91-93. The applicant's response did not amend the claims. The applicant instead acknowledged that Serraville is directed to "facilitating handover of a user device between a source base station … and a target base station" of a different network type, and that "[i]n order to facilitate such a handover between two different network types it is necessary that the first network obtains information about elements of the second network." Ex. 1002, 71. The applicant further acknowledged that "Serraville discloses a method to update the NCL in the first network with information about elements in the second network" using "the Automatic Neighbour Relation (ANR) function." *Id.* In other words, the applicant acknowledged that the prior art discloses a system for automatically updating an

NCL based on information from user terminals that are detected to be ready for handover.

61. The applicant, however, argued that Serraville does not disclose the "selector configured for selecting a part of the [detected] user terminals." *Id.*, 72. Specifically, the applicant stated that Serraville's "Identifier Management Module is operable for requesting information relating to identifiers of target gateway," but it was "not clear … how this module relates to the selector of the present application." *Id.* The applicant further distinguished Serraville by arguing that "[i]n the present application the updating of the NCL is performed independently of actual handover procedures, although the updating of the NCL is done based on information received from selected terminals about to be in a handover or reselection situation." *Id.*, 73. I think it is important to note that the applicant described the present application as "allow[ing] for the possibility that a terminal that is about to be handed over ***is not requested to report cell information***." *Id.*, 73. The applicant argued that by only selecting a part of the user terminals to be handed over, "the amount of cell information reporting can be tuned, which relates to a trade-off between the measurement overhead and the potential for neighbour cell list optimization." *Id.*, 73.

62. According to the applicant, their argument could be summarized as "Serraville relates to a method of facilitating handovers based on the results of an

ANR function based on information received from the terminal to be handed over, whereas the present application relates to updating (optimizing) an NCL based on information previously received selected terminals in a handover situation." *Id.*, 73.

63. Following this response, the examiner issued a notice of allowance, explaining that the reasons for allowance "are the same as those presented by the Applicant." *Id.*, 58.

D. IPR2022-00557

64. Claims 1 and 6-8 of the '560 Patent were previously challenged in an *inter partes* review proceeding brought by Ericsson Inc. ("Ericsson"), Case No. IPR2023-00582 on February 17, 2023. In that proceeding, Ericsson presented one ground of challenge against claims 1 and 6-8, arguing that they were rendered obvious by the combination of U.S. Pat. Pub. No. 2009/0191862 ("Amirijoo") and 3GPP TR 32.816 ("TR-32.816"). I have reviewed the papers and accompanying exhibits filed in that proceeding.

65. The Board instituted review on September 7, 2023. IPR2023-00582, Paper 10. On December 4, 2023, Patent Owner filed a Response. IPR2023-00582, Paper 12. On January 23, 2024, the parties filed a joint motion to terminate, indicating that they had settled their dispute, and the Board terminated the proceeding.

E. Claim Construction

66. For the purposes of my analysis in this IPR proceeding, I understand that the words of a claim are given their plain meaning that those words would have had to a POSITA at the time of the alleged invention. I also understand that the structure of the claims, the specification, and the prosecution history may also be used to better construe a claim insofar as the plain meaning of the claims cannot be understood. Moreover, I understand that even treaties and dictionaries may be used, albeit under limited circumstances, to determine the meaning attributed by a POSITA to a claim term at the time of filing. Furthermore, I understand that a Patent Owner's own apparent interpretation of certain terms in related proceedings can be considered to determine the meaning of patent claims in an IPR proceeding.

67. I have followed this approach in my analysis, and, except as explicitly stated below, I have applied the plain and ordinary meaning of those terms as the would have been interpreted by a POSITA at the time the invention was made (not today). For purposes of my analysis here, I have used October 7, 2009, the date of the European application to which the '560 patent claims priority, as the date of the invention.

1. "updating means configured for updating at least one of the first neighbour cell list and the second neighbour cell list using the received cell information" (Claim 1)

68. I have been informed that when a claim element uses the word "means," there is a rebuttal presumption that the claim element is a means-plus-function term. I understand this presumption can be overcome if the claim language itself recites sufficient structure.

69. In my opinion, the term "updating means" lacks sufficiently definite structure to overcome this presumption, and thus it should be construed as a means-plus-function term.

70. In my opinion, the recited function of the term is "updating at least one of the first neighbour cell list and the second neighbour cell list using the received cell information," and the term has a corresponding structure of "updater 14" disclosed in Figure 2, 9:26-28 and 9:58-59 of the '560 patent, and equivalents thereof.

71. I note that in IPR2023-00582, Ericsson proposed the same construction. Ex. 1010, 8-9. However, in its Institution Decision, the Board declined to construe the term because it was "not necessary." Ex. 1012, 17.

72. I also note that in the parallel district court litigation against Ericsson, the Court held that this term is a means-plus-function term. Ex. 1011, 40. The Court construed the term to have the same function proposed by Petitioner, and that its

corresponding structure is "'updater 14' however it is described in the specification," and "equivalents thereof." *Id.*, 41. I note that the specification only mentions the "updater 14" at 9:26-28, 9:58-59 and Figure 2, the same portions of the specification that I believe correspond to the claimed function. Thus, the Court's previous construction of this term is consistent with Petitioner's proposed construction.

2. "configured for" (Claim 1)

73. In my opinion, this term should be given its plain meaning.

74. In the Ericsson district court litigation, the Court also gave this term its "Plain and ordinary meaning." Ex. 1011. However, in its Claim Construction Order, the Court discussed previous cases (including an earlier case between KPN and Ericsson that involved an unrelated patent) where it had remarked that "configured to" does not encompass structure that is merely "capable of" performing the claimed function. *Id.*, 36-37. The Court also noted that Patent Owner agreed that "configured for" "requires something more than merely being capable of." *Id.*, 33. But the Court declined to adopt Defendants' proposal of "includes the necessary hardware and software for performing the functionality recited in the claim without the need to rebuild, rewrite or recompile the code for, or redesign any of that hardware or software," because it "would introduce various limitations without adequate support in the intrinsic record and for apparent purpose of attempting to resolve an infringement dispute regarding particular accused instrumentalities." *Id.*,

37. In my opinion, the Court's construction and discussion does not implicate any argument with respect to the prior art and therefore the term does not need to be construed.

3. "location information" (Claim 7)

75. In IPR2023-00582, Petitioner proposed construing this term in view of Patent Owner's infringement contentions as "information regarding at least the cell in which the terminal is operating, such cell corresponding to a particular geographic coverage area." Ex. 1011, 10. The Board rejected this construction as "presented without any consideration of the intrinsic record and is based solely on extrinsic evidence (PO's infringement contentions)." Ex. 1012, 18. The Board instead noted that the specification describes the location information as "generated by GPS module 25 or 'by means of measurements using the first and/or the second wireless access network." *Id.* (quoting Ex. 1001, 5:25-30, 9:59-62). The Board therefore construed "location" as "the actual location of the 'detected user terminals' within the cell in which the terminals are operating." *Id.*, 19.

76. In my opinion, this term need not be construed because, as I discuss below, the prior art renders it obvious under either interpretation.

VI. TR-32.816 AS PRIOR ART

77. In my opinion, TR-32.816 was published by at least May 2007. However, I note that I only rely on TR-32.816 for one limitation: "neighbour cell

list." As I discuss below, it is my opinion that Amirijoo's "neighbor relation list" is a neighbor cell list. Thus, the combination with TR-32.816 is merely an alternative argument. As a result, even if TR-32.816 is not considered prior art, the claims are still unpatentable in view of the other references I rely on.

78. TR-32.816 is the 3GPP Technical Report 32.816, which in my opinion was published by May 2007 by the 3rd Generation Partnership Project, *i.e.* 3GPP. I have reviewed the declaration of Mr. Craig Bishop who worked as a Rapporteur[2] for 3GPP from 1998 to 2003. I am also familiar with 3GPP as an organization as well as its publication practices, and agree with his description of 3GPP. 3GPP is a well-known standards organization tasked with developing protocols for mobile telecommunications. In my opinion, a POSITA would have been well-aware of their documents and publication practices.

79. 3GPP technical reports, including TR-32.816, were generally uploaded to the 3GPP FTP server on the date indicated on the document, in this case, May 2007. In my opinion, the date of publication indicated on the document and as indicated on the 3GPP website were reliable indicators of the publication date of that

[2] A Rapporteur is the "prime contact point on technical matters and for information on progress throughout the drafting phases." https://www.3gpp.org/ftp/Information/Working_Procedures/3GPP_WP.htm

document. It is also my opinion that, based on 3GPP's publication practices, the documents available on 3GPP's website as of today are true and correct copies of the documents on the day they were uploaded, unless indicated otherwise. This applies to TR-32.816.

80. Thus, it is my opinion that TR-32.816 was publicly accessible with reasonable diligence by May 23, 2007. It is also my opinion that Exhibit 1006 is a true and correct copy of TR-32.816 on or around the date it was first made publicly available.

VII. GROUNDS OF REJECTION[3]

A. Ground 1: Amirijoo and TR-32.816 Render Obvious Claims 1-6 and 9-17

81. Amirijoo describes a system and methods where a neighbor cell list of a serving base station (which are called "neighbor relation lists" in Amirijoo) is automatically updated. The serving base station, using measurements from the mobile stations it is serving, determines which devices it should handover to a neighboring base station. If the mobile station sends over an identifier of a neighboring base station which is not on the serving base station's NRL, under

[3] I am not aware of any secondary considerations of non-obviousness identified by Patent Owner. Nonetheless, in my opinion, none would overcome my opinions that each of the Challenged Claims is unpatentable, as explained throughout this Declaration. I reserve the right to address any purported secondary considerations of nonobviousness with respect to the '560 patent if Patent Owner later raises any.

Patent Owner's apparent interpretation, the serving base station will select that mobile station to further request and send back the Cell Global Identity of the unknown neighboring base station. The serving base station's NRL can then add the new neighbor base station, and the core network can also inform the unknown base station's NRL to add the serving base station's identifier.

82. If Patent Owner disputes that Amirijoo's "neighbor relation list" is not a "neighbour cell list," TR-32.816 describes neighbor cell lists and it would have been obvious to combine Amirijoo and TR-32.816.

1. Motivation to Combine

83. In my opinion, a POSITA would have been motivated to combine Amirijoo with TR-32.816's teaching of updating neighbor cell lists. I note that Amirijoo itself refers to TR-32.816 as part of a "vision" where "the new system shall be self-optimizing and self-configuring in as many aspects as possible," including automatic optimizing of neighboring cell lists. Ex. 1005, ¶16. I consider this strong evidence that a POSITA would have considered TR-32.816's teachings as supplemental to Amirijoo's teachings. I understand that an explicit motivation to combine two references is sufficient to establish motivation to combine.

84. A POSITA would further be motivated to combine Amirijoo and TR-32.816 because of the well-known benefits of such a combination. Specifically, the combination would allow 4G networks to support backward compatibility with older

2G and 3G networks. A POSITA would find motivation from Amirijoo's express disclosure that 4G networks will initially rely upon existing 2G and 3G networks. Ex. 1005, ¶15. Backwards compatibility with earlier generations of cellular technology was known to be crucial to the operation and commercial success of Amirijoo's system, as customers would still have coverage from older networks while the service provider built out its 4G network.

85. I also believe combining Amirijoo and TR-32.816 was a simple substitution of one known element (*i.e.* Amirijoo's NRLs) with another (*i.e.* TR-32.816's NCLs) to obtain predictable results: a system configured to update neighbor cell lists (as taught in TR-32.816) according to the "techniques for automatically managing relationships to neighbors in other RATS/frequencies" as disclosed in Amirijoo.

86. In my opinion, a POSITA would have had a reasonable expectation of success in combining Amirijoo at TR-32.816. Amirijoo itself cites to TR-32.816, which a POSITA would understand indicates that the teachings of these references are combinable. In addition, a POSITA would have known that the NCLs described in TR-32.816 were successfully implemented in existing 2G and 3G cellular networks, and would have been familiar with the details of said implementation. Thus, I believe that implementing TR-32.816's NCLs into Amirijoo would have

been well-within the skill of an ordinary artisan, and a POSITA would have anticipated success in such a combination.

87. In my opinion, Amirijoo and TR-32.816 are directed to the same field of endeavor as '560 patent, managing of wireless networks. Ex. 1001, Abstract ("The invention relates to a system and method for updating a neighbour cell list of a wireless access node."); Ex. 1005, Abstract ("[T]he technology concerns a method of operating a telecommunications system comprising a serving radio base station and a candidate radio base station."); Ex. 1006, 1 ("Telecommunication management; Study on Management of LTE and SAE").

2. Claim 1

(i) 1[pre]: A system for updating a neighbour cell list in a telecom communications architecture comprising a first wireless access network having a first wireless access node for which at least one first neighbour cell list is defined and a second wireless access network having a second wireless access node for which at least one second neighbour cell list is defined, the system comprising

88. In my opinion, to the extent the preamble is limiting, it is rendered obvious by Amirijoo in view of TR-32.816.

89. With respect to the limitation ***"a telecom communications architecture comprising a first wireless access network … and a second wireless access network …,"*** Amirijoo is directed to methods for updating neighbor relation lists ("NRLs") within a telecommunications system comprising multiple types of wireless access

networks, such as GERAN (2G network), UTRAN (3G network), and E-UTRAN (4G network). Specifically, Amirijoo's depicts in Figure 1 a "telecommunications system 10" (*i.e.* ***telecom communications architecture***) with "a first radio access network 12" (*i.e.* ***first wireless access network***) having a "first type radio access technology (RAT)" and a "second radio access network 14" (*i.e.* ***second wireless access network***") having a "second type radio access technology." Ex. 1005, ¶66. Amirijoo provides an example where the first network uses E-UTRAN while the second network uses GERAN. *Id.*

90. With respect to the limitation ***"first wireless access network having a first wireless access node … and a second wireless access network having a second wireless access node,"*** Amirijoo teaches that each of the two radio access networks (*i.e.* ***wireless access networks***) have one or more base stations (*i.e.* ***wireless access nodes***). Specifically, as depicted in Figure 1, "first radio access network 12" has one or more base stations (labeled 28_{G-1} and 28_{G-2}) (*i.e.* ***first wireless access nodes***) and "second radio access network 12" has one or more base stations (labeled 28_{U-1} and 28_{U-2}) (*i.e.* ***second wireless access nodes***). Base stations are "wireless access nodes according to the '560 patent. Ex. 1001, 1:37-41 ("The cell-specific list of surrounding cells that are considered for cell reselection or handover is called the neighbour cell list (NCL), ***which is stored in each base station*** and broadcast within the cell.").

91. With respect to the limitation ***"a first wireless access node for which at least one first neighbour cell list is defined and … a second wireless access node for which at least one second neighbour cell list is defined,"*** Amirijoo discloses that each base station has a "neighbor relation list" ("NRL") that lists the neighbor cells of the base station, *i.e.* ***first and second neighbour cell lists***. For example, Amirijoo notes that during a handoff of a mobile station from a "serving base station" to a "candidate base station," both the serving BS and the candidate BS each have an NRL to which the other BS can be added, thus teaching that each base station has an NRL for which it is defined. Ex. 1005, ¶82 ("[T]he candidate base station (BS) can be added to the neighbor relation list (NRL) of the serving base station (BS). … [T]he candidate base station (BS) adds an entry corresponding to the serving base station (BS) in its NRL.").

92. In my opinion, Amirijoo's NRL is a ***neighbour cell list***. This is confirmed by the '560 patent's description of an NCL as a "cell-specific list of surrounding cells that are considered for cell reselection or handover," with a cell being a "base station." Ex. 1001, 1:37-41. Amirijoo describes its NRL in the same way: as a list of surrounding base stations that are candidates for mobile device handover. For example, Amirijoo teaches that when a serving base station "hand[s] off a mobile station (MS) to the neighbor the CGI [Cell Global Identity] of the neighbor must be known," with said CGI found in the NRL. Ex. 1005, ¶14.

Amirijoo also describes that NRLs "in E-UTRAN contain[] GERAN and UTRAN ***neighbors***" and that its methodologies are directed to "detect[ing] new inter-RAT/frequency ***neighbor base stations*** using mobile station (MS) measurements" to "updat[e] the NRL." *Id.*, ¶¶27-31; *see also* ¶¶79-82 (describing how mobile stations send "measurement request[s]" to candidate "surrounding inter-RAT/frequency base stations" which are added to the serving base station's NRL based on the measurements).

93. In fact, a POSITA would have understood that Amirijoo's NRLs for use with E-UTRAN is the same as the NCLs used in GERAN and UTRAN networks. For example, Ericsson, the assignee of Amirijoo, proposed on May 2007 that LTE use "Automatic Neighbour Relation Lists," noting that "Neighbour Cell Lists will exist in LTE … but have a different role" and thus Ericsson proposed "giv[ing] it a new name: Neighbour Relation List," despite retaining its structure as a list containing neighboring cells. Ex. 1015, 1. This document also describes how neighboring cells are added to the NRL. *Id.*, 3.

94. However, if Patent Owner disputes that Amirijoo's NRLs are not NCLs, TR-32.816 discloses NCLs. In particular, TR-32.816 discloses that each cell has a "neighbour list" and provides a method for "further optimisation of … neighbour cell list," where new neighbors "can be included based on information about detected cells in UEs." Ex. 1006, 11. It would have been obvious to

incorporate TR-32.816's description of NCLs, as I discussed above. This is particularly the case with Amirijoo expressly discussing TR-32.816 as evidence of 3GPP's "vision" of a "self-optimizing and self-configuring" network. Ex. 1005, ¶16.

95. With respect to the limitation ***"system for updating a neighbour cell list,"*** Amirijoo describes that NRLs "in E-UTRAN contain[] GERAN and UTRAN neighbors" and that its methodologies are directed to "detect[ing] new inter-RAT/frequency neighbor base stations using mobile station (MS) measurements" to "updat[e] the NRL," *i.e.* a ***system for updating a neighbour cell list***. *Id.*, ¶¶27-31; *see also* ¶¶79-82 (describing how mobile stations send "measurement request[s]" to candidate "surrounding inter-RAT/frequency base stations" which are added to the serving base station's NRL based on the measurements).

96. I note that in its Institution Decision from IPR2023-00582, the Board held that the Petition there sufficiently established that Amirijoo alone discloses the preamble of claim 1. Ex. 1012, 23, 30.

> *(ii) 1[a]: a detector configured for detecting user terminals to be transferred from the first wireless access node of the first wireless access network to the second wireless access node of the second wireless access network;*

97. In my opinion, Amirijoo discloses this limitation.

98. Amirijoo discloses that the "serving base station" will detect which mobile stations, *i.e.* ***user terminals***, to perform a handover (*i.e.* ***transfer***) from the

serving base station, *i.e.* ***first wireless access node***, to a candidate base station, *i.e.* ***second wireless access node***. For example, Amirijoo teaches that for "inter-RAT[] HOs," that is, handovers/transfers of a mobile station from one network to another, "the serving base station (BS) needs to be able to trigger inter-RAT[] measurements, make a comparison between different RATs[], and make a HO [handover] decision." Ex. 1005, ¶17.

99. As shown in Figure 3, Amirijoo discloses that a serving base station's "data processing and control unit" (labeled 36_S), *i.e.* ***a detector***, "comprise[s] inter-RAT/frequency handover function 50 and measurement communication function 52." *Id.*, ¶77. Amirijoo discloses that this unit requests measurements from mobile stations to determine whether they should be handed over to a candidate base station. *Id.* ("[Measurement communication function 52 controls communications with mobile station (MS) 30 for requesting or obtaining measurements or information (e.g., measurements or information ***for potential handover purposes***); the respective inter-RAT/frequency handover function 50 is invoked when it is ***determined that a handover is to occur***."). Thus, the data processing and control unit, *i.e.* ***a detector***, detects which mobile stations will be transferred from the serving base station to a candidate base station.

100. Amirijoo provides several examples of triggering conditions for detecting which mobile stations to perform a handover. For example, one triggering

condition is based on the amount of data being consumed by a mobile device (¶¶84, 86), another triggering condition is the quality of the connection between the mobile device and the serving base station (¶85), and a third triggering condition involve the characteristics of the subscriber or mobile device (¶89).

101. As annotated below, Figure 4 of Amirijoo depicts this process, wherein the mobile device sends "configuration measurement[s]" to the serving base station for the base station to determine whether a triggering condition has been met. Ex. 1005, ¶79 ("[T]he base station (BS) receives measurements from the mobile station (MS) and evaluates the triggering conditions."). This information is annotated in **red**.

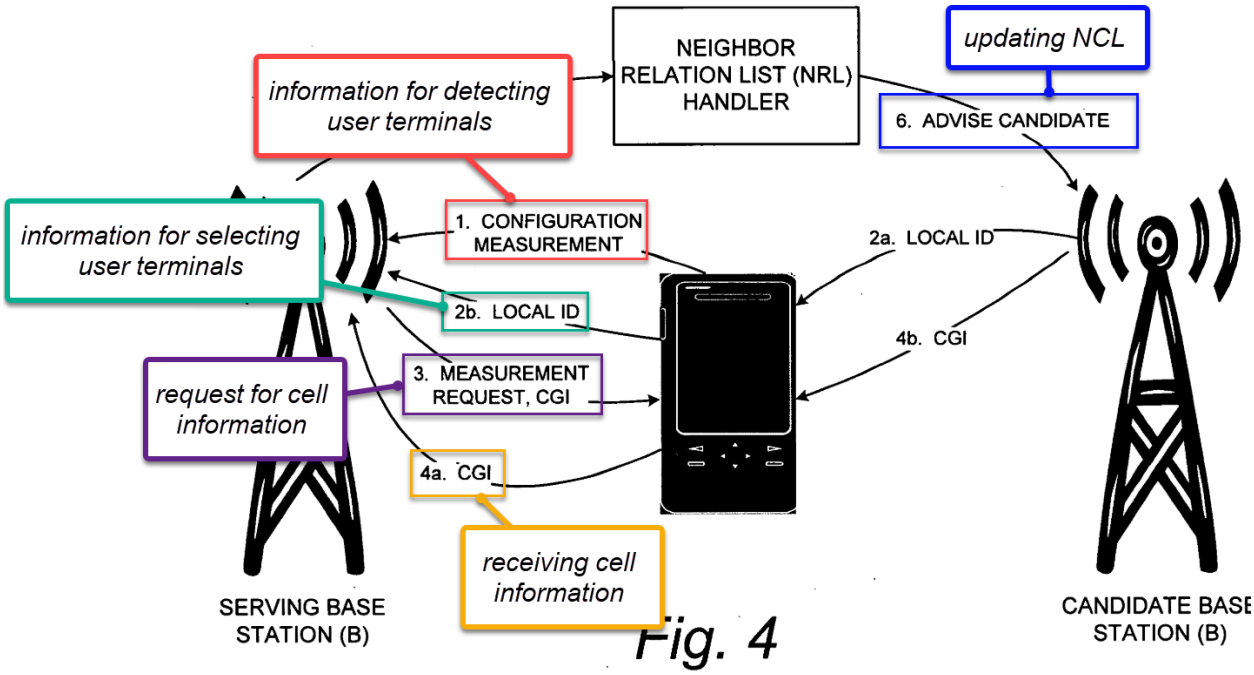

Fig. 4

102. I note that in the Board's Institution Decision for IPR2023-00582, the Board held that similar disclosures in Amirijoo disclosed this limitation. EX012, 24.

(iii) 1[b]: a selector configured for selecting a part of the user terminals;

103. In my opinion, Amirijoo discloses this limitation under Patent Owner's apparent construction as evidenced by its infringement contentions in the Ericsson litigation. There, Patent Owner accused Ericsson's devices of practicing the '560 patent because of their implementation of the standardized "Automatic Neighbor Relation (ANR) Function." Ex. 1014, 4. As I discuss below, Amirijoo discloses ANR functionality. I note, however, that the applicant's statements during prosecution could be read to exclude the standardized ANR functionality given the applicant's successful traversal of Serraville, although I do not provide an affirmative opinion on that issue. Regardless, as I discuss in Ground 2, Kazmi discloses this limitation consistent with applicant's statements, and it would have been obvious to combine Kazmi with Amirijoo.

104. Under Patent Owner's apparent construction, Amirijoo teaches a ***selector that selects a subset of the detected mobile devices to perform subsequent measurements***. Specifically, when a mobile device triggers one of the conditions discussed above, it will "measure[] the signal quality of surrounding inter-RAT/frequency base stations" and, along with the local ID's of the surrounding base

stations, send that information to the serving base station. Ex. 1005, ¶80. Amirijoo further discloses that the serving base station will select those mobile stations where the serving base station "has no prior knowledge of a neighbor base station (BS) with the reported local ID," upon which the serving base station "may send a CGI measurement request to the mobile station (MS)." *Id.*, ¶81. In other words, Amirijoo discloses ***selecting*** among mobile stations chosen for handoff those that detected unknown base stations. This step is depicted in Figure 4, as annotated below in **green**, where the mobile station receives the local IDs of surrounding base stations and sends them to the serving base station.

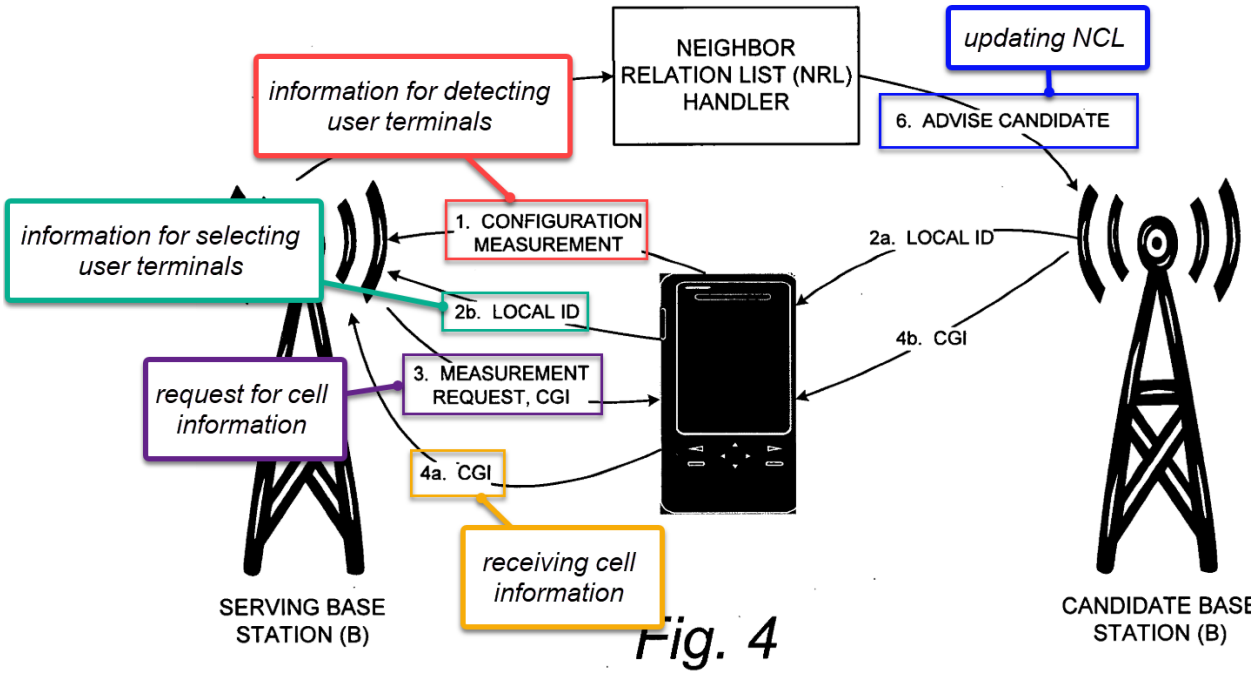

Fig. 4

105. Amirijoo discloses that such functionality is "executed by a … processor," in other words, either a special-purpose processor or software executed

by a general-purpose processor, either of which is ***a selector***. Ex. 1005, ¶64. The '560 patent's similarly describes that its invention "may be implemented as a program product for use with a computer system." Ex. 1001, 11:33-34. A POSITA would therefore understand that the claimed "selector" need not be physically separate from the claimed "detector."

> *(iv) 1[c]: a request generator configured for requesting from the first wireless access node one or more of the selected user terminals to report cell information of a plurality of wireless access nodes of at least one of the first wireless access network and the second wireless access network;*

106. In my opinion, Amirijoo discloses this limitation. Amirijoo discloses that, to the mobile stations which measured unknown candidate base stations (*i.e.* ***selected user terminals***), the serving base station (*i.e.* ***first wireless access node***) sends a request for the Cell Global Identity (CGI) of the unknown candidate base stations (*i.e.* ***requesting … to report cell information of a plurality of wireless access nodes of the first or second wireless access network***).

107. Specifically, Amirijoo discloses that "[i]f the serving base station (BS) has no prior knowledge of a neighbor base station (BS) with the reported local ID, the serving base station (BS) may send a CGI measurement [*i.e.* ***cell information***] request to the mobile station (MS), as illustrated by act (3) in FIG. 4." Ex. 1005, ¶81. This step is annotated in **purple** in the below annotated Figure 4.

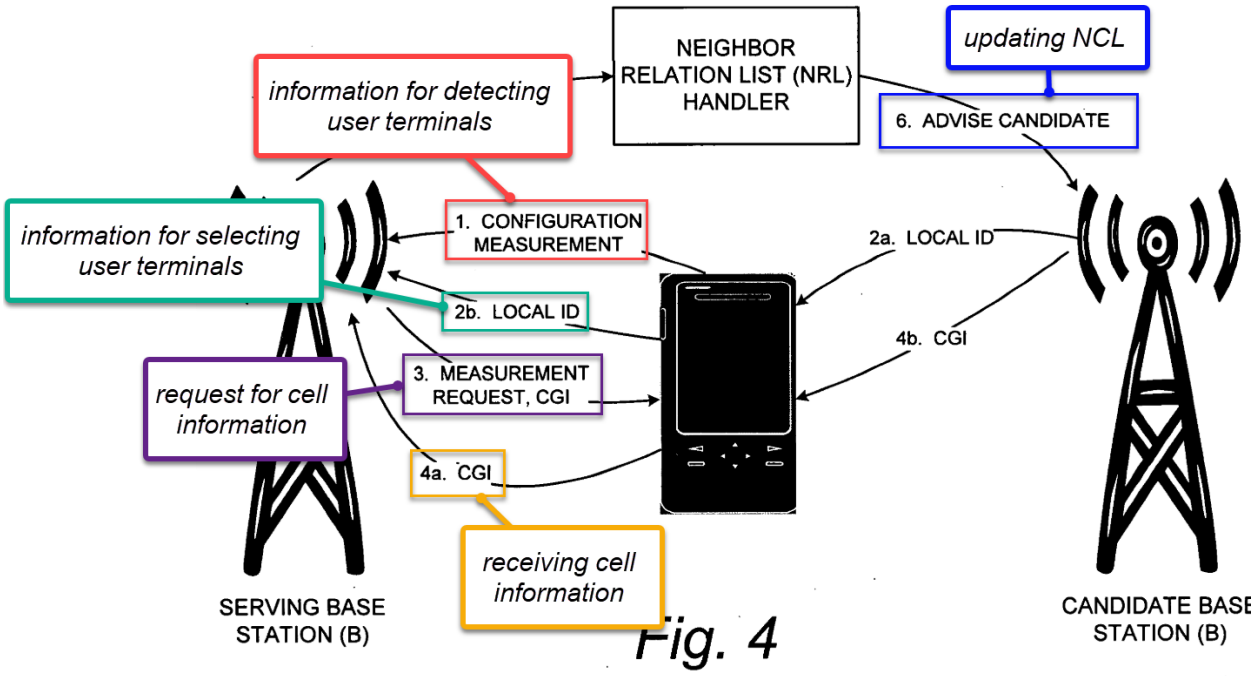

Fig. 4

108. CGI is cell information because the '560 patent explains that "cell information" includes the CGI of a base station. Ex. 1001, 2:4 ("Cell Global Identifier (CGI) and ***further cell information***").

109. Amirijoo further teaches that the mobile station performs measurements of a ***plurality of surrounding candidate base stations***. Ex. 1005, ¶80 ("The mobile station (MS) measures the signal quality of surrounding inter-RAT/frequency ***base stations***"). Thus, a POSITA would understand that the mobile station reports multiple local IDs, and more than one of them could be unknown to the serving base station. A POSITA would further understand that, in such a scenario, the serving base station's "CGI measurement request to the mobile station

(MS)" would request the CGI measurement for a ***plurality of base stations***, *i.e.* ***a plurality of wireless access nodes***.

110. In addition, Amirijoo discloses that "measurements from certain ***mobile stations*** … are used to detect inter-RAT/frequency ***neighbors***." *Id.*, ¶79. A POSITA would therefore understand that different mobile stations, *i.e.* ***user terminals***, may report local IDs of different unknown candidate base stations to the base station. A POSITA would further understand that, in such a scenario, the serving base station's "CGI measurement request to the mobile station (MS)" would request the CGI measurement to multiple mobile stations for a ***plurality of base stations***, *i.e.* ***a plurality of wireless access nodes***.

111. Amirijoo discloses requesting information of surrounding base stations for either the same network as the serving base station (*e.g.*, E-UTRAN) (*i.e.* ***first wireless access network***) or a different network (*e.g.*, GERAN) (*i.e.* ***second wireless access network***). Specifically, Amirijoo discloses that the surrounding candidate base stations (for which CGI measurements will be requested) could be either inter-RAT (base stations of a different network) or inter-frequency (base stations of the same network). As Amirijoo explains, inter-RAT refers to a "process wherein a mobile terminal switches from using a first radio access system having a first radio access technology (such as GSM) to a second radio access system having a second radio access technology (such as UTRA)." Ex. 1005, ¶10. By contrast, inter-

frequency refers to a handover within the same radio access technology. *Id.*, ¶15. ("[I]t is projected that LTE will operate in multiple frequency bands. [L]oad balancing between different frequency bands … require[s] inter-frequency handovers").

112. Amirijoo discloses that such functionality is "executed by a … processor," in other words, either a special-purpose processor or software executed by a general-purpose processor, either of which is ***a request generator***. Ex. 1005, ¶64. This is consistent with the '560 patents description that its invention "may be implemented as a program product for use with a computer system." Ex. 1001, 11:33-34. A POSITA would therefore understand that the claimed "request generator" need not be physically separate from the claimed "selector" or claimed "detector."

> *(v) 1[d]: a receiver configured for receiving the cell information from the one or more of the selected user terminals; and*

113. In my opinion, Amirijoo discloses this limitation.

114. Amirijoo discloses that the serving base station has an antenna or transceiver (*i.e.* ***a receiver***) which receives the CGI of an unknown neighboring base station (*i.e.* ***cell information***) from the mobile station (*i.e.* ***selected user terminal***). Ex. 1005, ¶81 ("[T]he mobile station (MS) measures the Cell Global Identity (CGI) of the candidate base station (BS) … and (as illustrated by act (4a)) reports the Cell

Global Identity (CGI) to the serving base station (BS).”). Amirijoo expressly teaches that the base station receives communications from the mobile station via an “antenna 39 … which communicates over an air interface with mobile station (MS).” *Id.*, ¶76. Amirijoo also discloses that the antenna is connected to a “transceiver (TX/RX)” which a POSITA would understand is a ***receiver*** (as well as a transmitter, hence the term “transceiver”). *Id.* This step of receiving cell information is annotated in **orange** in the below annotated Figure 4.

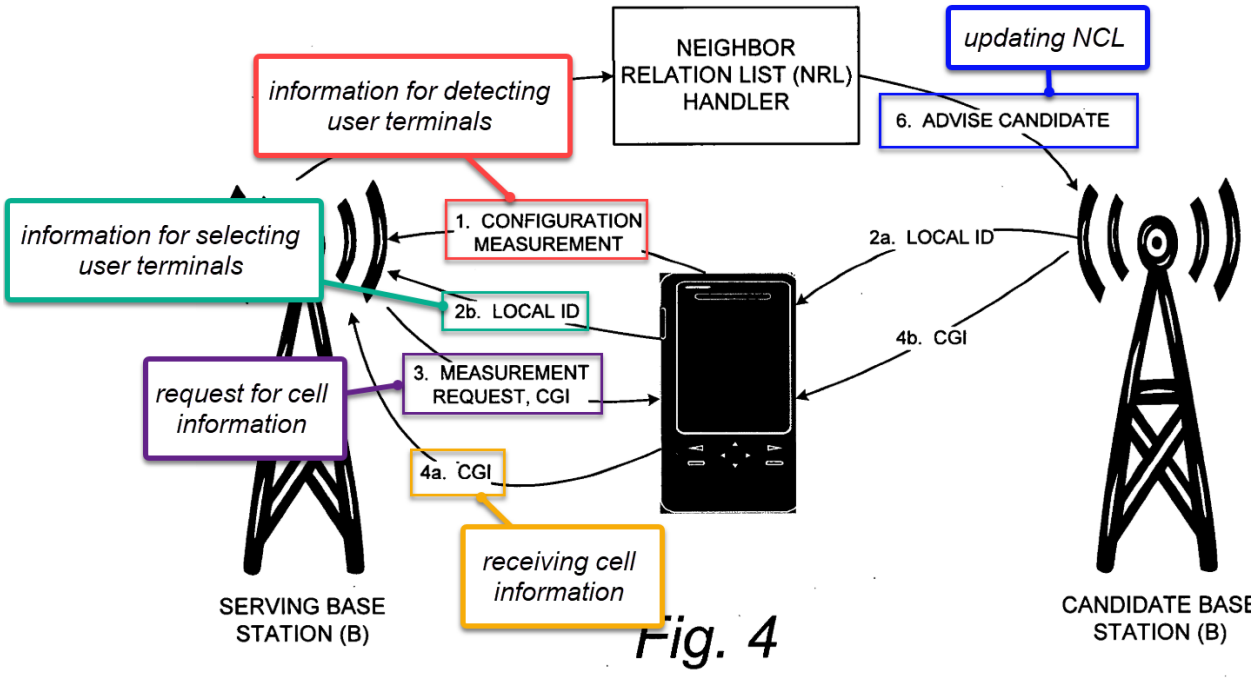

Fig. 4

115. In the alternative, Amirijoo also discloses that “the serving base station (BS) can inform an NRL handler, such as an Operation and Support System (OSS) or any other management node, about the newly detected candidate base station (BS),” in order for the NRL handler to at least “inform[] the candidate base station

(BS)" so that it can add the serving base station to its NRL. Ex. 1005, ¶82. A POSITA would understand that the NRL handler receives the CGI of the new candidate base stations, *i.e.* ***cell information***, because such information is necessary to know which candidate base station to inform. This step is reflected in **blue** in the above figure.

116. A POSITA would also understand that the OSS has a ***receiver*** for receiving the cell information. As depicted in Figure 2, the base stations are "connected to an external core network 16 which can comprise, or otherwise have access to, neighbor relation list (NRL) handler 18." Ex. 1005, ¶71. The external core network "may be (for example) the Public Switched Telephone Network (PSTN) and/or the Integrated Services Digital Network (ISDN)." *Id.*, ¶66. Thus, a POSITA would understand that the OSS within the external core network has a receiver for receiving any information from the base stations.

(vi) 1[e]: updating means configured for updating at least one of the first neighbour cell list and the second neighbour cell list using the received cell information.

117. In my opinion, Amirijoo discloses this limitation. Amirijoo discloses means for updating the NRL of either the serving base station (*i.e.* ***first neighbour cell list***) or the candidate base station (*i.e.* ***second neighbour cell list***) using the received CGI (*i.e.* ***cell information***).

118. As discussed above, I propose that "updating means" be construed as having a function of "updating at least one of the first neighbour cell list and the second neighbour cell list using the received cell information," and a corresponding structure of "updater 14" disclosed in Figure 2, 9:26-28 and 9:58-59 of the '560 patent, and equivalents thereof. In the Ericsson litigation, the Court construed this term as having corresponding structure of "'updater 14' however it is described in the specification." Ex. 1011, 41. As I noted, the specification only describes the "updater 14" at 9:26-28, 9:58-59 and Figure 2.

119. The specification describes that an updater 14 is "configured for updating (including verification) of the NCL-2A using the cell information CI" and that an updater 14 "may be used to update NCL-1A by adding wireless access node NodeB 2C, as illustrated." Ex. 1001, 9:26-28, 9:58-59. Figure 2 depicts these "updater[s] 14" as separate components in separate base stations:

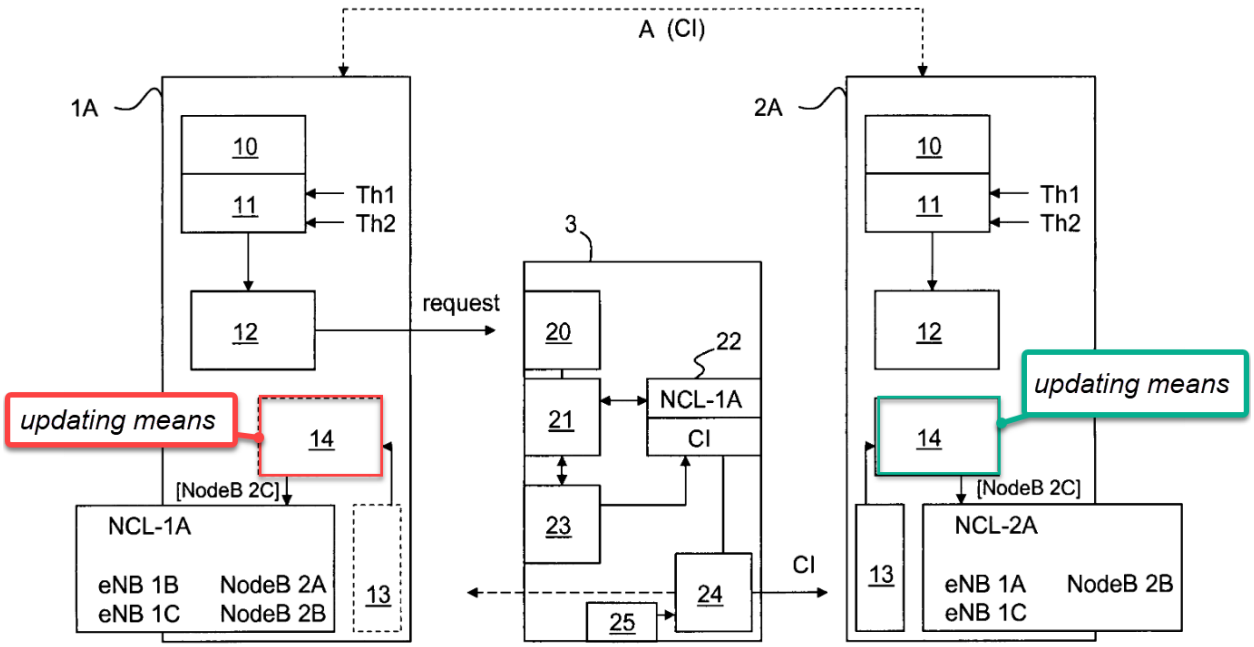

FIG. 2

120. In my opinion, Amirijoo discloses an "updating means" as I have construed it. Amirijoo teaches that it is "essential to make use of automatic in-service approaches for generating and updating NRLs." Ex. 1005, ¶24. Amirijoo discloses that the NRLs of both the serving base station and candidate base station can be updated based on the received CGI, *i.e.* ***cell information***.

121. For example, with respect to updating the NRL of the serving base station, Amirijoo discloses that after the candidate base station's CGI is reported to the serving base station, "the candidate base station (BS) can be added to the neighbor relation list (NRL) of the serving base station (BS)." Ex. 1005, ¶82. A POSITA would understand that such functionality is performed by the "data

processing and control unit 31" (*i.e.* ***updating means***) which is connected to the transceiver that receives the CGI. *Id.*, ¶¶76-77. Thus, Amirijoo discloses an updating means which has the same structure as disclosed in the '560 patent, that is, a function block used to update an NCL.

122. With respect to updating the NRL of the candidate base station, Amirijoo discloses that "the serving base station (BS) can inform an NRL handler" (*i.e.* ***updating means***) "about the newly detected candidate base station (BS)." Ex. 1005, ¶82. The NRL handler then "informs the candidate base station" which "adds an entry corresponding to the serving base station (BS) in its NRL." *Id.* Alternatively, the candidate base station also has a "data processing and control unit 31" (*i.e.* ***updating means***) which is connected to the transceiver that receives the command to update its NRL. *Id.*, ¶¶76-77. Thus, Amirijoo discloses an updating means which has the same structure as disclosed in the '560 patent, that is, a function block used to update an NCL.

123. To the extent Patent Owner distinguishes updating "neighbor relation lists" disclosed in Amirijoo from the updating means configured for updating "neighbour cell lists" recited in the Challenged Claims, the updating of neighbor cell lists is expressly taught by TR-32.816. It would have been obvious for a POSITA to supplement Amirijoo's system for "automatically managing relationships to neighbors in other RATs/frequencies" with TR-32.816's "neighbour cell list

optimization." TR-32.816 teaches an algorithm configured to update neighbor cell lists "based on information in UEs about detected cells." Ex. 1007, 11. And, like the means for updating the neighbor relation list taught in Amirijoo, the algorithm disclosed in TR-32.816 uses "UE measurement reporting" to identify missing neighbors and add them to the neighbor cell list(s) of the relevant eNodeB(s) (i.e., base stations). Ex. 1007, 11.

3. Claim 2

(i) 2[pre]/2[a]: The system according to claim 1, wherein the request generator is configured for requesting from the first wireless access node one or more of the selected user terminals to report cell information of a plurality of wireless access nodes of the first wireless access network;

124. I provide a brief summary of what claim 2 (as well as claim 4) describe. Claims 2 and 4 recite the receipt of cell information for updating an NCL from a device ***after*** a device has transferred from an old serving base station to a new serving base station, wherein the old serving base station receives the cell information ***via*** the new serving base station. For example, after transfer, the device provides the cell information to the new serving base station, which then delivers the information to the old serving base station using, for example, a backbone network.

125. This particular limitation 2[a] is identical to limitation 1[c] except that it requires reporting cell information of wireless access nodes of the ***first*** wireless access network, whereas limitation 1[c] allows for reporting cell information from

either the first or ***second*** wireless access network. Regardless, as discussed above in limitation 1[c], Amirijoo discloses requesting cell information for base stations from the same network as the serving base station, *i.e.* ***first wireless access network***. *See* Ex. 1005, ¶15.

(ii) 2[b]: wherein the receiver is configured for receiving the cell information of the wireless nodes of the first wireless access network via the second wireless access node,

126. In my opinion, Amirijoo discloses or renders obvious this limitation. Amirijoo discloses a system for the ***receiver*** of a base station to receive identifying information, *i.e.* ***cell information***, about unknown base stations of the same and different networks, *i.e.* ***wireless nodes***, via another base station, *i.e.* ***via the second wireless access node***.

127. Specifically, Amirijoo discloses that when the NRL of a base station (such as the ***second wireless access node***) is updated to include new neighboring cells, that base station "can inform an NRL handler, such as an Operation and Support System …, about the newly detected candidate base station[s]." Ex. 1005, ¶82. The NRL handler then informs other base stations about the new base stations, which can then add them to their respective NRL. *Id.*

128. I also believe it would have been obvious to use the NRL handler in the above manner. By doing so, NRLs could be centrally managed, which a POSITA would have been motivated to do given the well-known benefits. A POSITA would

have understood such well-known benefits to include having the NRL handler inform other base stations of new base stations, because it would minimize the amount of traffic dedicated to mobile stations requesting global identifiers of new base stations. What I mean is that central management of NRLs would provide a mechanism for base stations to update their NRLs via other base stations, thereby foregoing the need to always rely on mobile devices to provide the cell information.

129. Similarly, a POSITA would have been motivated to allow a serving base station to receive the global identifiers of unknown neighboring base stations within the same or different networks from mobile stations via the NRL handler ***after*** the mobile stations have been transferred to a candidate base station. A POSITA would understand that this would allow the mobile stations to be handed off to the desired candidate base station at an earlier point of time, while still allowing the (former) serving base station to receive the global identifiers it had requested the mobile stations to obtain. By performing an early handoff, this improves the service quality of the network. The purpose of handoffs is to allow the mobile station to be served by base station that is more likely to provide better service, such as one that has a stronger signal. Thus, an earlier handoff would allow the mobile station to receive the superior service at an earlier time.

130. A POSITA would have reasonably expected the use of the NRL handler in this manner to succeed because the NRL handler already provides a mechanism

for updating a base station's NRL via a different base station. Thus, the proposals would simply require what I believe to be a trivial change, that is, the new serving base station submitting the list of unknown neighboring base stations intended for the old serving base station to the NRL handler for the NRL handler to send to the old serving base station. Such functionality would be reasonably expected to succeed since it merely uses the NRL handler in a manner that it is designed for.

(iii) 2[c]: the system further comprising a transfer system configured for transferring user terminals from the first wireless access network to the second wireless access network prior to receiving the cell information of the plurality of wireless access nodes of the first wireless access network via the second wireless access node.

131. In my opinion, Amirijoo discloses or renders obvious this limitation. Amirijoo discloses performing handovers, *i.e.* ***transfers***, of mobile stations, *i.e.* ***user terminals***, from the serving base station, *i.e.* ***first wireless access node***, to the candidate base station, *i.e.* ***second wireless access node***.

132. In particular, Amirijoo teaches that for "inter-RAT[] HOs," that is, handovers of a mobile station from a base station in one network to a base station in a different network, "the serving base station (BS) needs to be able to trigger inter-RAT[] measurements, make a comparison between different RATs[], and make a HO decision." Ex. 1005, ¶17. Amirijoo also discloses that the serving base station and mobile station have an "inter-RAT[] handover function." *Id.*, ¶¶75, 77, Figure 3.

133. As I discussed in limitation 2[b], it would have been obvious to perform the handover ***prior*** to the mobile stations transmitting the global identifiers, *i.e.* ***cell information***, of the unknown neighbor base stations, as earlier handovers would allow the mobile stations to more quickly be served by a base station with a stronger signal or better service. A POSITA would further reasonably expect this to succeed as it would simply involve performing the handover immediately after the mobile stations receive the global identifiers.

4. Claim 3: The system according to claim 2, further comprising a data transfer system for transferring the cell information, or a derivative thereof, of the wireless access nodes of the first wireless access network to the first wireless access node.

134. As I discussed above in limitation 2[b], Amirijoo discloses an NRL handler, *i.e.* ***a data transfer system***, which transfers identifying information, *i.e.* ***cell information***, of unknown neighboring base stations from one base station to another base station.

5. Claim 4

(i) 4[pre]/4[a]: The system according to claim 1, wherein the request generator is configured for requesting from the first wireless access node one or more of the selected user terminals to report cell information of a plurality of wireless access nodes of the second wireless access network;

135. The only difference between claim 2 and claim 4 is that claim 2 recites the cell information is for base stations from the first wireless access network (which I have mapped to the network of Amirijoo's serving base station) and claim 4 recites

that it is for base stations from the second wireless access network (which I have mapped to the network of Amirijoo's candidate base station which the mobile device is transferred to).

136. As I discussed above in limitation 1[c], Amirijoo discloses a request generator that requests from mobile stations the CGI information of a plurality of unknown candidate base stations. As I also discussed in that limitation, the unknown candidate base stations can be on a different network as the serving base station and therefore are a ***plurality of wireless access nodes of the second wireless access network***.

(ii) 4[b]: wherein the receiver is configured for receiving the cell information of the wireless nodes of the second wireless access network via the second wireless access node,

137. *See* limitation 2[b]. As I discussed, Amirijoo's cell information could be for base stations from multiple networks (including the network of the candidate base station).

(iii) 4[c]: the system further comprising a transfer system configured for transferring user terminals from the first wireless access network to the second wireless access network prior to receiving the cell information of the plurality of wireless access nodes of the second wireless access network via the second wireless access node.

138. *See* limitation 2[c].

6. Claim 5: The system according to claim 4, further comprising a data transfer system for transferring the cell information,

or a derivative thereof, of the wireless access nodes of the second wireless access network to the first wireless access node.

139. *See* Claim 3.

7. Claim 6

(i) 6[pre]/6[a]: The system according to claim 1, wherein the request generator is configured for requesting from the first wireless access node one or more of the selected user terminals to report cell information of a plurality of wireless access nodes of the second wireless access network;

140. As I discussed above in limitation 1[c], Amirijoo discloses a request generator that requests from mobile stations the CGI information of a plurality of unknown candidate base stations. As also discussed in that limitation, the unknown candidate base stations can be on a different network as the serving base station and therefore are a ***plurality of wireless access nodes of the second wireless access network***.

(ii) 6[b]: wherein the receiver is configured for receiving the cell information of the wireless access nodes of the second wireless access network via the first wireless access node,

141. As I discussed above in limitation 1[d], Amirijoo discloses that the OSS receives cell information about "newly detected candidate base station[s]," *i.e.* ***cell information of the wireless access nodes of the second wireless access network***. Ex. 1005, ¶82. The OSS receives such information from the serving base station, *i.e.* ***via the first wireless access node***. *Id.*

(iii) 6[c]: further comprising a transfer system configured for transferring user terminals from the first wireless access network to the second wireless access network after receiving the one or more cell parameters of wireless access nodes of the second wireless access network via the first wireless access node.

142. In my opinion, Amirijoo discloses this limitation.

143. Amirijoo discloses performing handovers, *i.e.* ***transfers***, of mobile stations, *i.e.* ***user terminals***, from the serving base station, *i.e.* ***first wireless access node***, to the candidate base station, *i.e.* ***second wireless access node***. Amirijoo further discloses that the handover occurs ***after*** the serving base station receives the CGI information of new candidate base stations.

144. In particular, Amirijoo teaches that for "inter-RAT[] HOs," that is, handovers of a mobile station from a base station in one network to a base station in a different network, "the serving base station (BS) needs to be able to trigger inter-RAT[] measurements, make a comparison between different RATs[], and make a HO decision." Ex. 1005, ¶17. Amirijoo also discloses that the serving base station and mobile station have an "inter-RAT[] handover function." *Id.*, ¶¶75, 77, Figure 3.

145. Amirijoo discloses that the handover from serving base station to candidate base station occurs ***after*** the serving base station receives the CGI information, *i.e.* ***cell parameters***, of the new candidate base stations. For example, Amirijoo explains that "the serving base station (BS) needs to forward user plane

data to the target base station (BS), meaning that the target base station (BS) must be known and its unique identity, so-called Cell Global Identity (CGI), must be established before executing the HO." Ex. 1005, ¶13; *see also* ¶14 ("[W]hen handing off a mobile station (MS) to the neighbor the CGI of the neighbor must be known."). Thus, when the serving base station performs a handover to a new, previously-unknown candidate base station, it must have already received the CGI information about the new candidate base station.

146. In addition, Amirijoo discloses that the mobile stations request and receive CGI information about the candidate base station during a "transmission gap" with the serving base station, which begins and ends after a specified length of time. Ex. 1005, ¶¶91-92 ("[T]he serving base station (BS) issues a transmission gap of length T, where T is the worst case time to obtain the desired information from the candidate base station (BS)."). As shown in Figure 14, following the end of the transmission gap, the mobile station continues being served by the serving base station. Thus, a POSITA would understand that handover does not occur until after the CGI information is transmitted to the serving base station.

8. Claim 9

(i) 9[pre]

147. *See* limitation 1[pre].

(ii) 9[a]

148. *See* limitation 1[a].

(iii) 9[b]

149. *See* limitation 1[b].

(iv) 9[c]

150. *See* limitation 1[c].

(v) 9[d]

151. *See* limitation 1[d].

(vi) 9[e]

152. *See* limitation 1[e].

9. Claim 10

(i) 10[pre]/10[a]

153. *See* limitations 2[pre] and 2[a].

(ii) 10[b]

154. *See* limitation 2[b].

(iii) 10[c]

155. *See* limitation 2[c].

10. Claim 11

(i) 11[pre]/11[a]

156. *See* limitations 4[pre] and 4[a].

(ii) 11[b]

157. *See* limitation 4[b].

(iii) 11[c]

158. *See* limitation 4[c].

11. Claim 12

(i) 12[pre]/12[a]

159. *See* limitations 6[pre] and 6[a].

(ii) 12[b]

160. *See* limitation 6[b].

(iii) 12[c]

161. *See* limitation 6[c].

12. Claim 13

(i) 13[pre]

162. *See* limitation 1[pre]. Amirijoo further discloses that disclosed systems and methods are "represented in computer readable medium and so executed by a computer or processor," which includes "a single dedicated processor," "a single shared processor," or "a plurality of individual processors." Ex. 1005, ¶¶64-65.

(ii) 13[a]

163. *See* limitation 1[a].

(iii) 13[b]

164. *See* limitation 1[b].

(iv) 13[c]

165. *See* limitation 1[c].

(v) 13[d]

166. *See* limitation 1[d].

(vi) 13[e]

167. *See* limitation 1[e].

13. Claim 14

168. *See* Claim 3.

14. Claim 15

(i) 15[pre]/15[a]

169. *See* limitations 4[pre] and 4[a].

(ii) 15[b]

170. *See* limitation 4[b].

(iii) 15[c]

171. *See* limitation 4[c].

15. Claim 16

172. *See* Claim 5.

16. Claim 17

173. *See* Claim 5.

B. Ground 2: Amirijoo, TR-32.816, and Kazmi Render Obvious Claims 1-17

174. As I discussed in Ground 1, Amirijoo discloses limitations 1[b], 9[b] and 13[b]'s "selecting a part of the user terminals" by selecting mobile stations that returned local IDs of unknown base stations.

175. If Patent Owner argues that this is insufficient to disclose "selecting a part of the user terminals," Kazmi also discloses using other factors to select which

user terminals to request CGI information for candidate neighbor base stations. In my opinion, it would have been obvious to incorporate such teachings into Amirijoo and TR-32.816, thereby providing an alternative reason why claims 1, 9, and 13 are obvious.

176. Kazmi also discloses the limitations in claims 7 and 8, and thus the combination of these references renders obvious claims 7 and 8.

1. Motivation to Combine

177. In my opinion, a POSITA would have been motivated to combine Amirijoo and TR-32.816 with Kazmi's teachings of using selection criteria to select user terminals for requesting the global identifier of unknown neighboring cells.

178. Like Amirijoo, Kazmi is directed to "systems and methods for automatically adding a unique identifier associated with a cell to a neighbor cell list associated with another cell." Ex. 1007, Abstract. Like Amirijoo, Kazmi performs this process by requesting the CGI of the unknown neighboring cell from mobile terminals. *Id.* But Kazmi also describes various criteria for "selecting a particular mobile terminal from a set of mobile terminals" for which the base station will request the selected mobile terminal to retrieve CGI information. *Id.* Note that Kazmi uses the term "global cell identifier (GCI)," which like Amirijoo's CGI, is a globally unique identifier for the cell. Ex. 1007, ¶3; Ex. 1005, ¶13. These terms are interchangeable.

179. In my opinion, a POSITA would be motivated to incorporate Kazmi's teachings because they are an improvement on Amirijoo's teachings of optimizing the NCLs of its base stations. Kazmi itself provides sufficient motivation, noting that the use of such criteria provides "a relatively high probability of being able to obtain the GCI within a given period of time." Ex. 1007, ¶31. Such selection criteria "means radio conditions experienced by the selected UE with respect to cell 103b are expected to be good, ***thereby ensuring that the UE can obtain the GCI*** of cell 103b relatively quickly and thereby enabling base station 102s to schedule a small gap for GCI decoding so as to minimize data interruption." *Id.*, ¶37. Kazmi notes that "it is preferable that the gap be kept as small as possible." *Id.*, ¶47. In other words, a POSITA would be motivated to use Kazmi's selection criteria in order to select those user terminals which have the best chance of obtaining the unknown cell's global identifier in a short time period, which minimizes data interruption and increases the efficiency of the network.

180. Furthermore, a POSITA would also be motivated to use Kazmi's selection criteria as it would minimize the amount of network traffic dedicated to optimizing the NCLs. Kazmi's selection criteria optimizes the chance that the global identifiers of unknown neighboring cells can be obtained, which a POSITA would have known would require less user terminals to obtain the global identifiers. This

results in a reduction of traffic needed between the base stations and user terminals for updating NCLs, which improves the network's efficiency.

181. In my opinion, a POSITA would have reasonably expected the combination to succeed. Both Amirijoo and Kazmi have very similar disclosures directed to updating NCLs, with Kazmi further describing additional selection criteria for selecting user terminals. Kazmi provides sufficient details regarding the implementation of its selection criteria that would have been well-within the skill of an ordinary artisan. I also note that both Amirijoo and Kazmi are Ericsson patents directed to similar cellular technologies, including updating of NCLs, which provides more reason a POSITA would have expected success. Moreover, a POSITA would have expected that the combination of Amirijoo and TR-32.816 further combined with Kazmi would have also succeeded, as the use of TR-32.816's NCLs would not have posed any hurdle with implementing Kazmi's selection criteria.

182. In my opinion, like TR-32.816 and the '560 patent, Kazmi is directed to the field of managing wireless networks. Ex. 1007, ¶2 ("The present invention relates to the field of mobile networks. More specifically, the present invention relates to systems and methods for automatically determining the global cell identifier (GCI) of a neighboring cell.").

2. 1[b]: a selector configured for selecting a part of the user terminals / 9[b] and 13[b]: selecting a part of the user terminals;

183. In my opinion, Kazmi discloses this limitation.

184. Kazmi discloses various criteria for "selecting a particular mobile terminal from a set of mobile terminals." Ex. 1007, Abstract. In particular, Kazmi discloses that after the serving base station receives identifiers of unknown neighboring base stations from the served "UE[s]" (user equipment), *i.e.* ***user terminal***, the serving base stations will "determine[] whether it should instruct [that] UE 104 to obtain the GCI for" the unknown cell by "select[ing] from a set of UEs a UE 104 that has a relatively high probability of being able to obtain the GCI within a given period of time," *i.e.* ***select a part of the user terminals***. Ex. 1007, ¶¶29-30. Kazmi further discloses that "the selection may be based on one or more of: statistics regarding reported PCIs, statistics regarding reported cell quality, statistics of handover failures, statistics regarding the speed of the UEs in the set, statistics regarding propagation delay." *Id.*, ¶30.

185. Kazmi provides further details regarding the criteria for "selecting from a candidate set of UEs a particular UE to instruct to obtain the GCI of a neighbor cell." *Id.*, ¶41. Kazmi describes a number of factors which are included in a "P value" that determines whether the UE is selected. *Id.*, ¶¶42-46.

186. One of those factors is whether the UE "is in a discontinuous transmission mode (DRX) mode." *Id.*, ¶42. Being in such a mode will increase the chance that the UE is selected. *Id.* Another factor is the "downlink data rate for the selected UE," with the "P value" increasing "by an amount that is a function of the data rate value." *Id*. Still another factor is "the speed at which the selected UE is moving." *Id.*, ¶43. If the "speed value is less than a speed threshold, then the P value for the selected UE may be increased by a predetermined amount." *Id.* The process also includes the UE's reported "cell quality value pertaining to" the unknown cell and the "propagation delay value" between the UE and the unknown cell. *Id.*, ¶¶44-45.

187. Once a UE is selected, the serving base station "instructs the selected UE to obtain the GCI of" the unknown cell. *Id.*, ¶32. When the UE obtains the GCI, the serving base station "receives from the selected UE a message containing the GCI of" the unknown cell and "adds the GCI to the neighbor cell list." *Id*.

188. Based on all of the above, Kazmi discloses ***selecting a part of the user terminals***. And as I discussed above, it would have been obvious to combine these teachings with Amirijoo and TS-32.816.

3. Claim 7: The system according to claim 1, wherein the telecommunications system is further configured for receiving location information from one or more of the detected user terminals and wherein the location information

is used as a selection parameter for selecting the part of the detected user terminals.

189. In my opinion, Kazmi discloses this limitation.

190. Kazmi discloses that location information is used as a ***parameter for selecting the part of the detected user terminals***. Specifically, Kazmi discloses that the selected user terminal "is expected to ***be close to***" the unknown cell. Ex. 1007, ¶37. Kazmi also discloses that it uses as a selection criteria the "speed at which the selected UE is moving." *Id.*, ¶43. A POSITA would understand that a base station or user terminal typically does not include any mechanism for directly calculating a user terminal's speed, and that speed is instead calculated by determining the location of the user terminal at two different points in time, where a speed can be derived by finding how far the device traveled in that time. Thus, in order for the base station in Kazmi to calculate and use the "speed at which the selected UE is moving" as a parameter for selection, the base station would need to know and use the user terminal's location. Ex. 1007, ¶43.

191. Thus, a POSITA would have understood that the specific location of the user terminal is received from the user terminal and used (among other factors) to select the user terminal.

192. In my opinion, it also would have been obvious to a POSITA that the selection process in Kazmi requests location information from the user terminal and uses it to calculate the "speed at which the selected UE is moving" to be used as a

selection parameter. Ex. 1007, ¶43. A POSITA would have been motivated by the fact that a base station does not have a mechanism for calculating the user terminal's speed or location. A POSITA would have also understood that a user terminal has various mechanisms for determining its own location, including using a GPS receiver, which provides a precise location of the user terminal. Ex. 1008, ¶41. Thus, a POSITA would have been motivated to request a GPS location from the user terminal in order to receive a precise location of the user terminal in order to calculate a precise speed of the user terminal. A POSITA would understand the well-known benefits of precision with respect to calculating speed of a user terminal as selection criteria. Precise data would improve the data as a criterion used in selection. Precise data would allow the system to select user terminals that are more likely to obtain the CGI information from the candidate base station.

193. In the alternative, as I explained below in Ground 3, this claim would have been obvious in view of Mach, which expressly discloses a mobile device using a GPS receiver.

4. Claim 8: The system according to claim 1, wherein one or more thresholds, possibly service-dependent, are defined in the telecommunications system for transferring the user terminals between the first wireless access network and the second wireless access network and wherein at least one of

the thresholds is used as a selection parameter for selecting the part of the detected user terminals.

194. In my opinion, Amirijoo in view of Kazmi renders obvious this limitation.

195. As I discussed above in Ground 1, limitation 1[a], Amirijoo uses several "triggering condition" for a serving base station to perform a handover of a mobile station to a candidate base station of a different network, *i.e.* ***one or more thresholds … for transferring the user terminals between the first wireless and the second wireless access network***. For example, Amirijoo describes that a handover can be initiated "[i]f the estimated signal quality of the candidate base station (BS) is above a ***threshold***." Ex. 1005, ¶20.

196. As discussed in this ground for limitation 1[b], Kazmi discloses that the selection process also uses signal quality between the candidate base station and user terminal. For example, Kazmi discloses using "cell quality value[s] pertaining to" the unknown cell "that was reported by the selected UE to" the serving base station. Ex. 1007, ¶44. Kazmi also describes using "downlink data rate" and "propagation delay." *Id.*, ¶¶42, 45. A POSITA would understand that such factors are measures of ***signal quality*** between the user terminal and the unknown base station.

197. A POSITA would have understood that the use of cell quality value, downlink data rate, and propagation delay for selecting user terminals also involves using the same ***threshold*** described by Amirijoo for determining whether to perform

a handover. Kazmi teaches that such "cell quality information" is used to determine handover. Ex. 1007, ¶29. Thus, a POSITA would understand that, when the selection step described in Kazmi is incorporated into Amirijoo, it would likewise use the same thresholds for determining handover.

198. I also believe that a POSITA would have considered it obvious in the Amirijoo-Kazmi combination to use the same thresholds for determining handover and selecting which user terminals to request CGI information. As Kazmi explains, the selected user terminals should "ha[ve] a relatively high probability of being able to obtain the GCI within a given period of time," which is why it uses cell quality to make that determination. Ex. 1007, ¶31; *see also* ¶37 ("[R]adio conditions experienced by the selected UE with respect to cell 103b are expected to be good"). A POSITA would have understood that cell or signal quality of the candidate base station is similarly used to determine whether to initiate a handover. *See, e.g.*, Ex. 1005, ¶20. Thus, a POSITA would have considered it obvious to use the same threshold for both selecting user terminals and for initiating handover, since a POSITA would understand that the concern for signal quality is generally the same. A POSITA would have been motivated by the fact that the optimal threshold for initiating a handover will meet the same goals and address the same concerns as the threshold for selecting the user terminals. A POSITA would have further been motivated because this would allow the telecommunications operator to calculate an

optimal threshold only once, after which it can be used by both the selection of user terminals and determining handovers. This would improve the efficiency and cost of the system. I note that Amirijoo itself teaches that thresholds for determining which user terminals will collect measurements can "be the same threshold as is used for inter-RAT/frequency handover measurements." Ex. 1005, ¶87.

199. A POSITA would have had a reasonable expectation of success in using the same threshold. Doing so would have been a trivial implementation well-within the skill of an ordinary artisan.

5. Remaining Limitations and Claims

200. In my opinion, the remaining limitations of independent claims 1, 9, and 13, and Claims 2-6 and 10-12, are rendered obvious by this ground for the same reasons discussed above for Ground 1.

C. <u>Ground 3:</u> Amirijoo, TR-32.816, Kazmi and Han Render Obvious Claims 2-5, 10, 11, and 15

201. As I discussed in Grounds 1 and 2, the combination of Amirijoo and TR-32.816 (with or without Kazmi) render obvious claims 2-5, 10, 11, and 15's recitation of receiving cell information via the second wireless access node, from devices that were transferred before the information was received.

202. But Han provides further support that this is obvious. Han discloses a mechanism for a new serving base station to provide an updated NCL to a device's previous serving base station following the device's transfer.

203. In particular, Hans teaches that after a mobile station is transferred to a new serving base station, the new base station "detects a neighbor list error of the previous BS [base station] 101 … on the basis of log information reported from a corresponding MS [mobile station]," and then "updates a neighbor list of a previous BS 101." Ex. 1016, ¶¶43-45. The detection of a neighbor list error could be done by detecting "a service coverage hole in the middle with a previous BS." *Id.*, ¶48. The new base station updates the previous base station's neighbor list by "transmit[tin]g updated neighbor list information directly to the [previous base station] through a backbone network, or transmit the updated neighbor list information … through the WSM [Wireless System Manager] server." *Id.*, ¶49. Alternatively, the MS can determine whether a neighbor list update is needed. *Id.*, ¶51.

204. In my opinion, a POSITA would have found it obvious to combine these teachings with the combination of Amirijoo, TR-32.816, and Kazmi. The combination would initially proceed as taught in Amirijoo where, as I discussed in limitations 1[c], 1[b], and 1[c], a serving base station selects a handoff-ready mobile device to request CGI information (*i.e.* ***cell information***) from unknown neighboring cells, whether belonging to the serving base station's network (*i.e.* ***first wireless access network***) or the candidate base station's network (*i.e.* ***second wireless access network***). As taught in Han, the mobile device would be handed off prior to

transmitting the cell information to the serving base station. When the mobile device has been transferred to the new base station, it will provide the CGI information to the new base station where such information is transferred to the old base station through the backbone network, as taught in Han.

205. In this combination, Amirijoo's "serving base station" ***receives cell information*** of unknown neighboring cells (whether belonging to a ***first or second wireless access network***) via the new base station (*i.e.* ***second wireless access node***), and such information is received ***after*** the mobile device is transferred. This combination therefore renders obvious limitations 2[b], 2[c], 4[b] and 4[c], and their corresponding limitations in claims 10, 11, and 15. The remaining limitations of those claims, as well as claims 3, 5, 14, 16, and 17 (which depend on claims 2, 4, 10, 11, and 15), are rendered obvious for the same reasons discussed in Ground 1.

206. In my opinion, a POSITA would be motivated to incorporate Han's teachings into the Amirijoo combination because of the well-known benefits of centrally managing the NCLs of various base stations within cellular networks. Central management would minimize the amount of traffic dedicated to mobile stations requesting global identifiers of new base stations. A POSITA would further be motivated because Han's teachings allow mobile devices to be transferred before transmitting cell information, which allows for quicker transfer while still allowing the (former) serving base station to receive the global identifiers it had requested the

mobile stations obtain. By performing an early handoff, this improves the service quality of the network, allowing devices to be handed off to a base station with a higher quality of service at an earlier time.

207. A POSITA would have reasonably expected the combination to succeed. Amirijoo itself provides a mechanism for base stations to provide updated NCLs to other base stations, specifically the NRL handler I discussed in Ground 1, claim 2. Moreover, Han provides sufficiently detailed explanations for its teachings that was within the capabilities of a POSITA to implement. Implementing the combination would thus be within the capabilities of a POSITA.

208. In my opinion, like Amirijoo, TR-32.816, and Kazmi, Han is directed to the field of managing wireless networks. Ex. 1016, Abstract ("An apparatus and method for updating a neighbor list in a mobile communication system are provided.").

D. <u>Ground 4:</u> Amirijoo, TR-32.816, Kazmi, and Mach Render Obvious Claim 7

209. As I discussed in Ground 2, the combination of Amirijoo, TR-32.816 and Kazmi renders obvious claim 7's recitation of receiving and using location information as a parameter for selecting user terminals.

210. But Mach expressly teaches receiving and using location information, including GPS information, as part of a handover process. And as I discuss below,

it would have been obvious to incorporate such teachings into Amirijoo, TR-32.816 and Kazmi, rendering obvious claim 7.

1. Motivation to Combine

211. In my opinion, a POSITA would have been motivated to combine Amirijoo, TR-32.816, and Kazmi with Mach's teachings of receiving and using GPS location information to improve a network's algorithms.

212. Mach teaches that user terminals can use a GPS network to obtain its position. Ex. 1008, ¶41. Mach further teaches that a base station serving the user terminal can request the GPS location information, which is used to improve the network's operations and management functions." *Id.*

213. A POSITA would have been motivated to incorporate those teachings in the combined Amirijoo-TR-32.816-Kazmi system. In my opinion, a POSITA would have been aware and motivated by the well-known benefits of using GPS location information to improve network operations. Mach itself teaches that network operation algorithms, including algorithms for determining handover, "can be ***improved*** using the UE's positional data (position, speed) obtained from the" GPS network. Ex. 1008, ¶43; *see also* Ex. 1008, ¶2 ("using position information from a first network (e.g., GPS) for improving performance in or of a second network (e.g., terrestrial cellular)."); ¶40 (GPS location information "can be used as an additional input or as a replacement input to estimated position/speed in many existing L1-L3

(and other) radio protocols and algorithms used in mobile phones to improve their performance, particularly when operating in a mobile network operating on protocols developed many years ago such as for example UMTS, though these teachings may also be used in other radio access technology systems such as LTE, WIMAX etc.").

214. To illustrate, Kazmi provides selection criteria that POSITA would understand would be improved through the use of GPS information. For example, Kazmi discloses that its selection criteria is used to determine whether a user terminal is "close to" the unknown cell. Ex. 1007, ¶37. A POSITA would understand that the GPS location information disclosed in Mach would often provide a relatively precise location of the user terminal. The use of such information would allow Kazmi's selection criteria to determine whether it is "close to" the unknown cell in a manner that is more accurate compared to other methods.

215. Moreover, a POSITA would be motivated to use the GPS location information of the user terminal as a selection criteria because it provides a more accurate assessment of the mobile terminal's signal strength. A POSITA would understand that the signal strength of the user terminal to the serving base station or unknown neighboring base station is highly dependent on the precise location of the user terminal. Specifically, proximity of a user terminal to a base station strongly correlates with the strength of the signal between the user terminal and a base

station—which is precisely why Kazmi is concerned with whether a user terminal is "close to" the unknown cell. Ex. 1007, ¶37. Thus, a POSITA would understand that using Mach's GPS location information as a selection criteria would improve Kazmi's selection of user terminals because the precision of GPS location information would result in a better assessment of whether a user terminal has a stronger signal with the unknown neighboring base station. The precision of GPS location information was generally well-known and even today, it usually provides the most precise location information relative to other methods.

216. In addition, Kazmi also teaches using the "speed at which the selected UE is moving" as a selection criteria. And Mach teaches that the speed of the user terminal can be calculated by "obtain[ing] multiple ***positions*** over a window of time and comput[ing] its speed from the elapsed distance over the elapsed time window." Ex. 1008, ¶39. Thus, a POSITA would be motivated to give effect to Kazmi's teachings of using the user terminal's speed by using Mach's GPS location information to calculate the "multiple positions over a window of time" in order to derive the speed of the mobile station. In addition, a POSITA would be motivated by the fact that the GPS location information will be more precise than alternative methods of locating a user terminal and therefore provide a relatively more accurate determination of speed. A POSITA would understand that this combination would therefore improve the accuracy of Kazmi's selection criteria.

217. A POSITA would have reasonably expected the combination to succeed. Mach provides sufficient disclosure for a POSITA to implement its teachings into the Amirijoo-TR-32.816-Kazmi combination, including teachings regarding how mobile station obtains GPS location information and provides such information to the serving base station. GPS of course was well-known by this time. Using such information as selection criteria would further be within the skill of an ordinary artisan, as calculating distances and speed using GPS location information (*i.e.* longitude and latitude) would simply use rudimentary mathematics.

218. In my opinion, like Amirijoo, TR-32.816, and Kazmi, Mach is directed to the field of managing wireless networks. Ex. 1008, ¶2 ("The exemplary and non-limiting embodiments of this invention relate generally to wireless communication systems, methods, devices and computer programs and, more specifically, relate to using position information from a first network (e.g., GPS) for improving performance in or of a second network (e.g., terrestrial cellular).").

2. Claim 7: The system according to claim 1, wherein the telecommunications system is further configured for receiving location information from one or more of the detected user terminals and wherein the location information is used as a selection parameter for selecting the part of the detected user terminals.

219. In my opinion, Amirijoo-TR-32.816-Kazmi in view of Mach renders obvious this limitation.

220. Mach describes a base station that ***receives GPS location information*** from a mobile station, *i.e.* ***user terminal***, to be used for improving the algorithms used by the base station. As discussed above, these teachings would have been obvious to incorporate into the Amirijoo-TR-32.816-Kazmi combination such that the system would receive the GPS location information and use it as ***a parameter for selecting which user terminals to request CGI information***.

221. Mach discloses that a "mobile/portable UE 10," *i.e.* ***user terminal***, "has access to a first wireless network 100" such as "a non-terrestrial positioning network (e.g., GPS)." Ex. 1008, ¶41. The GPS receiver in the user terminal "***fixes its position*** from signals received from multiple GSP [sic] satellites," *i.e.* ***obtains location information***. *Id.* Mach further discloses that the user terminal is connected to a base station of a "second wireless network 200," which is a cellular telephony network like "UMTS, E-UTRAN and GSM." *Id.* This cellular network may "put the UE's positional data which the UE obtains … to use, for example in its O&M [operations and management] functions." *Id.*, ¶46.

222. Mach specifically describes that the user terminal will "report to the second network … the UE's position," *i.e.* ***the telecommunications system is configured for receiving location information from the user terminal***. *Id.*, ¶47. Mach teaches that the location information "can significantly improve the operator's knowledge of his network coverage and be very useful for network maintenance or

troubleshooting network problems." *Id.*, ¶48. Mach also teaches that the cellular network's "algorithms can be improved using the UE's positional data (position, speed)."

223. As discussed above, it would have been obvious to incorporate these teachings into Amirijoo in view of Kazmi (and TR-32.816). In particular, as discussed in Ground 2, Kazmi describes ***selecting certain user terminals*** to request CGI information of an unknown neighbor cell based on certain ***selection parameters***, such as whether the user terminal is "close to" the unknown cell or the "speed at which the selected UE is moving." Ex. 1007, ¶¶37, 43. In view of Mach, it would be obvious to use the GPS ***location information*** transmitted by the user terminal for these selection parameters. For example, it would be obvious to use the location information as taught in Mach to determine whether a user terminal is "close to" an unknown cell, *i.e.* ***using the location information as a selection parameter***. Ex. 1007, ¶37. Similarly, it would be obvious to use the location information to determine the speed of the user terminal, *i.e.* ***using the location information as a selection parameter***. Ex. 1007, ¶43. Mach itself teaches that the speed of the user terminal can be calculated by "obtain[ing] multiple ***positions*** over a window of time and comput[ing] its speed from the elapsed distance over the elapsed time window." Ex. 1008, ¶39.

VIII. CONCLUSION

224. I hereby declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this proceeding.

Executed on this January 17, 2025 by:

Kevin C. Almeroth, Ph. D.