

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

VASU HOLDINGS, LLC,
Patent Owner.

Case IPR2025-00450

Patent No. 10,419,996

**DECLARATION OF MARK LANNING IN SUPPORT
OF PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,419,996**

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. QUALIFICATIONS	5
III. LEGAL UNDERSTANDING	8
IV. BACKGROUND OF THE TECHNOLOGY	15
V. THE '996 PATENT	20
A. '996 Patent Overview	20
B. The Prosecution History	22
C. Priority Date of Claims 39 and 41	24
VI. LEVEL OF ORDINARY SKILL IN THE ART	25
VII. CLAIM CONSTRUCTION	27
VIII. GROUNDS OF UNPATENTABILITY	27
IX. SPECIFIC GROUNDS FOR CHALLENGE	28
A. GROUND 1: Dorenbosch in view of Donovan (Claims 1, 12, 23, 25, 34, and 35)	29
1. Overview of Dorenbosch (Ex. 1004, U.S. Patent App. Pub. 2005/0048977)	29
2. Overview of Donovan (Ex. 1005, U.S. Patent App. Pub. 2005/0063348)	35
3. Motivation to Apply Donovan's Teachings to Dorenbosch	39
4. Invalidity of Claims 1, 12, 23, 25, 34, and 35 Over Dorenbosch in view of Donovan	45
B. GROUND 2: DeAnna in view of Ground 1 (Claims 12, 23, and 34)	86
C. GROUND 3: Iizuka in view of Donovan (Claim 39)	91

1.	Overview of Iizuka (Ex. 1007, U.S. Patent App. Pub. 2005/028254)	91
2.	Motivation to Apply Donovan’s Teachings to Iizuka	98
3.	Invalidity of Claim 39 Over Iizuka in view of Donovan.....	104
D.	GROUND 4: Ground 3 in view of Preston (Claim 39).....	136
E.	GROUND 5: Ground 3 in view of Pan (Claim 41).....	139
1.	Overview of Pan (Ex. 1009, U.S. Patent App. Pub. 2004/0002335)	139
2.	Motivation to Apply Pan’s Teachings to Iizuka in view of Donovan	140
3.	Invalidity of Claim 41 Over Iizuka in view of Donovan and Pan	143
X.	SECONDARY CONSIDERATIONS	151
XI.	CONCLUSION	153

I. INTRODUCTION

1. My name is Mark Lanning and I am currently the President of Telecom Architects, Inc. and Reticle Consulting, LLC. I have been retained on behalf of Samsung Electronics Co. Ltd. and Samsung Electronics America Inc. (“Samsung”), to provide my opinions on certain issues related to U.S. Patent No. 10,419,996 (“the ’996 patent”) in connection with the above-captioned *inter partes* review (“IPR”) proceeding. In particular, I have been asked to provide my insights, analysis, and opinions regarding whether claims 1, 12, 23, 25, 34, 35, 39, and 41 of the ’996 patent (“Challenged Claims”) are obvious over the prior art references identified below.

2. I understand that the ’996 patent is titled “Mobile device with automatic switching between cellular and wifi networks,” names as inventors Vasudevan Ganesan and Stephane H. Maes, and is currently owned by Vasu Holdings LLC. I have considered the ’996 patent. I understand that the ’996 patent has been provided as Ex. 1001.

3. I understand that the file history of the ’996 patent has been provided as Ex. 1002. I have considered this file history, and I will refer to it as “the ’996 File History.”

4. I understand that the ’996 patent is a continuation-in-part of U.S. Patent Application No. 15/480,293 (“the ’293 Application”), which is a continuation of U.S. Patent Application No. 14/806,482, which is a continuation of U.S. Patent

Application No. 13/899,303, which is a continuation of U.S. Patent Application No. 13/168,585, which is a continuation of U.S. Patent Application No. 11/031,498, which claims priority to U.S. Provisional Patent Application No. 60/534,466 (“the ’466 Provisional Application”).

5. I understand that the ’996 patent claims a priority date of January 6, 2004, the filing date of the ’466 Provisional Application. As I discuss in Section V.C, claims 39 and 41 are not entitled to the benefit of at least the ’293 Application filing date. I have been asked to assume for all the Challenged Claims except claims 39 and 41, the Challenged Claims are entitled to the January 6, 2004 filing date of U.S. Patent Application No. 15/921,275 (“the ’275 Application”) for the purposes of rendering my opinions in this declaration. I have been asked to assume Challenged Claims 39 and 41 are entitled to the March 14, 2018 filing date of the ’275 Application for the purposes of rendering my opinions in this declaration. I have not been asked to opine on whether the Challenged Claims of the ’996 patent are entitled to this priority date, and do not provide any opinion on that subject.

6. My analysis and conclusions set forth in this declaration are based on my educational background and experiences in the field (see Section II). I am qualified to opine concerning what a person of ordinary skill in the art would have known and understood during that time. Before January 6, 2004, my level of skill in the art was at least that of a person of ordinary skill. I am qualified to opine

concerning what a person of ordinary skill in the art would have known and understood at the time of the '996 patent's purported invention. My analysis and conclusions herein are from the perspective of a person of ordinary skill in the art as of March 14, 2018, for claim 39 and 41. My analysis and conclusions herein are from the perspective of a person of ordinary skill in the art as of January 6, 2004, for all remaining claims.

7. As part of my independent analysis for this declaration, I have considered the following: the background knowledge/technologies that were commonly known to persons of ordinary skill in this art during the time before the earliest claimed priority date for the '996 patent; my own knowledge and experiences gained from my work experience in the field of the '996 patent and related disciplines; and my experience in working with others involved in this field and related disciplines.

8. I have considered the following non-exhaustive list of references in preparing my declaration. I have been instructed to assume that each of these references qualifies as prior art.

- **U.S. Patent Application Publication No. 2005/0048977 (“Dorenbosch”)** to Jheroen Dorenbosch et al. (“Dorenbosch”), titled “System and method to improve WLAN handover behavior and phone battery life when stationary in border cells,” filed on August 26, 2003 and published on March 3, 2005. I understand that a copy of this reference has been designated as Exhibit 1004. Throughout my declaration, references to Dorenbosch are to Exhibit 1004.

- **U.S. Patent Application Publication No. 2005/0063348 (“Donovan”)** to Timothy Donovan (“Donovan”), titled “Wireless local area network ad-hoc mode for reducing power consumption,” filed on September 19, 2003 and published on March 24, 2005. I understand that a copy of this reference has been designated as Exhibit 1005. Throughout my declaration, references to Donovan are to Exhibit 1005.
- **U.S. Patent Application Publication No. 2003/0084056 (“DeAnna”)** to Robert DeAnna et al. (“DeAnna”), titled “System for development, management and operation of distributed clients and servers,” filed on October 11, 2002 and published on May 1, 2003. I understand that a copy of this reference has been designated as Exhibit 1006. Throughout my declaration, references to DeAnna are to Exhibit 1006.
- **U.S. Patent Application Publication No. 2005/0282541 (“Iizuka”)** to Fumiyuki Iizuka et al. (“Iizuka”), titled “Mobile terminal, program for controlling mobile terminal, program for call-management server, and call management process,” filed on December 6, 2004 and published on December 22, 2005. I understand that a copy of this reference has been designated as Exhibit 1007. Throughout my declaration, references to Iizuka are to Exhibit 1007.
- **U.S. Patent Application Publication No. 2002/0126654 (“Preston”)** to Andrew Preston et al. (“Preston”), titled “Homing and controlling IP telephones,” filed on March 8, 2001 and published on September 12, 2002. I understand that a copy of this reference has been designated as Exhibit 1008. Throughout my declaration, references to Preston are to Exhibit 1008.
- **U.S. Patent Application Publication No. 2004/0002335 (“Pan”)** to ShaoWei Pan et al. (“Pan”), titled “Method and apparatus for implementing bi-directional soft handovers between wireless networks without carrier control,” filed on June 26, 2002 and published on January 1, 2004. I understand that a copy of this reference has been designated as Exhibit 1009. Throughout my declaration, references to Pan are to Exhibit 1009.

9. I understand that there is a pending district court litigation between Petitioners and Vasu Holdings LLC (“Samsung Litigation”) involving the ’996

patent.

10. I am being compensated by Samsung at my standard hourly consulting rate of \$550 for my time on this matter. My compensation is not dependent on the outcome of this proceeding or any other proceeding between the parties.

11. In forming my opinions, I relied on the documents cited in this declaration and the documents identified in the attached Appendix B. These documents comprise patents, file histories, printed publications, and other related documents. As discussed below, each document is a type that experts in my field would have reasonably relied upon when forming their opinions. Further, experts in my field would have had access to each document either through the applicable patent offices and/or well-known libraries, conferences, or publications in the field. My opinions are also based upon my personal and professional experience.

II. QUALIFICATIONS

12. I am qualified by education and experience to testify as an expert in the field of telecommunications including circuit-switched networks, multiple generations of cellular networks, and packet-switched networks. The following overview of my background pertains to my qualifications for providing expert testimony in this matter.

13. I am currently the president of two consulting companies: Telecom Architects, Inc. and Reticle Consulting, LLC. Telecom Architects provides

consulting services to fixed and wireless telecom service providers and their equipment suppliers. I have been President of Telecom Architects since 1999.

14. I have over 40 years of experience working in the telecommunications industry that began in the U.S. Army Signal Corp. My experience relevant to this case includes my work as an architect of various telecommunications systems and my work developing equipment used in telecommunications systems. This experience includes extensive design, implementation and testing work on the wireless interface functionality (between the base station and mobile phones) for multiple generations of cellular standards.

15. I received a B.S. in Computer Science from Southern Methodist University (SMU) in 1983.

16. DSC, now a part of Alcatel, hired me in 1983 where I was a software development manager on the team responsible for updating DSC's PSTN telephone switch into a Mobile Switching Center (MSC) for Motorola to sell as a part of their cellular product offering in the U.S. and many other countries.

17. In 1991, I began working as a consultant to Motorola for its "SuperCell" base station product and as a consultant to British Telecom to upgrade its current analog cellular network, and I was one of the network architects responsible for the design and rollout of its Global System for Mobile Communications (GSM) network known as Cellnet. Beginning in the early 1990s, I was responsible for

implementation of the SMS service, including working with suppliers of the SMS Center (SMSC), Mobile Switching Centers (MSCs) and cellular phones to define and roll out the functionality that was to be provided.

18. I was personally involved with Nokia, Ericsson, Motorola and other equipment suppliers in this effort.

19. Since 1995, I have also provided second generation (2G) and third generation (3G) Code Division Multiple Access (“CDMA”) network architecture and equipment design and implementation consulting services to companies such as Sprint, Nextel, Nokia, and Ericsson. While consulting to Nextel, which has since become part of Sprint, as one of the network architects for its iDEN network, one of my responsibilities was to define the network and mobile phone functionality required to support MMS and advanced data communications capability.

20. In addition to my cellular experience listed above, for at least the past ten years, I have kept up to date my knowledge of the present-day 3G, 4G, and 5G cellular network and wireless standards and their associated equipment and protocols. I have done this through my study of each new release of these standards, technical books and trade publications as well as my expert work in legal cases, which has involved evaluating the functionality of many different types of network equipment, mobile devices, and baseband chipsets. I have also evaluated thousands of cellular technology patents, and most of these were for cellular phone and/or base

station functionality.

21. I am a member of the Institute of Electrical and Electronics Engineers (IEEE), including the IEEE Standards Association. I am also a member of the Association for Computing Machinery (ACM). While employed at DSC, I was a member of the ANSI T1 and T1X1 standard groups responsible for the definition and standardization of the Advanced Intelligent Network (AIN) and Signaling System 7 (SS7) protocol.

22. A detailed record of my professional qualifications, including a list of publications, awards, and professional activities, is set forth in my curriculum vitae attached to this report as Appendix A.

III. LEGAL UNDERSTANDING

A. My Understanding of Priority Dates and Priority Claims

23. I have been informed that for a claim in a later-filed application to be entitled to the benefit of the filing date of a prior application, the specification of the prior application must contain a written description of the invention and the manner and process of making and using the claimed invention, in such full, clear, concise, and exact terms to enable an ordinarily skilled artisan to practice the invention claimed in the later patent application. Additionally, the priority application must describe the later claimed invention in sufficient detail that a person having ordinary skill in the art can clearly conclude that the inventor invented the claimed invention

as of the filing date sought. I understand this analysis is performed on a claim-by-claim basis.

B. My Understanding of Claim Construction

24. I am not an attorney and offer no legal opinions, but in the course of my work, I have had experience studying and analyzing patents and patent claims from the perspective of a person skilled in the art.

25. I have been informed that patent claims are construed from the viewpoint of a person of ordinary skill in the art of the patent at the time of the invention. I have been informed that patent claims generally should be interpreted consistent with their plain and ordinary meaning as understood by a person of ordinary skill in the art in the relevant time period (*i.e.*, at the time of the purported invention, or the so called “effective filing date” of the patent application), after reviewing the patent claim language, the specification, and the prosecution history (*i.e.*, the intrinsic record).

26. I have further been informed that a person of ordinary skill in the art must read the claim terms in the context of the claim itself, as well as in the context of the entire patent specification. I understand that in the specification and prosecution history, the patentee may specifically define a claim term in a way that differs from the plain and ordinary meaning. I understand that the prosecution history of the patent is a record of the proceedings before the U.S. Patent and

Trademark Office and may contain explicit representations or definitions made during prosecution that affect the scope of the patent claims. I understand that an applicant may, during the course of prosecuting the patent application, limit the scope of the claims to overcome prior art or to overcome an examiner's rejection, by clearly and unambiguously arguing to overcome or distinguish a prior art reference, or clearly and unambiguously disavowing claim coverage.

27. In interpreting the meaning of the claim language, I understand that a person of ordinary skill in the art may also consider "extrinsic" evidence, including expert testimony, inventor testimony, dictionaries, technical treatises, other patents, and scholarly publications. I understand this evidence is considered to ensure that a claim is construed in a way that is consistent with the understanding of those of ordinary skill in the art at the time of the claimed invention. For example, this can be useful for a technical term whose meaning may differ from its ordinary English meaning. I understand that extrinsic evidence may not be relied on if it contradicts or varies the meaning of claim language provided by the intrinsic evidence, particularly if the applicant has explicitly defined a term in the intrinsic record.

C. My Understanding of Anticipation

28. I understand that a patent claim is invalid as "anticipated" if all the limitations of the claim are present, either expressly or inherently, in a single prior art publication or patent.

29. I also understand that a prior art reference can disclose a claimed feature because the feature is expressly described or because the feature is inherent in the disclosure. I understand that something is inherent in a prior art reference if the missing descriptive matter must necessarily be present, not merely probably or possibly present, and it would be so recognized by a person of ordinary skill in the art as of the priority date of the patent. I understand that it is acceptable to examine evidence outside of the prior art reference (i.e., extrinsic evidence) in determining whether a feature, while not expressly discussed in the reference, is necessarily present in it.

30. I have further been informed that where a reference discloses multiple embodiments, the reference should not be limited to a preferred embodiment. Instead, each disclosed embodiment may anticipate.

31. Moreover, I have been informed that as part of an anticipation analysis, it is proper to take into account not only specific teachings of the reference, but also the inferences that one skilled in the art would reasonably be expected to draw therefrom. A reference can anticipate a claim even if it does not expressly spell out all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would at once envisage the claimed arrangement or combination.

D. My Understanding of Obviousness

32. I understand that a claim may be invalid if the subject matter described by the claim as a whole would have been obvious to a hypothetical person of ordinary skill in the art in view of a prior art reference or in view of a combination of references at the time the claimed invention was made. Therefore, I understand that obviousness is determined from the perspective of a hypothetical person of ordinary skill in the art and that the asserted claims of the patent should be read from the point of view of such a person at the time the claimed invention was made. I further understand that a hypothetical person of ordinary skill in the art is assumed to know and to have all relevant prior art in the field of endeavor covered by the patent in suit.

33. I have been informed that there are two criteria for determining whether prior art is analogous and thus can be considered prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the patentee's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the patentee is involved. I have also been informed that the field of endeavor of a patent is not limited to the specific point of novelty, the narrowest possible conception of the field, or the particular focus within a given field. I have also been informed that a reference is reasonably pertinent if, even though it may be in a different field from

that of the patentee's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to a patentee's attention in considering their problem.

34. I have also been advised that an analysis of whether a claimed invention would have been obvious should be considered in light of the scope and content of the prior art, the differences (if any) between the prior art and the claimed invention, and the level of ordinary skill in the pertinent art involved. I understand as well that a prior art reference should be viewed as a whole.

35. I have also been advised that in considering whether a claimed invention would have been obvious over a combination of prior art references, I may assess whether there are apparent reasons to combine known elements in the prior art in the manner claimed in view of interrelated teachings of multiple prior art references, the effects of demands known to the design community or present in the marketplace, and/or the background knowledge possessed by a person of ordinary skill in the art. I understand that other principles may be relied on in evaluating whether a claimed invention would have been obvious, and that these principles include the following:

- A combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results;
- When a device or technology is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the

same field or in a different one, so that if a person of ordinary skill can implement a predictable variation, the variation is likely obvious;

- If a technique has been used to improve one device, and a person 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 their skill;
- An explicit or implicit teaching, suggestion, or motivation to combine two prior art references to form the claimed combination may demonstrate obviousness, but proof of obviousness does not depend on or require showing a teaching, suggestion, or motivation to combine;
- Market demand, rather than scientific literature, can drive design trends and may show obviousness;
- In determining whether the subject matter of a patent claim would have been obvious, neither the particular motivation nor the avowed purpose of the named inventor controls whether the claim is obvious;
- One of the ways in which a patent's subject can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims;
- Any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed;
- "Common sense" teaches that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle;
- A person of ordinary skill in the art is also a person of ordinary creativity, and is not an automaton;
- A patent claim can be proved obvious by showing that the claimed combination of elements was "obvious to try," particularly when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions such that a person of ordinary skill in the art would have had good reason to pursue the known options within his or her technical grasp; and

- One should be cautious of using hindsight in evaluating whether a claimed invention would have been obvious.

36. I further understand that, in making a determination as to whether the claimed invention would have been obvious to a person of ordinary skill, the Board may consider certain objective factors if they are present, such as: commercial success of products practicing the claimed invention; long-felt but unsolved need; teaching away; unexpected results; copying; and praise by others in the field. These factors are generally referred to as “secondary considerations” or “objective indicia” of nonobviousness. I understand, however, that for such objective evidence to be relevant to the obviousness of a claim, there must be a causal relationship (called a “nexus”) between the claim and the evidence, and that this nexus must be based on a novel element of the claim rather than something in the prior art. I also understand that even when they are present, secondary considerations may be unable to overcome primary evidence of obviousness (such as motivation to combine with predictable results) that is sufficiently strong.

IV. BACKGROUND OF THE TECHNOLOGY

37. The '996 patent is generally directed to a mobile communication device that performs wireless handover between networks. *See* '996 patent, 2:14-38, 3:7-18. The device includes a **first communication module** (e.g., cellular) and a **second communication module** (e.g., Wi-Fi) as well as a **network switch unit** to automatically switch between them. '996 patent, Abstract, 2:47-53, 5:40-50. The

network switch unit switches the device from the **first communication module** to the **second communication module** after it detects a difference in context, e.g., a sufficiently high Wi-Fi signal strength. '996 patent, 5:63-66, 6:41-50, 7:45-52. The Claims were allowed after being amended to recite that, “upon activation of a **timer**,” the **network switch unit** causes the “**second communication module**” to “change state from a sleep mode to a stand-by mode,” and that it also causes the module to change from a “stand-by mode to an active mode before [a] communication is switched to” the **second communication module**. '996 File History (Ex. 1002), 494-501.

38. Based on my experience in the field, however, these concepts were already known in the art prior to the '996 patent's priority date. For example, Dorenbosch discloses a “mobile subscriber device” that includes a “**transceiver for the WAN system**” and a “**transceiver...for the WLAN system**.” Dorenbosch, Abstract, [0026], Fig. 4. “The mobile subscriber [device] 306 also includes” a “**handover manager 514**” to automatically switch between the **WAN transceiver** and the **WLAN transceiver**. Dorenbosch, [0027], [0038], Figs. 4-5.

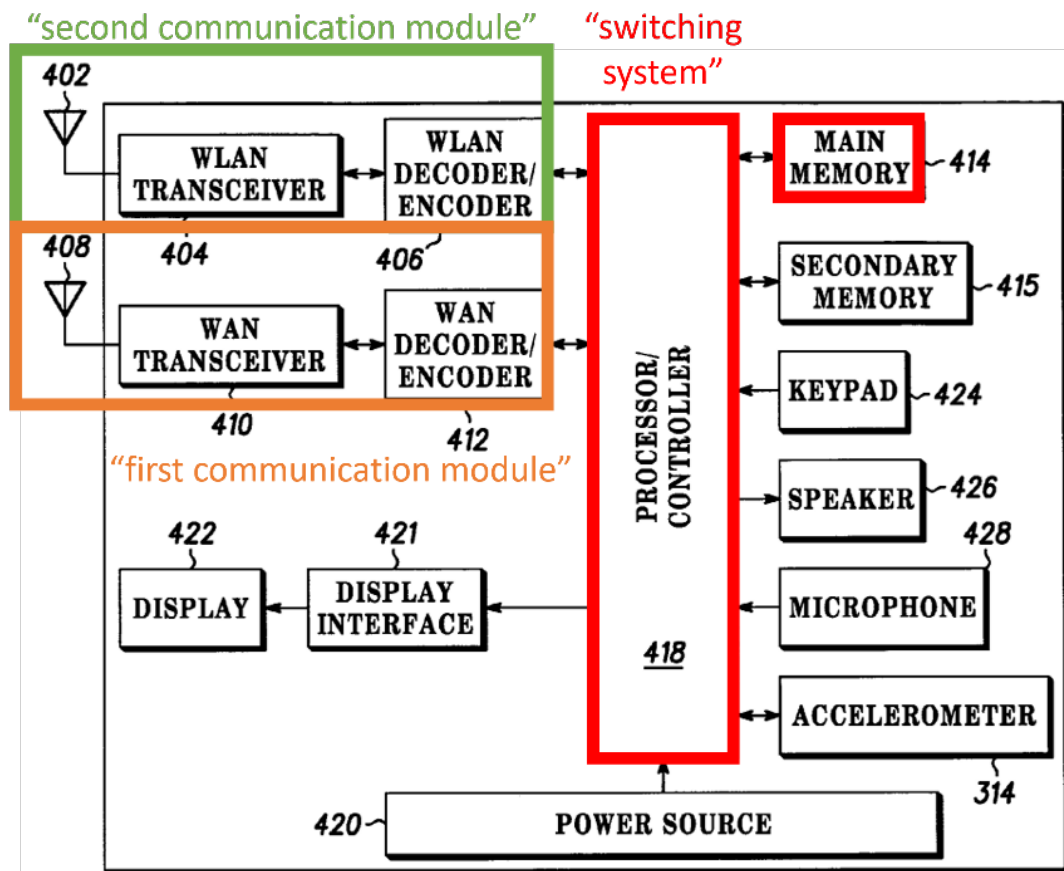


FIG. 4 306

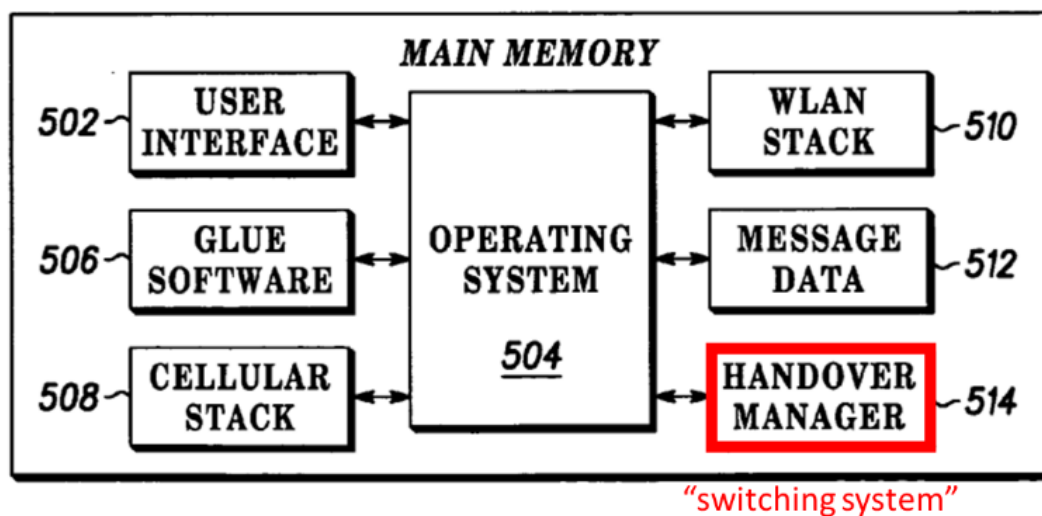


FIG. 5 414

Dorenbosch, Figs. 4-5.

39. In addition, Donovan discloses a wireless network communications

device 48 with a crystal oscillator 54 (“XOSC”), that is used as a timer to calibrate a counter 88 and low power oscillator 84. Wireless network communications device 48 exits a sleep mode (or power save mode) and enters a wake-up period upon activation of XOSC 54, before being activated for communication. Donovan, [0042], [0049], [0053].

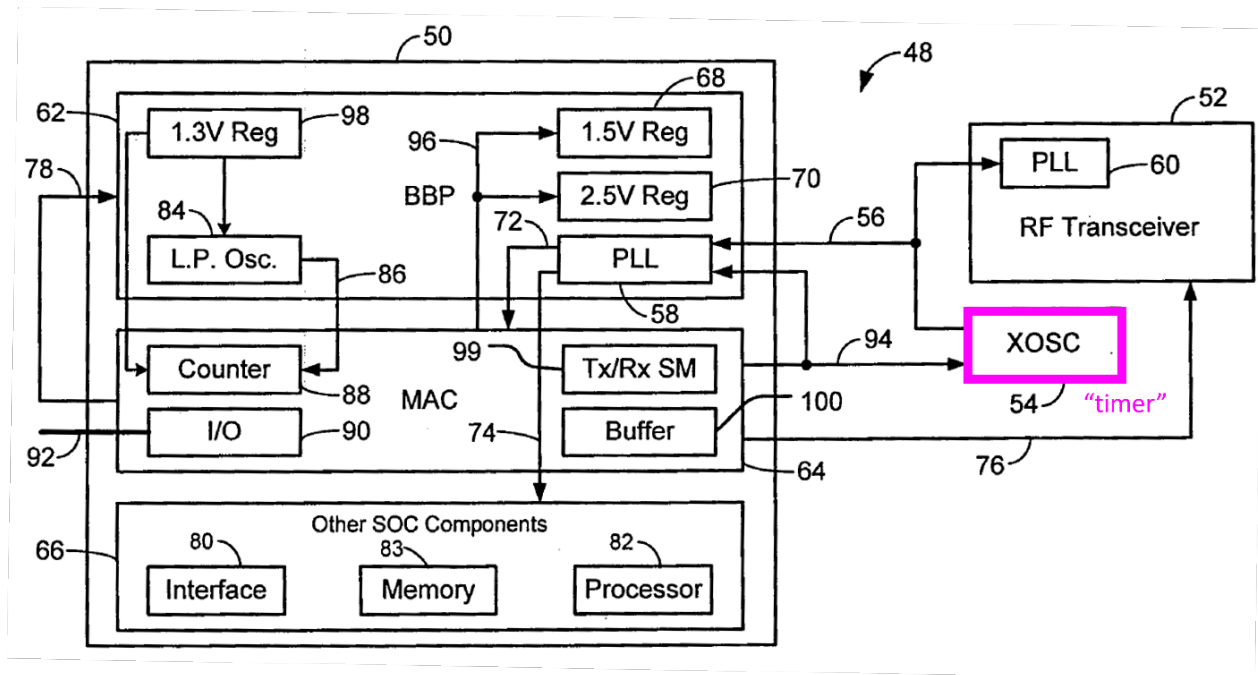
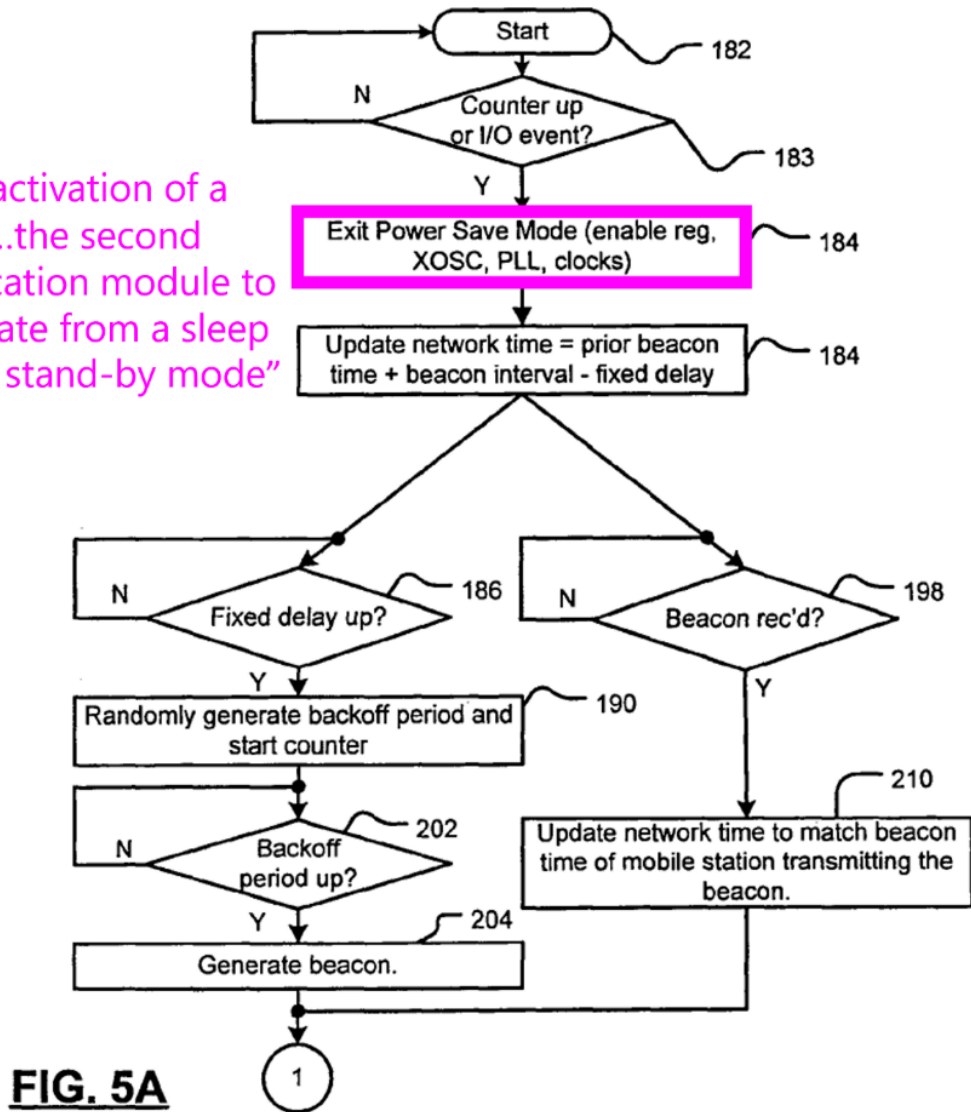


FIG. 2

“upon activation of a timer...the second communication module to change state from a sleep mode to a stand-by mode”



Donovan, Figs. 2, 5A.

40. Donovan recognizes that placing a communication module in a sleep mode and waking up upon enabling an oscillator saves battery while allowing for quick transition to an active mode, and as I explain below in detail, a person of ordinary skill in the art would have been motivated to apply these advantageous teachings to Dorenbosch.

41. As I discuss below, the claims of the '996 patent are obvious over the prior art. Further, there were no technological barriers to combining these teachings from the prior art and a person of ordinary skill in the art would have been motivated to combine these teachings and would have understood that the combination would have yielded predictable results.

V. THE '996 PATENT

A. '996 Patent Overview

42. The '996 patent generally relates to “a mobile communication device” for wireless handover between networks. '996 patent, Abstract, 2:47-52, 4:10-19, 5:28-46. The mobile communication device of the '996 patent “is configured so as to automatically switch a communication that is already in progress using a wireless cellular network (hereinafter alternatively referred to as cellular network) to a wireless Voice over IP (VoIP) network or vice versa.” '996 patent, 2:41-47.

43. As shown in Fig. 1, the “mobile communication device” includes “**a first communication module** and **a second communication module**,” such as “**a cellular communication module** adapted to enable communication using wireless cellular networks” and “**a Wi-Fi communication module** adapted to enable communication using a Voice over IP (VoIP) protocol.” '996 patent, 5:28-46, Claim 1. The mobile communication device “is adapted to [further] include, in part,...a first antenna adapted to receive and transmit data between the **[cellular]**

communication module and a cellular network,...a second antenna adapted to receive and transmit data between the **Wi-Fi communication module** and a VoIP network, a signal monitoring circuit,” and a **network switch unit** to facilitate handover between the **cellular communication module** and the **Wi-Fi communication module**. ’996 patent, 2:47-57.

44. When the device is “in communications with a cellular network” using **cellular communication module**, if a “context,” such as “a detected Wi-Fi signal level,” is “greater than a predefined threshold value,” the device “**activates [a] timer**” and the “**network switch unit**” “**automatically switch[es]** communication” from the **cellular communication module** to the **Wi-Fi communication module**. ’996 patent, 3:4-5, 5:62-64, 6:2-6. Before switching communication to the **Wi-Fi communication module**, the **Wi-Fi communication module** transitions from a sleep mode (during which the **Wi-Fi communication module** consumes a “relatively small amount of power”), to a stand-by mode (during which the **Wi-Fi communication module** consumes “an intermediate amount of power”), before entering an active mode (during which the **Wi-Fi communication module** consumes “an amount of power larger than the intermediate amount of power”). ’996 patent, 3:7-18.

45. Moreover, the “mobile communication device 100” is adapted to “**automatically switch** communication” between “a **Wi-Fi communication**

module” and “**a cellular communication module.**” ’996 patent, 6:52-58, Claim 34. When the device is “in communications with a VoIP network,” if a “context,” such as “the detected Wi-Fi signal level,” is “below a second predefined threshold value,” the device “**activates [a] timer**” and the “**network switch unit**” “**automatically switch[es] communication**” from the **Wi-Fi communication module** to the **cellular communication module.** ’996 patent, 4:4-5, 6:52, 55-58. Before switching communication to the **cellular communication module,** the **cellular communication module** transitions from a sleep mode (during which the **cellular communication module** consumes a “relatively small amount of power”) to a stand-by mode (during which the **cellular communication module** consumes “an intermediate amount of power”), before entering an active mode (during which the **cellular communication module** consumes “an amount of power larger than the intermediate amount of power”). ’996 patent, 3:39-50.

B. The Prosecution History

46. In formulating my opinions, I considered the contents of the prosecution history of the ’996 patent. *See* Ex. 1002.

47. U.S. Patent Application 15/921,275, which matured into the ’996 patent, was filed on March 14, 2018. The Examiner issued a Non-Final Office Action rejecting the as-filed claims under §§112 and 103. ’996 File History (Ex. 1002), 426-29.

48. The Examiner rejected pending claims 1-3, 5-8, 10-18, 20-24, 26-32, 34-38, and 40 based on U.S. Patent Pub. 2005/0059400 (“Jagadeesan”) in view of U.S. Patent Pub. 2004/0153676 (“Krantz”). *Id.* The Examiner rejected the remaining claims using other references, including U.S. Patent Pubs. 2005/0025164 (“Kavanaugh”), 2014/0204902 (“Maltsev”), 2006/0105766 (“Azada”), 2006/0009219 (“Jaakkola”), 2004/0203788 (“Fors”), and 2006/0010272 (“Solomon”) in further view of Jagadeesan and Krantz. *Id.* at 434-40.

49. In response, on February 7, 2019, Applicant amended each independent claim to add “wherein upon activation of a timer,” a “communication module” “change[s] state from a sleep mode to a stand-by mode” and from a “stand-by mode to an active mode before [a] communication is switched to” the communication module. *Id.* at 494-501. Applicant argued that “Jagadeesan, Krantz, and [other cited art] do not teach...activation of a timer,” changing state from “a sleep mode to a stand-by mode,” or causing a communication module to “change state from the stand-by mode to an active mode” before a communication is switched to the communication module.” *Id.* at 503.

50. The Examiner then issued a Final Office Action on February 26, 2019, rejecting the claims on the same § 103 grounds. *Id.* at 518-28. Applicant did not amend the claims, but instead argued for reexamination and reconsideration. *Id.* at 560. In particular, Applicant argued that while Krantz teaches the desirability of

reducing “the amount of time the network interface module is in a high-power state when not sending traffic or scanning,” Krantz does not “specifically teach the interface causes the communication module to change state from the stand-by mode to an active mode before a communication is switched to the communication module,” or “wherein upon activation of a timer, the interface causes a communication module to change state from a sleep mode to a stand-by mode.” *Id.* at 560. Additionally, Applicant argued that Jagadeesan does not rectify Krantz’s shortcomings, so the claims must be allowable over the teachings of both Krantz and Jagadeesan. *Id.* at 562.

51. The claims were subsequently allowed on May 10, 2019 and the patent issued on September 17, 2019. *Id.* at 601. The Examiner agreed with Applicant that none of the cited art teaches ““upon activation of a timer, the switching system causes the second communication module to change state from a sleep mode to a stand-by-mode.”” *Id.* at 518-528, 562, 601.

C. Priority Date of Claims 39 and 41

52. Based on my understanding of a priority date for a claim described in Section III.A above, Claims 39 and 41 are not entitled to a priority date before March 14, 2018, the filing date of the ’275 Application. I understand that the parent of the ’275 Application is Application No. 15/480,293 (“the ’293 Application”). The ’293 Application does not describe at least the following limitations of claims 39 and 41:

(a) “notifying an [interface/interface server]”; (b) “establishing [a/the] second communication link between the [interface /interface server] and [the/an] end destination device without disrupting the first communication link”; and (c) “re-directing the second communication link from the [interface/interface server] to [a/another] mobile communication device.” For example, the ’293 Application does not describe an interface server or an interface. To the extent any network components in the ’293 Application are argued to be an “interface server” or “interface,” there is no description in the 293 Application of any of the claimed functionality required for the “interface server” or “interface.”

53. I have not been asked to evaluate whether any of the remaining claims are described by the specification of an earlier application.

VI. LEVEL OF ORDINARY SKILL IN THE ART

54. In rendering the opinions set forth in this declaration, I was asked to consider the patent claims and the prior art through the eyes of a person of ordinary skill in the art at the time of the alleged invention. I understand that the factors considered in determining the ordinary level of skill in a field of art include the level of education and experience of persons working in the field; the types of problems encountered in the field, the teachings of the prior art, and the sophistication of the technology at the time of the alleged invention. I understand that a person of ordinary skill in the art is not a specific real individual, but rather is a hypothetical

individual having the qualities reflected by the factors above. I understand that a person of ordinary skill in the art would also have knowledge from the teachings of the prior art, including the art cited below.

55. With respect to Grounds 1 and 2, I have been asked to assume that Claims 1, 12, 23, 25, 34, and 35 are entitled to the benefit of the January 6, 2004 filing date of the '466 Provisional Application filing date. With respect to Grounds 3 and 4, I have been asked to assume that Claims 39 and 41 are not entitled to the benefit of the '293 Application filing date, and instead, I have been asked to assume claims 39 and 41 are entitled to the March 14, 2018 filing date of the '275 Application.

56. Upon consideration of these factors, and based on my knowledge and experience in the field and my review of the '996 patent and file history, I believe that a person having ordinary skill in the art in this matter would have had at least a Bachelor's degree in electrical engineering, computer engineering, computer science, or the equivalent thereof, and approximately two years of professional experience working with networking and wireless communications systems. Additional education could substitute for professional experience, or vice-versa.

57. Based on my experiences, I have at least the skills of a person having ordinary skill in the art as well as a good understanding of the capabilities of a person having ordinary skill in the art. To be clear, all of my opinions in this declaration are

from the perspective of one of ordinary skill in the art as I have defined it here during the relevant timeframe.

VII. CLAIM CONSTRUCTION

58. I have been instructed that the Challenged Claims of the '996 patent are to be given their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the alleged invention in light of the specification and the prosecution history pertaining to the patent. I have followed these principles in my analysis set forth in this document.

59. I understand that the parties have not proposed constructions for the '996 patent in the Samsung Litigation.

VIII. GROUNDS OF UNPATENTABILITY

60. As I explain above in Section IV, a mobile communication device that performs wireless handover between networks was well-known in the art.

61. In this section, I will explain why the teachings or combinations of teachings from the following references render obvious each of the Challenged Claims:

Name	Exhibit	Publication	Filed	Published/ Issued
Dorenbosch	1004	US2005/0048977	8/26/2003	3/3/2005
Donovan	1005	US2005/0063348	9/19/2003	3/24/2005
DeAnna	1006	US2003/0084056	10/11/2002	5/1/2003
Iizuka	1007	US2005/0282541	12/6/2004	12/22/2005

Preston	1008	US2002/0126654	3/8/2001	9/12/2002
Pan	1009	US2004/0002335	6/26/2002	1/1/2004

I have been instructed to assume that each of these references qualifies as prior art.

62. As I explain below, the Challenged Claims are invalid based upon the following prior art grounds:

- **Ground 1:** Challenged Claims 1, 12, 23, 25, 34, and 35 of the '996 patent are rendered obvious by Dorenbosch in view of Donovan.
- **Ground 2:** Challenged Claims 12, 23, and 34 of the '996 patent are rendered obvious by DeAnna in view of Dorenbosch and Donovan.
- **Ground 3:** Challenged Claim 39 of the '996 patent is rendered obvious by Iizuka in view of Donovan.
- **Ground 4:** Challenged Claim 39 of the '996 patent is rendered obvious by Iizuka in view of Donovan and Preston.
- **Ground 5:** Challenged Claim 41 of the '996 patent is rendered obvious by Iizuka in view of Donovan and Pan.

63. It is my opinion that Challenged Claims of the '996 patent are unpatentable as explained below. I note that in this discussion, I may focus on the particular language in the specific claims, but it should be understood that my analysis applies to the corresponding elements of all Challenged Claims containing identical or substantially identical language.

IX. SPECIFIC GROUNDS FOR CHALLENGE

64. As I explain above in Section IV, although the '996 patent purports to have invented a mobile communication device that performs wireless handover

between networks, such devices were well-known in the art. As described below, the cited prior art provides these teachings.

65. In this section, I explain why claims 1, 12, 23, 25, 34, 35, 39, and 41 of the '996 patent are rendered obvious by the teachings of Dorenbosch, Donovan, DeAnna, Iizuka, Preston, and Pan. I note that, in this discussion, I may focus on the particular language in specific claims, but it should be understood that my analysis applies to the corresponding limitations of all claims containing identical or substantially identical language.

A. GROUND 1: Dorenbosch in view of Donovan (Claims 1, 12, 23, 25, 34, and 35)

1. Overview of Dorenbosch (Ex. 1004, U.S. Patent App. Pub. 2005/0048977)

66. Dorenbosch provides an improvement to wireless communications handover procedures, by “transfer[ring] a call in progress on one system over to a different system without a noticeable consequence to the end user, such as a lost call, an unnecessary charge, [and] significant reduction in battery life.” Dorenbosch, [0005].

67. Dorenbosch discloses a “mobile subscriber device” includes a “two sets of transceivers—one for the WLAN system and one for the WAN system, each transceiver containing an antenna 402, 408, an RF front end 404, 410, and a decoder/encoder 406, 412 respectively, designed to transmit, receive, encode and

decode wireless signals for the frequencies and characteristics of its corresponding system.” Dorenbosch, Abstract, [0026], Fig. 4. “The mobile subscriber [device] 306 also includes **one or more processors 418** which processes instructions” and “**a main memory 414**” with “**handover manager 514**.” Dorenbosch, [0027], Figs. 4-5. Dorenbosch’s handover message performs a method of handing over communications between the **WLAN transceiver** and **WAN transceiver**. Dorenbosch, [0038].

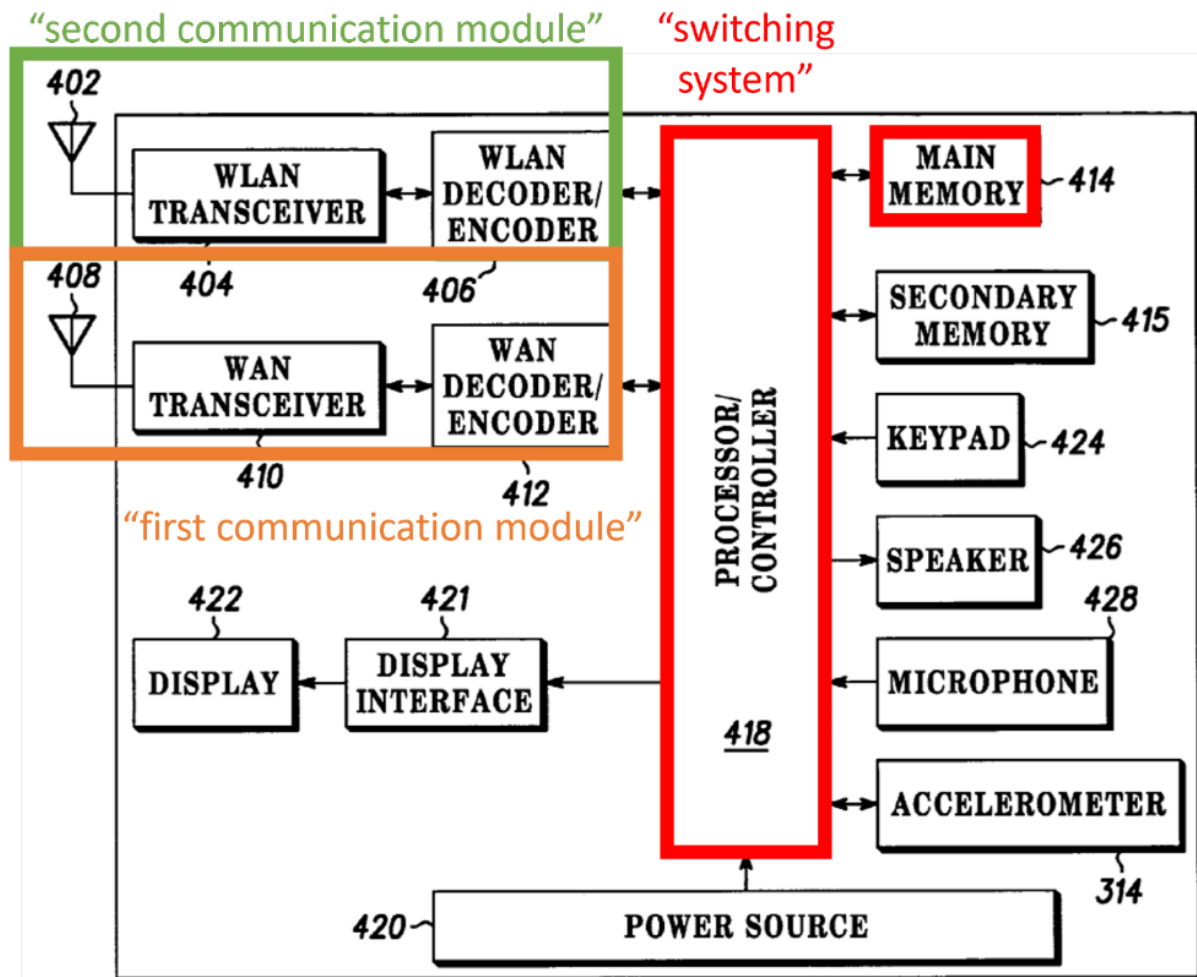


FIG. 4 306

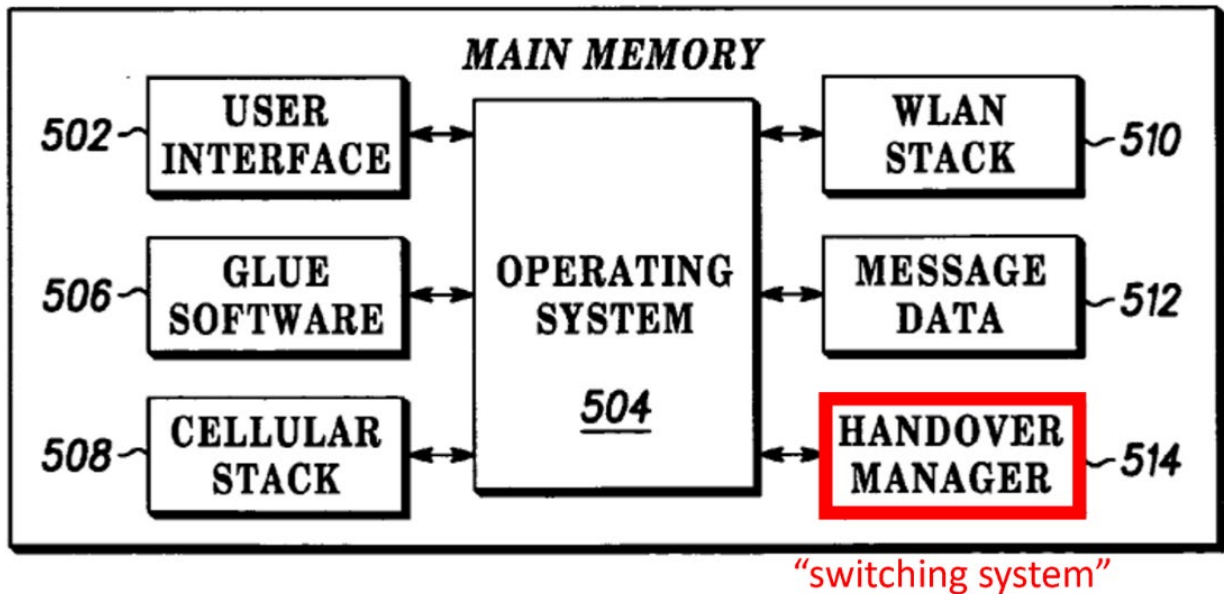


FIG. 5 414

Dorenbosch, Figs. 4-5.

68. Dorenbosch teaches operations when the **handover manager 514** is initially connected to a WAN using the **WAN transceiver**, illustrated in Figure 10 (below). Dorenbosch, [0045]. At this time, the device “terminate[s] running the **WLAN stack [510]** and **hardware [404, 406]**...[to] sav[e] battery life.” Dorenbosch, [0037]. Thus, the **WLAN transceiver** uses a relatively small amount of power.

69. When **handover manager 514** detects a “**border cell**, if the speed and/or displacement exceed predetermined thresholds,” the device will check the signal strength of the WLAN signal.” Dorenbosch, [0045]. If the “**WLAN signal strength [is] greater than a predetermined level**,” the **WLAN stack [510]** and **hardware [404, 406]** enter a stand-by mode, including “the steps necessary to bring

up the corresponding hardware and software.” Dorenbosch, [0045]. At this time, the **WLAN transceiver** uses an intermediate amount of power.

70. After a warm-up period in stand-by mode, and before **automatically switching** from the **WAN transceiver** to the **WLAN transceiver** to “conduct any present and/or subsequent calls via the WLAN system,” the mobile subscriber device enters an active mode to “check the signal strength of the WLAN signal.” Dorenbosch, [0045]. In the active mode, the device uses a greater amount of power compared to when the device is in stand-by mode, because the **WLAN transceiver** is actively receiving a signal. Dorenbosch, [0037]-[0038].

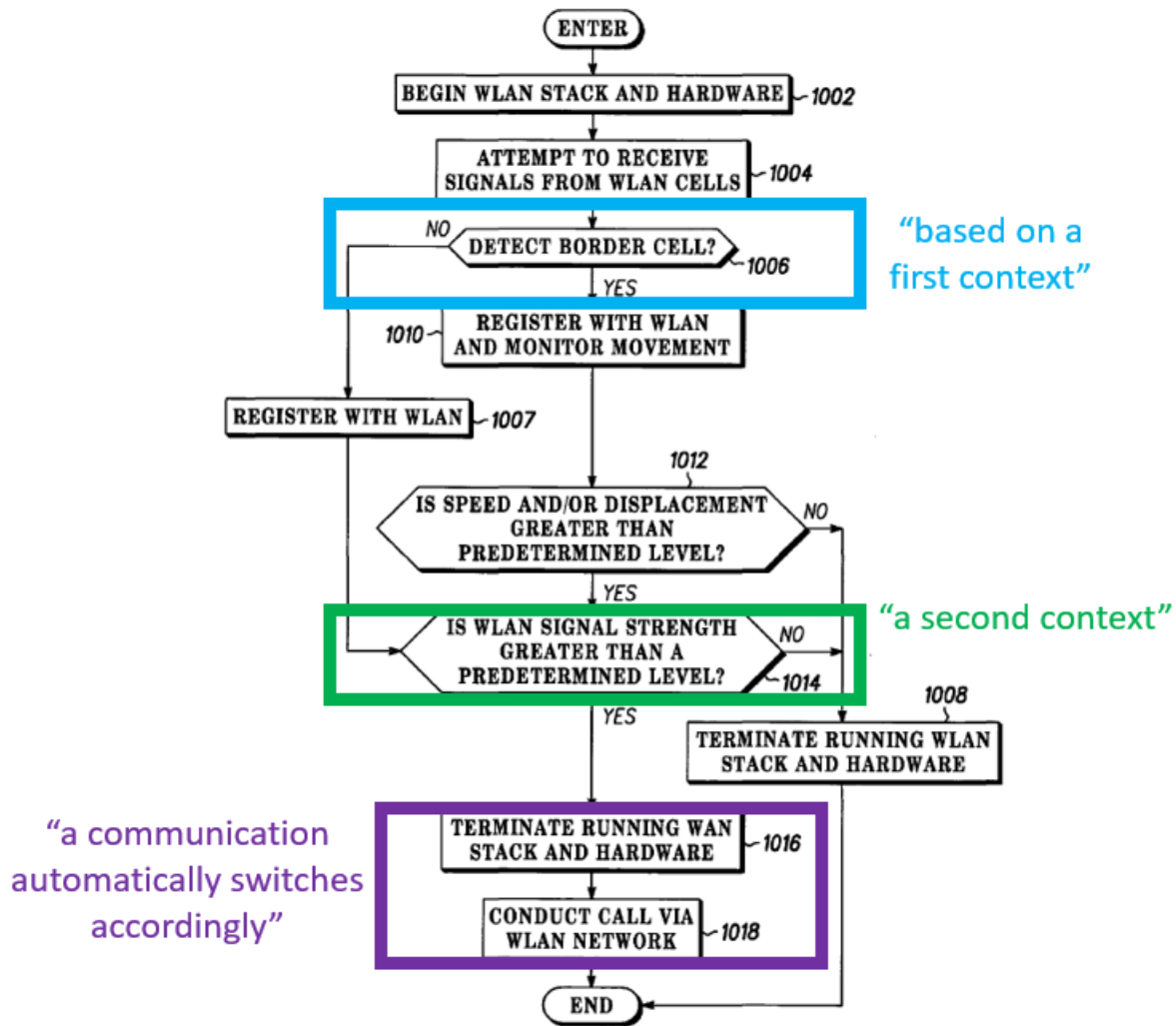


FIG. 10 1000

Dorenbosch, Fig. 10.

71. “From time to time, while on the WAN network, the unit 306 will execute this process in order to check for coverage of the WLAN system” to provide “cost savings by allowing more calls to be made over the WLAN.” Dorenbosch, [0045]. This is because of the costs associated with operating calls over WAN. Dorenbosch, [0013]. The process of checking for WLAN coverage “will run more often during a call than when idle (not on a call)” to attain cost savings wherever

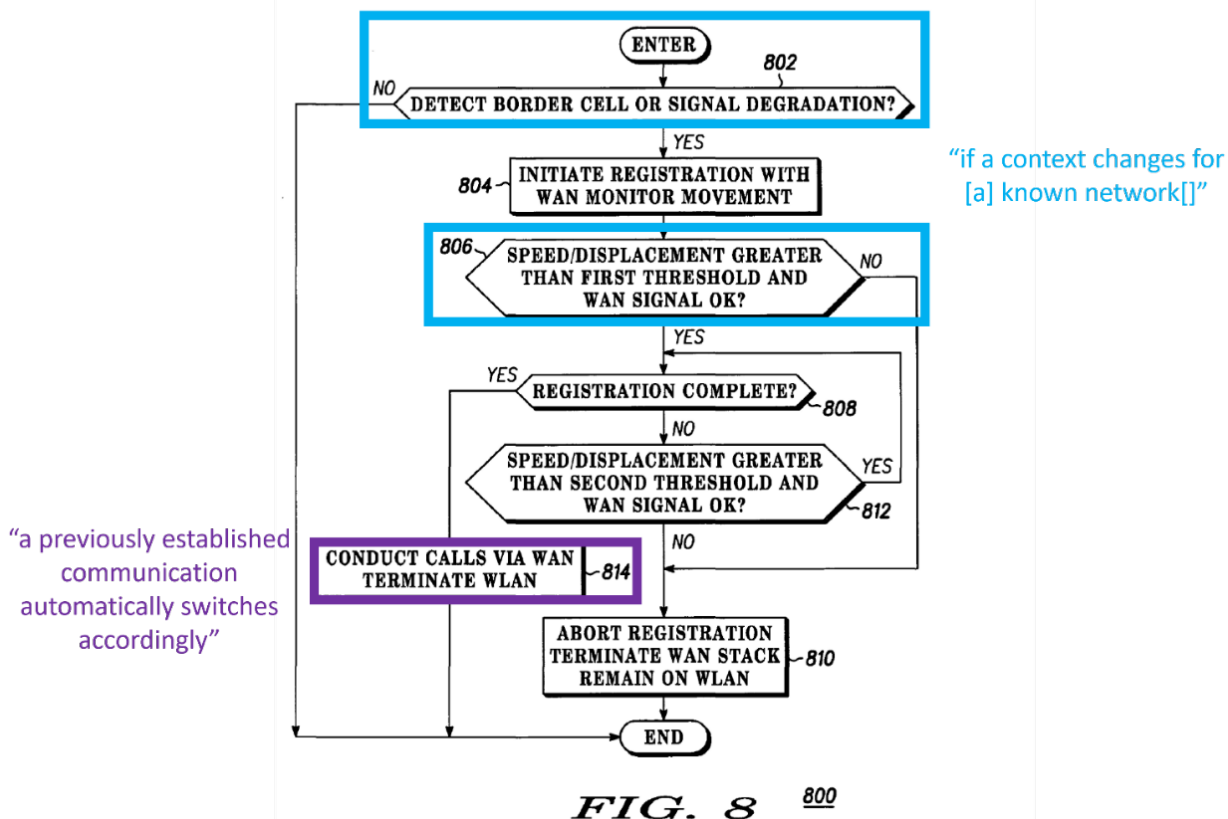
possible. Dorenbosch, [0045].

72. Dorenbosch also teaches operations when the **handover manager 514** is initially connected to a WLAN using the **WLAN transceiver** illustrated in Figure 8 (below). Dorenbosch, [0037]. At this time, the device “will terminate running the **WAN stack 508 and hardware 410, 412.**” Dorenbosch, [0045]. Thus, the **WAN transceiver** uses a relatively small amount of power.

73. When **handover manager 514** “detects...**degradation in signal quality of the WLAN coverage,**” and “**the signal strength of the WAN signal is still good,**” the device “initiates the registration sequence with the WAN system and begins to monitor the movement of the device.” Dorenbosch, [0038]. “The process of initiating the registration sequence with a communications system...includes the steps necessary to bring up the corresponding hardware and software” for the WAN system. Dorenbosch, [0038]. During this process of bringing up the hardware and software for the WAN system, the **WAN stack 508 and hardware 410, 412** enters a stand-by mode and uses an intermediate amount of power. Dorenbosch, [0038].

74. After a warm-up period in stand-by mode, and before **automatically switching** from the **WLAN transceiver** to the **WAN transceiver**, the mobile subscriber device enters an active mode to receive and measure signal strength of the WAN signals. Dorenbosch, [0038]. In the active mode, the device uses a greater amount of power compared to when the device is in stand-by mode, because the

WAN transceiver is actively receiving a signal. Dorenbosch, [0037]-[0038].



Dorenbosch, Fig. 8.

2. Overview of Donovan (Ex. 1005, U.S. Patent App. Pub. 2005/0063348)

75. Donovan discloses a mobile station including “wireless network communications device 48,” containing a system on chip (“SOC”) circuit 50, an RF transceiver 52, and a crystal oscillator 54 (“XOSC”). Donovan, [0042], Fig. 2. The XOSC 54 “can be located externally or the amplifier portion of the [XOSC 54] can be integrated with the SOC circuit 50 and the crystal portion of the crystal oscillator 54 can be located externally.” Donovan, [0042]. The XOSC 54 is a timer because processor 82 “calibrates” the timing of “low power oscillator 84 using the XOSC

54,” ensuring low power oscillator properly tracks time itself. [0048]. XOSC 54 also provides a reference signal to phase-locked loop (PLL) 60 within RF transceiver 52. Donovan, [0042], [0049]. Upon enabling XOSC 54, wireless network communications device 48 exits a sleep mode (or power save mode) and enter a wake-up period before being activated for communication. Donovan, [0053].

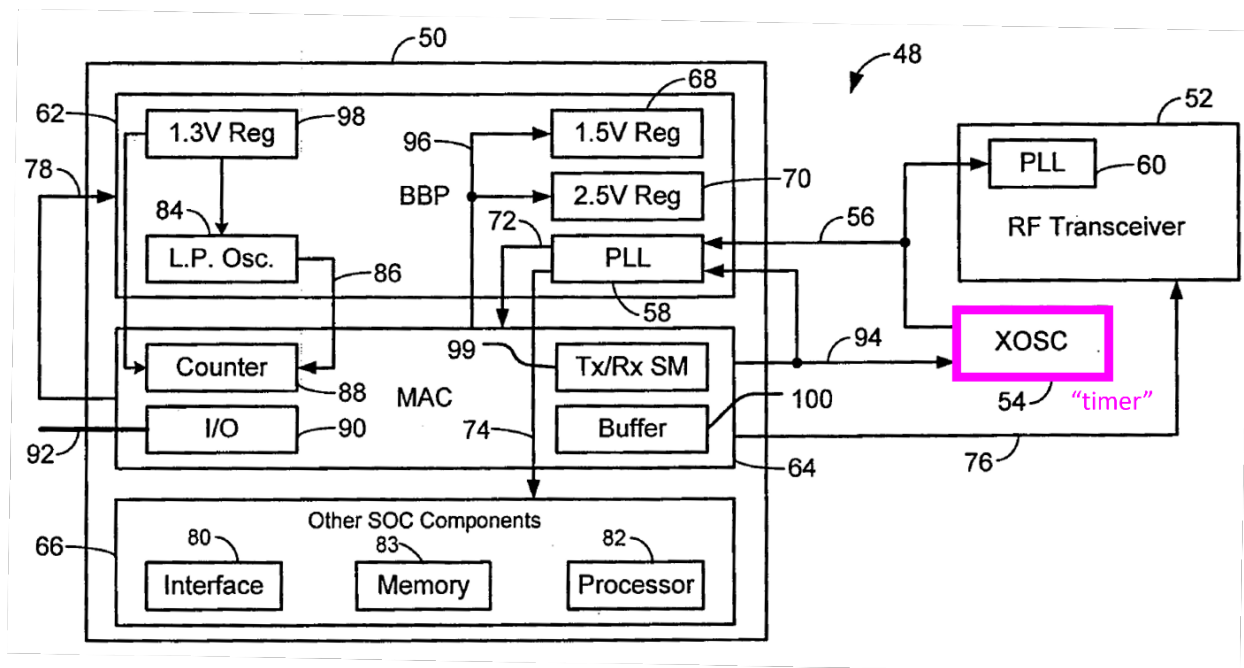


FIG. 2

Donovan, Fig. 2.

76. During sleep mode, “the I/O module 90 monitors the I/O input 92.” Donovan, [0053]. “If the I/O input 92 is triggered during the low power mode, the wireless network communications device 48 returns to the active mode.” Donovan, [0050]. “If the I/O input 92 is not triggered” during sleep mode, “the wireless network communications device 48” returns to the active mode “after the counter 88 reaches the end of the low power period.” Donovan, [0053]. “In order to return to

the active mode, the MAC device 64 enables the voltage regulators 68 and 70 and the **XOSC 54**, respectively” in part to wake-up and calibrate the device. Donovan, [0048]-[0049], [0053]

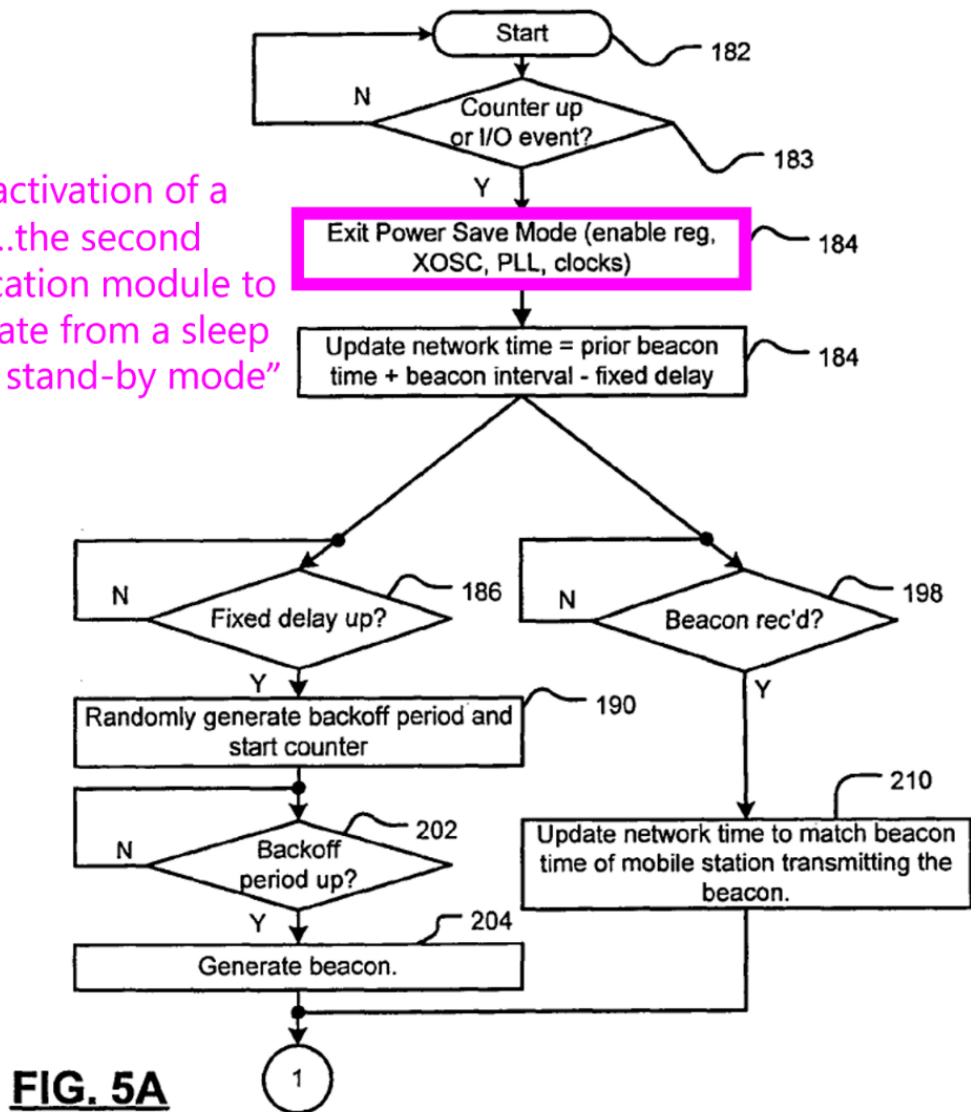
77. During this process, MAC device 64 transmits signals to various components in the wireless network communications device 48, causing the wireless network communications device 48 to change between sleep, stand-by, and active modes to “conserve power” or “transmit[]/receive[] data.” Donovan, [0007], [0043]. Specifically, wireless network communications device 48 begins in a sleep mode (or “low power mode”) where “the internal clocks are disabled and the PLLs, **the [crystal oscillator] XOSC** and the voltage regulators are shut down,” but “low power voltage regulator 98 provides power for the low power oscillator 84 and the counter.” Donovan, [0052], [0056], Fig. 4.

78. Wireless network communications device 48 includes input/output (I/O) module 90 that receives a signal to trigger a return to the active mode. Donovan, [0050]. The transition (or “wake-up”) from sleep to active mode is not instantaneous—the wireless network communications device 48 first enters a stand-by mode, which includes the time needed to “stabilize all circuitry.” Donovan, [0057]. This process is commenced upon “enabl[ing] the voltage regulators 68 and 70 and the **XOSC 54**,” which produces reference signals to enable other components of the wireless network communications device 48, including PLL 58 and clocks 72

and 74, before “RF transceiver 52” “operate[s] in the active mode.” Donovan, [0053], [0044].

79. In “sleep mode,” wireless network communications device 48 uses a small amount of power because **XOSC 54** and other components are shut down. Donovan, [0056]. During the warmup period, wireless network communications device 48 uses an intermediate amount of power because **XOSC 54**, PLL 56, and clocks 72 and 74 and BBP 62 and transceiver 52 are successively activated. Donovan, [0053]. And in active mode, wireless network communications device 48 uses a greater amount of power because, in “the active state, it will be put into receive mode, and will wait for a beacon to be received,” and will also “transmit a beacon.” Donovan, [0058].

“upon activation of a timer...the second communication module to change state from a sleep mode to a stand-by mode”



Donovan, Fig. 5A.

3. Motivation to Apply Donovan’s Teachings to Dorenbosch

80. Dorenbosch and Donovan are in the same field as the '996 patent—which includes wireless communications—and are reasonably pertinent to the problems purportedly addressed by the '996 patent—e.g., maintaining a strong network connection. *See* '996 patent, 2:14-38 (“Demand for high bandwidth and quality of service (QoS) associated with mobile communication devices with full

roaming capability is on the rise.”), 3:7-18; Dorenbosch, [0003] (“Ideally, there should be no degradation or otherwise negative indication that a device is on one network or another to an end user.”), [0006]-[0009] (“When a user is leaving the WLAN coverage 104, the decision to hand over from the WLAN 104 to the macro network or WAN 102 needs to be made early enough to avoid dropping calls due to the rapid falloff of WLAN coverage.”), [0013]; Donovan, [0004] (“Since the mobile stations are often battery powered, it is important to minimize power consumption to preserve battery life. Therefore, some wireless devices implement a low power mode and an active mode.”), [0007], [0010]-[0013]. Like the ’996 patent, Dorenbosch and Donovan each contemplate wireless communication systems operable for seamless communications while minimizing the operation of unnecessary components. *See* ’996 patent, 6:51-63; Dorenbosch, [0005] (“It is critical to be able to transfer a call in progress on one system over to a different system without a noticeable consequence to the end user, such as a lost call, an unnecessary charge, significant reduction in battery life, etc.”), [0008] (“[Handover] needs to be made early enough to avoid dropping calls due to [a] rapid falloff [in] coverage.”), [0037] (“The unit 306 may then terminate running the WLAN stack and hardware...thereby saving battery life.”); Donovan, [0013] (“[A]t least one mobile station remains in the active mode between beacon intervals. This is due in part to the fact that at least one mobile station needs to maintain network time”), [0051]

(“The MAC device 64 disables internal clocks in the SOC circuit 50. The MAC device 64 next disables the first PLL 58, then the XOSC 54 and voltage regulators 68 and 70 with a disable signal 94.”), [0050], [0052]-[0053].

81. A person of ordinary skill in the art would have been motivated to apply Donovan’s teachings of a communication module switching from a sleep mode to a stand-by mode upon activating an oscillator to Dorenbosch’s WAN or WLAN transceivers to advantageously optimize battery life while facilitating quick power-up during handover. Donovan, [0004], [0037]; Dorenbosch, [0008], [0037]-[0038]. Donovan explains that in its low power mode “[t]he RF transceiver 52 remains deactivated during the low power mode and does not transmit or receive RF signals.” Donovan, [0045]. This allows the communications device to “utilize a small amount of power to ensure a quick transition from the low power mode to the active mode.” Donovan, [0045]. Moreover, Donovan emphasizes the importance of maintaining low power while connected to a network. *See, e.g.*, Donovan, [0004] (“Since the mobile stations are often battery powered, it is important to minimize power consumption to preserve battery life. Therefore, some wireless devices implement a low power mode and an active mode.”). Dorenbosch discloses that, when its transceivers are activated, first, the mobile device will “bring up” the relevant WAN or WLAN hardware but does not explain details of this process. Dorenbosch, [0038]. Further, Dorenbosch explains “[w]hen the registration sequence is completed, the

unit will conduct any present call and subsequent calls via the WAN system, at step 814, and will terminate running the WLAN stack 510 and hardware 404, 406. This method saves battery life by both aborting the handover to the WAN when unnecessary, and terminating the WLAN stack and hardware when the call is transferred to the WAN system.” Dorenbosch, [0038]. A person of ordinary skill in the art would have been motivated to look to Donovan for a warm-up process to apply to the WAN or WLAN transceiver, and understood that first activating an oscillator followed by related circuitry (including necessary clocks and PLLs that depend on the oscillator) as part of the warm-up process advantageously provides the desired reduction in power consumption while allowing quick warm-up to an active state. For example, as Donovan explains, by not completely shutting down the RF transceiver, but instead placing it in a low power mode, this allows “a quick transition” to the active mode, minimizing the delay before the device is able to communicate. Donovan, [0045]. *See also* Donovan [0004] (“During the low power mode, the wireless device shuts down components and/or alters operation to conserve power. Usually, the wireless device is not able to transmit or receive data during the lower power mode.”), [0037] (“To minimize power consumption, the wireless ad-hoc power savings mode according to the present invention allows all of the mobile stations to update each of the other mobile stations in a Basic Service Set (BSS) while minimizing the number of frame transitions that are required by each

mobile station. Using the approach described below, the amount of time that each mobile station spends in the low power mode is significantly increased, which reduces the average power consumption of the mobile stations.”); Dorenbosch, [0038] (“When the registration sequence is completed, the unit will conduct any present call and subsequent calls via the WAN system, at step 814, and will terminate running the WLAN stack 510 and hardware 404, 406. This method saves battery life by both aborting the handover to the WAN when unnecessary, and terminating the WLAN stack and hardware when the call is transferred to the WAN system.”). While Donovan discusses application of its network communications device 48 including an RF transceiver to a WLAN, a person of ordinary skill in the art would have understood that the power saving and quick transition from low power mode to active mode benefits would be equally applicable to Dorenbosch’s WAN transceiver.

82. Moreover, a person of ordinary skill in the art would have had a reasonable expectation of success in applying Donovan’s teachings in implementing Dorenbosch’s handover system. Since the warm-up period in Dorenbosch is not instantaneous, Dorenbosch already contemplates some time needed to transition to an activated state—e.g., allowing time to “stabilize all circuitry” for wake-up as described by Dorenbosch. Dorenbosch, [0038]. Moreover, Donovan explains how to implement a power oscillator to initiate a warmup process within a transceiver.

For example, Donovan explains that first the XOSC 43 is activated, followed by PLL and clock circuitry that depends on the XOSC, and then a baseband processor (BBP) and transceiver that depend on the PLLs and clocks. Donovan, [0053] (“In order to return to the active mode, the MAC device 64 enables the voltage regulators 68 and 70 and the XOSC 54, respectively. The MAC device 64 activates the first PLL 58. The MAC device next enables the internal clocks 72 and 74. Finally, the MAC device 64 instructs the BBP 62 and the RF transceiver 52 to operate in the active mode.”). And while Dorenbosch does not explicitly refer to an “oscillator” in its transceivers, a person of ordinary skill in the art would have been motivated to apply Donovan’s teachings to Dorenbosch because it was known that transceivers commonly included oscillators (like Donovan’s XOSC) to effect the transmission and reception of wireless data at a desired frequency. For example, in a 2003 technical reference handbook published by the well-known John Wiley & Sons, Inc. (Wiley) publishing company (that would have been accessible to a person of ordinary skill in the art, e.g., through a library or a college bookstore) titled “Wireless Data Technologies,” Vern A. Dubendorf discusses the use of oscillators to facilitate frequency hopping (switching between frequencies during wireless communications). Ex. 1016, 9-13; *see also* the McGraw-Hill Dictionary of Scientific and Technical Terms (6th ed., 2003) (which I understand has been identified as Ex. 1025, and would have been accessible to a person of ordinary skill in the art, e.g.,

through a library or a college bookstore) at 1498 (defining “oscillator” as “[t]he stage of a superheterodyne receiver¹ that generates a radio-frequency signal of the correct frequency to mix with the incoming signal and produce the intermediate-frequency value of the receiver,” and “[t]he stage of a transmitter that generate the carrier frequency of the station or some fraction of the carrier frequency.”).

83. Accordingly, a person of ordinary skill in the art would have had a reasonable expectation of success in applying Donovan’s teachings of waking up from a sleep period upon activating an oscillator to Dorenbosch mobile device, and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality.

4. Invalidity of Claims 1, 12, 23, 25, 34, and 35 Over Dorenbosch in view of Donovan

84. As I discuss below, Claims 1, 12, 23, 25, 34, and 35 are rendered obvious by Dorenbosch in view of Donovan. In addition to my discussion in Section

¹ “Superheterodyne receiver” is defined as “[a] receiver in which all incoming modulated radio-frequency carrier signals are converted to a common intermediate-frequency carrier value for additional applications and selectivity prior to demodulation.” Ex. 2025, 2071. This is the standard process for an RF receiver to convert a received analog RF signal into a digital signal.

IX.A.1-3, the following discussion identifies example disclosures followed by bulleted excerpts that each disclose Claims 1, 12, 23, 25, 34, and 35.

a. Element [1.pre]

85. **Element [1.pre] recites “A device comprising.”** This element is met by Dorenbosch.

86. To the extent the preamble is limiting, Dorenbosch discloses a device (*e.g.*, “mobile subscriber device”). *See, e.g.*, Dorenbosch:

- **[0026]**: “A block diagram of an exemplary *mobile subscriber device (SU) 306* is shown in FIG. 4. The SU 306 contains two sets of transceivers—one for the WLAN system and one for the WAN system...”

87. Dorenbosch discloses a “mobile subscriber device” communicating over a WLAN and a WAN. Dorenbosch, [0026].

b. Element [1.a]

88. **Element [1.a] recites “a switching system to switch operation between a first communication module and a second communication module.”** This element is met by Dorenbosch.

89. Dorenbosch discloses a switching system (*e.g.*, “processor[] 418” and “main memory 414” having “handover manager 514”) to switch operation (*e.g.*, “handover”) between a first communication module (*e.g.*, “transceiver” for “WLAN system”) and a second communication module (*e.g.*, “transceiver” for “WAN system”). *See, e.g.*, Dorenbosch:

- Fig. 4:

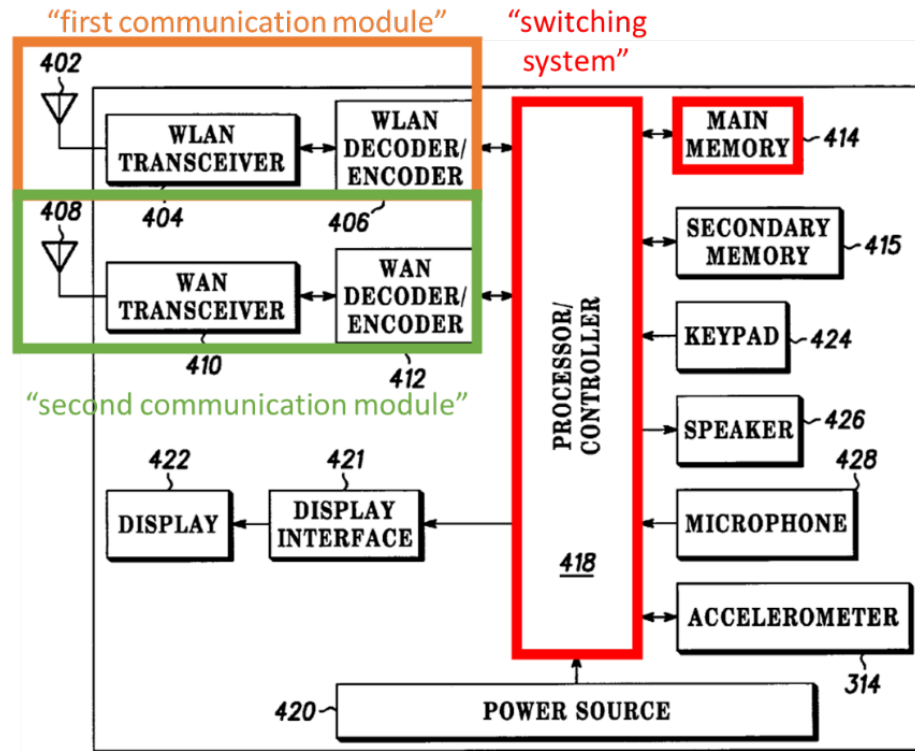


FIG. 4 306

- Fig. 5:

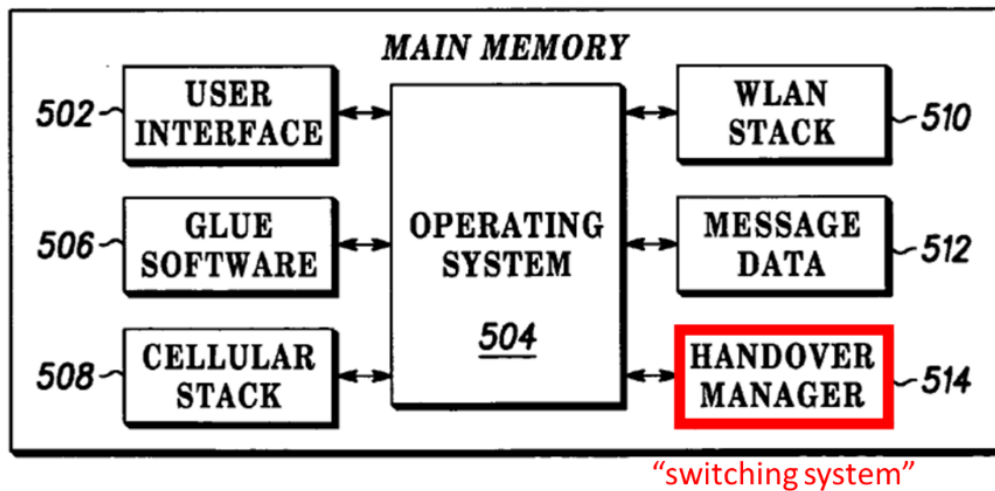


FIG. 5 414

- [0021]: “FIGS. 7, 8, 9, 10 and 11 are operational flow diagrams illustrating portions of *a handover process between a WLAN and a WAN* according to a preferred embodiment of the present invention.”
- [0026]: “A block diagram of an exemplary mobile subscriber device (SU) 306 is shown in FIG. 4. The SU 306 contains *two sets of transceivers—one for the WLAN system and one for the WAN system...*”
- [0027]: “The mobile subscriber unit 306 also includes *one or more processors 418...main memory 414*” which includes “*handover manager 514...*”
- [0038]: “[T]he process of initiating the registration sequence with a communications system, be it a *cellular (WAN) system* or a *local area (WLAN) system*, includes the steps necessary to bring up the corresponding hardware and software for that system.”

90. Dorenbosch discloses a mobile subscriber unit 306 that “contains two sets of transceivers—one for the WLAN system” (e.g., for “IEEE Standard 802.11” communications) and “one for the WAN system, each transceiver containing an antenna 402, 408, an RF front end 404, 410, and a decoder/ encoder 406, 412.” Dorenbosch, [0026], Fig. 4.² The subscriber unit 306 also includes “one or more

² While Dorenbosch discloses its WAN and WLAN transceivers as including antennas, RF front ends and decoders/encoders, the figures illustrate each of the RF front ends 404 and 410 as a “transceiver” itself. Dorenbosch, Fig. 4. In my declaration, I use “transceiver for WAN system” or “WAN transceiver” to refer to elements 408, 412 and 412, and “transceiver for WLAN system” or “WLAN transceiver” to refer to elements 402, 404 and 406. However, elements 404 and 410 alone would also satisfy the requirements for a communication module.

processors 418 which processes instructions” and “main memory 414” that includes “a handover manager 514” for triggering a handover between the WLAN and WAN transceivers. Dorenbosch, [0021], [0027], Figs. 4-5.

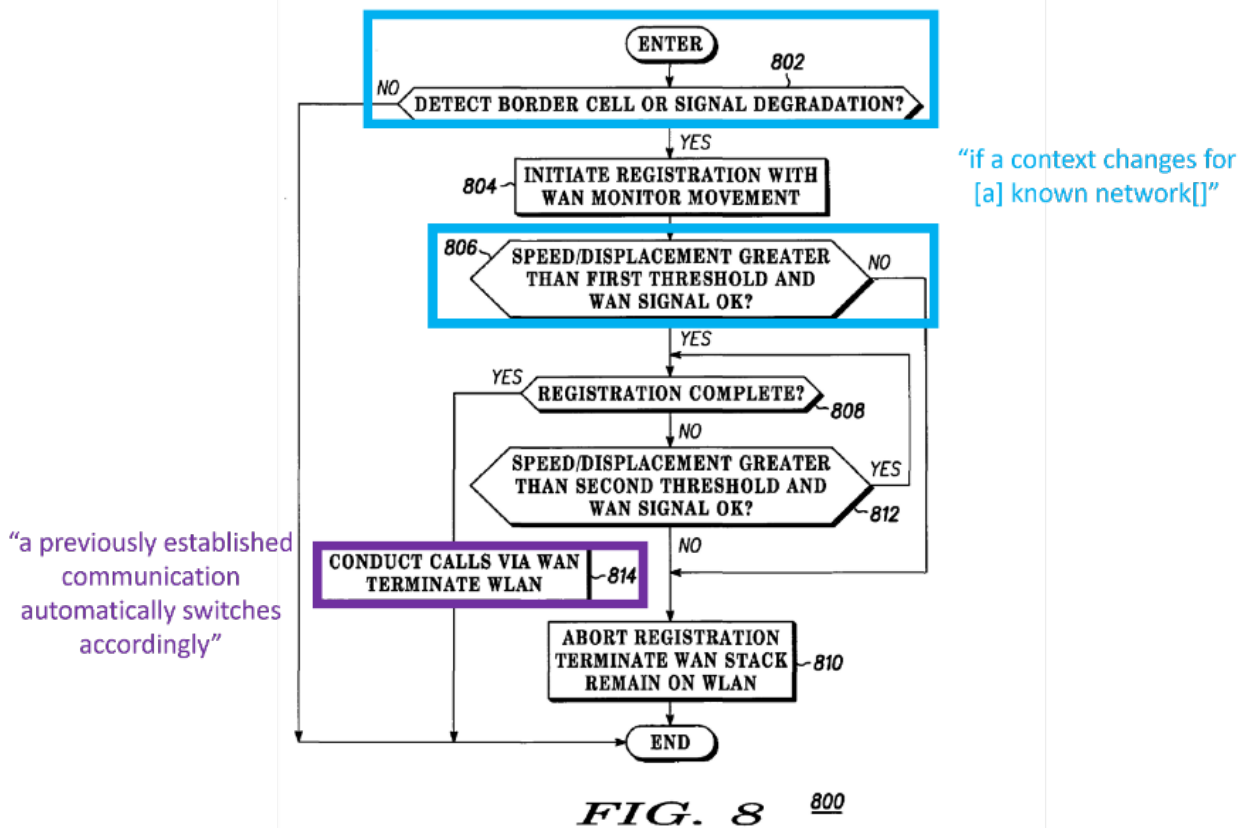
c. Element [1.b]

91. **Element [1.b] recites “wherein if a context changes for known networks or a new network is detected with a more favorable context, a previously established communication automatically switches accordingly.”**

This element is met by Dorenbosch.

92. Dorenbosch discloses if a context changes (*e.g.*, detecting “WLAN signal degradation” and “the strength of the WAN signal is...good”) for known networks (*e.g.*, “WLAN” and “WAN”) or a new network is detected with a more favorable context (*e.g.*, “the signal strength of the WAN signal is still good” when “detect[ing]...WLAN signal degradation”), a previously established communication (*e.g.*, “present call” via WLAN) automatically switches accordingly (*e.g.*, switch to “conduct any present call...via the WAN system”). *See, e.g.*, Dorenbosch:

- **Fig. 8:**



- [0038]: “[T]he subscriber unit 306 attempts to detect the presence of a border cell 210 or degradation in signal quality of the WLAN coverage at step 802. If the border cell 210 or *WLAN signal degradation is detected*, *then the unit 306 initiates the registration sequence with the WAN system and begins to monitor the movement of the device 306*, at step 804....[I]f either the speed and/or displacement of the device 306 do not exceed a first predetermined threshold or the strength of the WAN signal is unacceptable, at step 806, then the registration sequence is aborted....However, *if* the speed and/or displacement of the device 306 do exceed the first predetermined threshold and *the signal strength of the WAN signal is still good*, at step 806, then the device checks to see if the registration sequence has been completed, at step 808....When the registration sequence is completed, *the unit will conduct any present call and subsequent calls via the WAN system, at step 814*, and will terminate running the WLAN stack 510 and hardware 404, 406.”

93. Dorenbosch discloses handover manager 514 performs a “routine during a call” illustrated in Figure 7, which is “further expand[ed] upon” in Figure

8. In this routine, when handover manager 514 “detects...[a] degradation in signal quality of the WLAN coverage,” and “the signal strength of the WAN signal is still good” while the speed or displacement of the device exceeds a threshold, handover manager 514 switches to the WAN to conduct the “present call...via the WAN system.” Dorenbosch, [0038]. Switching is performed automatically because it is performed without human intervention. Both the WLAN and WAN are known networks. For example, the WLAN is known because the device is connected to the WLAN. The WAN is also known because handover manager 514 was able to determine “the signal strength of the WAN signal is *still* good.” Dorenbosch, [0038].

94. To the extent it is argued that the WAN is a new network instead of a known network, Dorenbosch still meets this limitation, because Dorenbosch discloses the WAN has a more favorable context than the WLAN by handover manager 514, when the WLAN signal is weak and the WAN signal is strong, prompting the switch from WAN to WLAN. Dorenbosch, [0038].

95. To the extent it is argued “automatically switches” requires the switching to occur based on the changed context regardless of any other factors (such as speed or displacement), a person of ordinary skill in the art would have understood, or at least found it obvious, the switch would occur automatically, regardless of speed or displacement, if the connected signal quality degraded significantly to a point where the call would be dropped if the network switch did

not occur, to beneficially allow the call to continue without disruption. For example, in a March 1996 article for the well-known and readily accessible IEEE Communications Magazine (that would have been accessible to a person of ordinary skill in the art, e.g., through the IEEE website or a library) titled “Trends in Handover Design,” Gregory P. Pollini explains that, in some circumstances, handover “must be done as quickly as possible due to the sudden signal drop as a mobile turns a corner.” Ex. 1017, 85.

d. Element [1.c]

96. Element [1.c] recites “**wherein upon activation of a timer, the switching system causes the second communication module to change state from a sleep mode to a stand-by mode.**” This element is met by Dorenbosch in view of Donovan.

97. Dorenbosch discloses the switching system (*see* [1.a]) causes the second communication module (*e.g.*, “transceiver” for “WAN system”) to change state to a stand-by mode (*e.g.*, “steps necessary to bring up the corresponding hardware and software for” “WAN system”). *See, e.g.*, Dorenbosch:

- [0038]: “[T]he process of initiating the registration sequence with a communications system, be it a cellular (WAN) system or a local area (WLAN) system, includes the *steps necessary to bring up the corresponding hardware and software for that system.*”
- [0041]: “Alternative methods may include monitoring the speed and displacement of the device before initiating the WAN registration process, and beginning the sequence only if the speed and/or displacement exceed the predetermined thresholds. This presents further benefits to the phone

battery life and the WAN system demands in that *the unit 306 does not even start the WAN stack 510 and hardware 410, 412, or burden the WAN system unnecessarily until sufficient movement has been detected.*”

- [0045]: “If all the conditions are met (i.e. sufficient signal strength, necessary movement conditions within border cell coverage) then *the unit 306 will terminate running the WAN stack 508 and hardware 410, 412,* at step 1016, and conducts any present and/or subsequent calls via the WLAN system, at step 1018.”

98. See my discussion of element [1.a] above (Section IX.A.4.b).

99. Dorenbosch further discloses when using the WLAN communication module, the WAN hardware and software are not needed so the device “will terminate running the WAN stack 508 and hardware 410, 412.” Dorenbosch, [0045]. Thereafter, while communicating over the WLAN, if “WLAN signal degradation is detected,” a registration process is initiated, which “includes the steps necessary to bring up the corresponding hardware and software” for the WAN system. Dorenbosch, [0038]. During this period when the WAN hardware and software are brought up, the WAN transceiver is in a stand-by mode (intermediate power) where it is transitioning to the active mode, but is not yet able to receive and transmit signals. Dorenbosch, [0038]. A person of ordinary skill in the art would have understood the device is in a stand-by mode because the device is waiting before it can communicate, and is using an intermediate amount of power. That is, when the device is warming up, it is unable to communicate, and thus, must wait (i.e., stand-by) before it is able to receive signals to measure the signal strength. This is

consistent with the '996 patent, which explains that the device transitions from a sleep mode to a stand-by mode, thus “consuming an intermediate amount of power.” '996 patent, 3:39-45. Moreover, only in the active mode will the device become adapted to “transmit signal[s] to and receive signal[s] from” a network, and thus, the device is similarly waiting in a stand-by mode before it is ready to perform desired transmission and/or reception of signals. '996 patent, 5:35-37, 50-58.

100. To the extent it is argued that “stand-by mode” requires the WAN transceiver to be capable of actively transmitting or receiving signals—while not yet communicating—a person of ordinary skill in the art would have understood that Dorenbosch teaches, or at least renders obvious, that after bringing up the WAN hardware and software, there exists a period when no signals are received, but the WAN transceiver is able to receive signals. For example, because the WAN transceiver is first activated at a random time when WLAN signal degradation occurs, the mobile device will not know the timing of transmissions for the WAN, and there will be a period during which the WAN transceiver is capable of receiving, but waiting to receive a signal from the WAN. For example, U.S. Patent No. 6,567,383 (issued on March 20, 2003), discloses that “synchronization data” is sent intermittently by a cellular base station. Ex. 1018, 2:29-34 (explaining that a synchronization channel is transmitted with a duration of two symbols, each having “30 microseconds”), Fig. 2 (showing synchronization data transmitted at beginning

of frame, followed by a period for communication of data by other devices). The synchronization data allows devices to perform “time synchronization,” recognizing a mobile device that is not connected to the network and has not yet received the synchronization data would not know the timing of transmissions in the cellular network. Ex. 1018, 2:5-9. During the period when the mobile device is looking for the cellular (or WAN) synchronization signal, the device would be able to receive signals, but would be listening (in stand-by) until it receives the symbols of the synchronization signal. As but one scenario where this would happen, if the WAN transceiver wakes up in a region where nobody else is connected to a cellular base station (such as in a rural area), only the base station and the mobile device of the user would be operating. When the cellular transceiver wakes up, it would listen, and would hear only signals from the cellular base station during the periods when the base station transmits. And if the mobile device’s cellular transceiver wakes up during a period when the base station is not transmitting, the cellular transceiver would wait until it hear the signal from the base station.

101. Donovan discloses upon activation of a timer (*e.g.*, “enables...the XOSC”), the second communication module (*e.g.*, “wireless network communication device”) changes from a sleep mode (*e.g.*, “transition from low power mode”) to a stand-by mode (*e.g.*, a “wakeup” period). *See, e.g.*, Donovan:

- **Fig. 2**

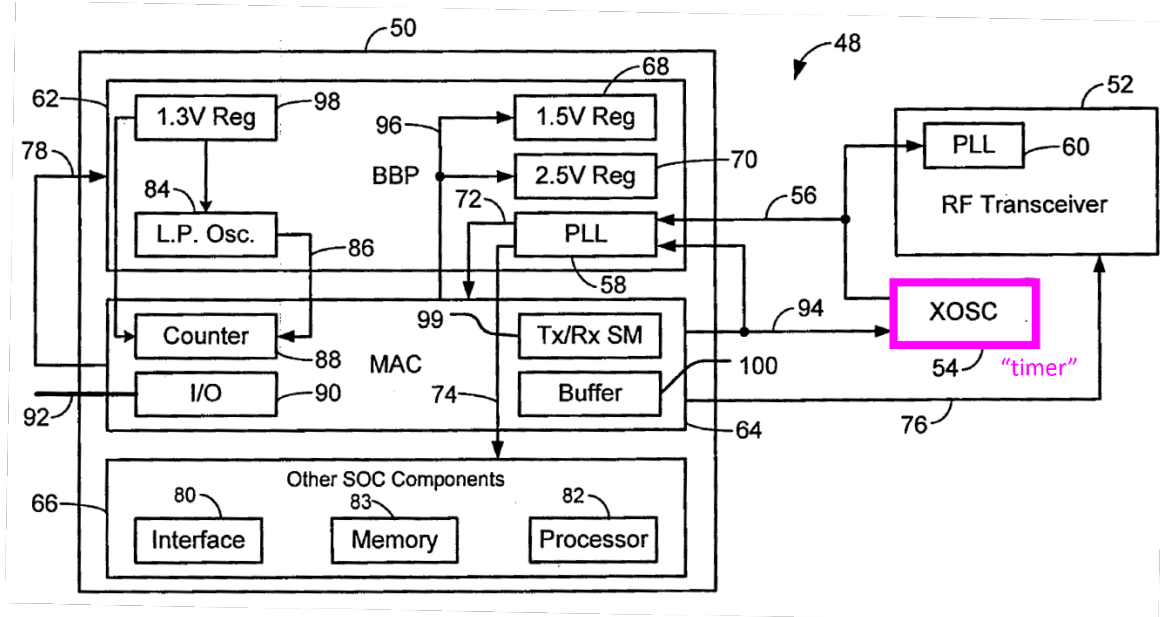


FIG. 2

- [0044]: “*The first PLL 58 generates one or more clock signals 72 for the MAC device 64, one or more clock 74 for the other SOC components 66 and one or more clock signals for the BBP 62 based on the reference signal 56 from the XOSC 54.*”
- [0048]: “Therefore, before the wireless network communications device 48 enters the low power mode, the processor 82 optionally calibrate[s] the low power oscillator 84 using the XOSC 54 to ensure that the lower power oscillator 84 *accurately tracks the desired low power time period.*”
- [0050]: “In the event that a *mobile station requires the wireless network communications device 48 to return to the active mode, the mobile station triggers an I/O input 92.* If the I/O input 92 is triggered during the low power mode, the wireless network communications device 48 returns to the active mode.”
- [0052]: “*The low power voltage regulator 98 provides power for the low power oscillator 84 and the counter during the low power mode.* The low power voltage regulator 98 also *supplies power to registers and memories in the SOC circuit 50 so that the state of the SOC circuits 50 is retained, which is important for fast wake up time.*”
- [0053]: “During the low power mode, the I/O module 90 monitors the I/O input 92. If the I/O input 92 is not triggered during the low power mode, the wireless network communications device 48 returns to the high power mode after the counter 88 reaches the end of the low power period. *In*

order to return to the active mode, the MAC device 64 enables the voltage regulators 68 and 70 and the XOSC 54, respectively. The MAC device 64 activates the first PLL 58. The MAC device next enables the internal clocks 72 and 74. Finally, the MAC device 64 instructs the BBP 62 and the RF transceiver 52 to operate in the active mode.”

- [0056]: “In step 168, the processor 82 optionally calibrates the low power oscillator 84 using signals generated by the XOSC 54. In step 170, *the RF transceiver and the BBP are transitioned to the low power state or mode.* In step 172, the *internal clocks are disabled and the PLLs, the XOSC and the voltage regulators are shut down.* Control ends in step 174.”
- [0057]: “Upon entering *sleep mode, all mobile stations time the duration of the sleep interval in order to wakeup and stabilize all circuitry* prior to the next scheduled beacon. *Preferably, this is done with a low frequency oscillator that is described above in order to reduce current consumption.* In step 183, if the counter is up and the wakeup time has arrived, the remaining circuitry is enabled in step 184.”
- [0058]: “Once a mobile station has returned to the active state, it will be put into receive mode, and will wait for a beacon to be received in step 198.”

102. Donovan discloses that the “wireless network communications device 48” begins in a “sleep mode” (or “low power mode”) where “the internal clocks are disabled and the PLLs, the [crystal oscillator] XOSC and the voltage regulators are shut down,” but “low power voltage regulator 98 provides power for the low power oscillator 84 and the counter.” Donovan, [0052], [0056], Fig. 4.

103. The transition (or “wakeup”) from sleep to active mode is not instantaneous—the wireless network communications device 48 first enters a stand-by mode, which includes the time needed to “stabilize all circuitry.” Donovan, [0057]. This wakeup process is initiated by first activating the XOSC 54, which is in turn used as an input to PLL 58, and to enable internal clocks 72 and 74. Donovan,

[0053], [0044]. During this time, the wireless network communications device must stand by until it enters the active state, after which the device can transmit and receive. Donovan, [0058].

104. The XOSC is a timer as it keeps track of timing. For example, the XOSC 54 is used by processor 82 to “calibrate[s] the low power oscillator 84...to ensure that the lower power oscillator 84 *accurately tracks the desired low power time period.*” Donovan, [0048]. In this regard, “low power oscillator 84 is typically susceptible to performance deviations due to temperature variances,” and the calibration using the XOSC allows the device to accurately measure time. Donovan, [0048]. A person of ordinary skill in the art would have understood that this calibration involves processor 82 counting the number of oscillations of the lower power oscillator 84 occurring in a fixed time determined by the oscillations of the XOSC 54, and at minimum renders using an oscillator as a reference timer for calibration of other components obvious particularly after leaving the low power state in order to recalibrate. For example, Donovan discloses a frequency of the XOSC as 44 MHz, while the low power oscillator operates at about a frequency or 100 Mhz. Donovan, [0043], [0048]. The processor would measure the XOSC for a certain number of oscillations (e.g., 44 million oscillations) to determine, e.g., 1 second, and then count the number of oscillations of the low power oscillator during that period. If the number of oscillations is different than 100 during the 1 second

period timed using the XOSC, the processor would adjust the number of oscillations of the low power oscillator to cause an increment in a counter. The counter is used to keep track of a low power time period. Donovan, [0048]. As a result, the device ensures that “the low power oscillator 84 accurately tracks the desired low power time period.” *See* Donovan, [0048].

105. During the wakeup period during which components of the wireless network communications device 48 initiate operation, Donovan’s wireless network communications device uses an intermediate amount of power. For example, it uses more power than the low power state, because the XOSX 54 and related circuitry are turned on during the wakeup period, but less than an active mode because the wireless network communications device 48 is not yet transmitting and receiving. Donovan, [0042], [0045], [0053].³

106. To the extent it is argued that “stand-by mode” requires the WAN transceiver to be capable of actively receiving signals—while not actually receiving signals—as noted earlier in this section, Dorenbosch teaches this. A person of

³ This is consistent with the ’996 patent, which discloses “a sleep mode, during which the cellular communication module consumes relatively small amount of power,” and “a stand-by mode during which the cellular communication module consumes an intermediate amount of power.” ’996 patent, 3:41-50.

ordinary skill in the art would have understood that, when applying Donovan's teachings to Dorenbosch, the resulting system would similarly meet this interpretation, as Donovan explains that, after the communication module wakes up, it "will wait for a beacon to be received," such that it is in stand-by mode while waiting. Donovan, [0058]. The need to wait for a beacon, even when the device is capable of receiving signals, was well known, as I explain above (where I discuss Ex. 1018 (U.S. Patent No. 6,567,383)).

107. As I discussed in Section IX.A.3, a person of ordinary skill in the art would have been motivated to apply Donovan's teachings of switching from a sleep mode to a stand-by mode by activating an oscillator in implementing Dorenbosch's WAN transceiver.

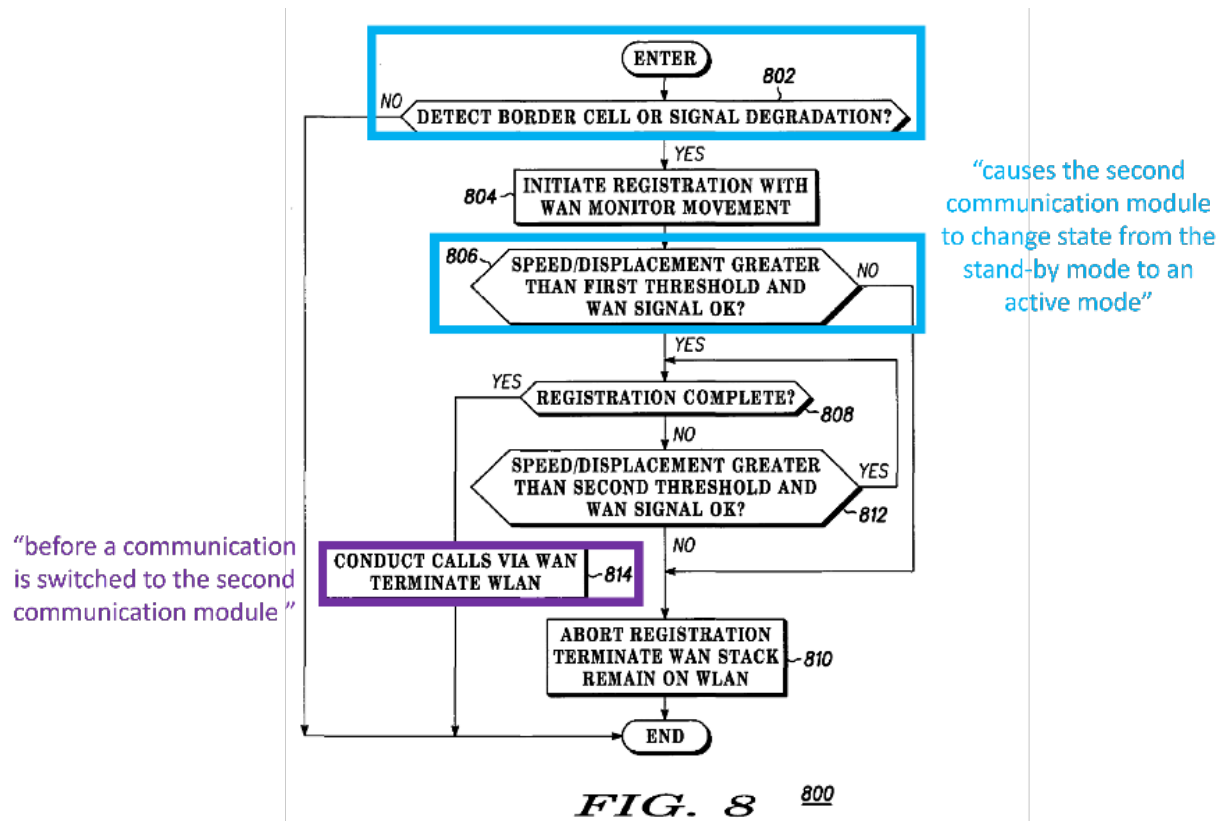
e. Element [1.d]

108. **Element [1.d] recites "the switching system causes the second communication module to change state from the stand-by mode to an active mode before a communication is switched to the second communication module."** This element is met by Dorenbosch in view of Donovan.

109. Dorenbosch discloses the switching system (*see* [1.a]) causes the second communication module (*e.g.*, "transceiver" for "WAN system") to change state from the stand-by mode (*see* [1.c]) to an active mode (*e.g.*, circuitry of "transceiver" for "WAN system" activated) before a communication is switched to

the second communication module (e.g., “conduct any present call...via the WAN system” using the WAN transceiver). See, e.g., Dorenbosch:

- **Fig. 8:**



- [0038]: “When the registration sequence is completed, *the unit will conduct any present call* and subsequent calls *via the WAN system*, at step 814, and will terminate running the WLAN stack 510 and hardware 404, 406.”

110. See my discussion of element [1.a]-[1.c] above (Section IX.A.4.b-d).

111. As I discussed for element [1.b], Dorenbosch discloses that a call is handed over to the WAN if the WLAN signal degrades and the WAN signal is strong. After warm-up, and prior to the communication handover, the device enters an active mode to receive and measure the WAN signal strength. Dorenbosch,

[0038]. This process uses more power than the stand-by period because the WAN transceiver is now actively receiving a signal. Dorenbosch, Fig. 7, [0037]-[0038].⁴

112. Dorenbosch further discloses further discloses, after determining the WAN signal strength is sufficient (and thus the WAN transceiver is activated), handover manager 514 causes the communication to switch to the WAN. Dorenbosch, [0038].

113. Donovan discloses a stand-by mode (*e.g.*, a “wake-up” period). See my discussion of element [1.c] above (Section IX.A.4.d), which also addresses the motivation to apply Donovan’s teachings to Dorenbosch.

f. Element [12.pre]

114. **Element [12.pre]** recites “**A method comprising.**” This element is met by Dorenbosch.

115. To the extent the preamble is limiting, Dorenbosch discloses a method (*e.g.*, “handover process”). *See, e.g.*, Dorenbosch:

- Figs. 7, 8, 9, 10 and 11 are *operational flow diagrams illustrating portions of a handover process between a WLAN and a WAN* according to a preferred embodiment of the present invention.

⁴ This is consistent with the ’996 patent, which discloses “a stand-by mode” where the communication module consumes “an intermediate amount of power,” and “a full active mode” where the communication module consumes “an amount of power larger than the intermediate amount of power.” ’996 patent, 3:41-50.

g. Element [12.a]

116. **Element [12.a] recites “detecting a first context.”** This element is met by Dorenbosch.

117. Dorenbosch discloses detecting a first context (*e.g.*, detecting “WLAN signal degradation”).

118. See my discussion of element [1.b] above (Section IX.A.4.c).

h. Element [12.b]

119. **Element [12.b] recites “detecting a second context.”** This element is met by Dorenbosch.

120. Dorenbosch discloses detecting a second context (*e.g.*, detecting whether “the strength of the WAN signal is unacceptable” or “good”).

121. See my discussion of element [1.b] above (Section IX.A.4.c).

i. Element [12.c]

122. **Element [12.c] recites “automatically switching, with a server, a communication in progress via a wireless network to a communication via a network based on the second context.”** This element is rendered obvious by Dorenbosch.

123. Dorenbosch renders obvious automatically switching, with a server (*e.g.*, “portable wireless device[]”), a communication in progress via a wireless network (*e.g.*, switching from a “present...call[]” via “WLAN”) to a communication via a network (*e.g.*, to “conduct any present call...via the WAN system”) based on

the second context (e.g., detecting whether “the strength of the WAN signal is unacceptable” or “good”). *See, e.g., Dorenbosch:*

- [0030]: “Various software embodiments are described in terms of this exemplary computer system. After reading this description, it will become *apparent to a person of ordinary skill in the relevant art(s) how to implement the invention using other computer systems and/or computer architectures.*”
- [0049]: “The novel system and related methods for *improving WLAN handover behavior and phone battery life provide significant advantages for dual-mode cellular communication systems (WLAN/WAN systems)*, such as improving the reliability of the handover, thereby allowing for significant cost savings by allowing more calls to be made over the WLAN...*Since portable wireless devices, cellular telephones, and two-Way radios, are incorporating motion detecting devices more frequently, these types of devices will particularly benefit from the preferred embodiments* of the present invention as has been discussed above.”

124. See my discussion of element [1.b] above (Section IX.A.4.c).

125. Dorenbosch further discloses its invention is applicable to “for dual-mode cellular communication systems (WLAN/WAN systems)” like “portable wireless devices, cellular telephones, and two-Way radios.” Dorenbosch, [0030], [0049].

126. A person of ordinary skill in the art would have found it obvious to implement Dorenbosch’s portable wireless device as the well-known concept of a server to advantageously allow portable service of data between devices, e.g., to allow one user to download information from another user’s portable device. *See DeAnna, [0022]* (disclosing implementing a portable wireless device as a server to allow “sharing and processing of data throughout a distributed organization”),

[0121]. *See also* the McGraw-Hill Dictionary of Computing & Communications (6th ed., 2003) (which I understand has been identified as Ex. 1023, and would have been accessible to a person of ordinary skill in the art, e.g., through a library or a college bookstore) at 340 (defining “server” to be “[a] computer or software package that sends requested information to a client or clients in a network”) and the Modern Dictionary of Electronics (7th ed., 1999) (which I understand has been identified as Ex. 1024, and would have been accessible to a person of ordinary skill in the art, e.g., through a library or a college bookstore) at 683 (defining “server” to be “[a] computer or processor that holds applications, files, or memory shared by users on a network”). As explained by DeAnna, which I discuss further in Section IX.B, a server is incorporated in a system “designed with a highly mobile and rapidly evolving organization in mind, where even remote client devices can operate as servers [for] device-to-device information processing and communications,” which “enables flexible and rapid device and software integration, reduces development risk and moves one step closer to the goal of pervasive computing and knowledge sharing within large, distributed, diverse systems of users, software and hardware platforms.” DeAnna, [0022].

j. Element [12.d]

127. **Element [12.d] recites “wherein automatically switching is based on detecting the second context being preferred over the first context within a**

set of known networks or from a newly discovered network.” This element is met by Dorenbosch.

128. Dorenbosch discloses automatically switching (*see* [12.c]) is based on detecting the second context being preferred over the first context (*e.g.*, detecting “the strength of the WAN signal is” “good” preferred over “WLAN signal degradation”) within a set of known networks (*e.g.*, “WLAN” and “WAN”) or from a newly discovered network (*e.g.*, “the signal strength of the WAN signal is” “good”).

129. See my discussion of element [1.b] above (Section IX.A.4.c).

130. As I explained in [1.b], automatic switching from the WLAN to the WAN occurs after detecting both that the WAN signal strength is good while the WLAN signal has degraded, such that the good WAN signal is preferred over the degraded WLAN signal. Dorenbosch, [0038].

k. Element [12.e]

131. Element [12.e] recites “**wherein upon activation of a timer, the server causes a communication module to change state from a sleep mode to a stand-by mode.**” This element is rendered obvious by Dorenbosch in view of Donovan.

132. Dorenbosch renders obvious the server (*see* [12.c]) causes a communication module (*e.g.*, “transceiver” for “WAN system”) to change state to a

stand-by mode (*e.g.*, “steps necessary to bring up the corresponding hardware and software for” “WAN system”).

133. See my discussion of elements [1.a], [1.c], and [12.c] above (Section IX.A.4.a, d, i).

134. Donovan discloses upon activation of a timer (*e.g.*, “enables...the XOSC”) causing a communication module (*e.g.*, “wireless network communication device”) to change state from a sleep mode (*e.g.*, “transition from low power mode”) to a stand-by mode (*e.g.*, a “wakeup” period).

135. See my discussion of element [1.c] above (Section IX.A.4.d).

136. As I discussed in Section IX.A.3, a person of ordinary skill in the art would have been motivated to apply Donovan’s teachings of switching from a sleep mode to a stand-by mode by activating an oscillator in implementing Dorenbosch’s WAN transceiver.

I. Element [12.f]

137. **Element [12.f] recites “the server causes the communication module to change state from the stand-by mode to an active mode before a communication is switched to the communication module.”** This element is rendered obvious by Dorenbosch in view of Donovan.

138. Dorenbosch renders obvious the server (*see* [12.c]) causes the communication module (*e.g.*, “transceiver” for “WAN system”) to change state from

the stand-by mode (*see* [1.d]) to an active mode (*see* [1.d]) before a communication is switched to the communication module (*see* [1.d]).

139. See my discussion of elements [1.d] and [12.c] above (Section IX.A.4.e, i).

140. Donovan discloses the stand-by mode (*e.g.*, a “wakeup” period).

141. See my discussion of element [1.c] above (Section IX.A.4.d), which also addresses the motivation to apply Donovan’s teachings to Dorenbosch.

m. Element [23.pre]

142. **Element [23.pre]** recites “**A method comprising.**” This element is met by Dorenbosch. See my discussion of element [12.pre] above (Section IX.A.4.f).

n. Element [23.a]

143. **Element [23.a]** recites “**determining a first context.**” This element is met by Dorenbosch. See my discussion of element [12.a] above (Section IX.A.4.g). While element [12.a] requires “detecting a first context,” element [23.a] requires “determining a first context.” But upon detecting the first context (*e.g.*, “WLAN signal degradation”), Dorenbosch’s device is determining the WLAN signal has degraded, and thus, meets both limitations.

o. Element [23.b]

144. **Element [23.b]** recites “**determining a second context.**” This element is met by Dorenbosch. See my discussion of element [12.b] above (Section

IX.A.4.h). While element [12.b] requires “detecting a second context,” element [23.b] requires “determining a second context.” But upon detecting the second context (*e.g.*, detecting whether “the strength of the WAN signal is unacceptable” or “good”), Dorenbosch’s device is determining whether the WAN signal is unacceptable or good, and thus, meets both limitations.

p. Element [23.c]

145. Element [23.c] recites “**automatically switching, with a server, a communication in progress via a first network to a communication via a second network based on the second detected context.**” This element is met by Dorenbosch. See my discussion of element [12.c] above (Section IX.A.4.i).

q. Element [23.d]

146. Element [23.d] recites “**wherein automatically switching is based on detecting the second context being preferred over the first context within a set of known networks or from a newly discovered network.**” This element is met by Dorenbosch. See my discussion of element [12.d] above (Section IX.A.4.j).

r. Element [23.e]

147. Element [23.e] recites “**wherein upon activation of a timer, the server causes a communication module to change state from a sleep mode to a stand-by mode.**” This element is met by Dorenbosch in view of Donovan. See my discussion of element [12.e] above (Section IX.A.4.k).

s. Element [23.f]

148. **Element [23.f] recites “the server causes the second communication module to change state from the stand-by mode to an active mode before the communication is switched to the communication module.”** This element is met by Dorenbosch in view of Donovan. See my discussion of element [12.f] above (Section IX.A.4.l).

t. Element [25.pre]

149. **Element [25.pre] recites “A method comprising.”** This element is met by Dorenbosch. See my discussion of elements [12.pre] above (Section IX.A.4.f).

u. Element [25.a]

150. **Element [25.a] recites “determining a first context.”** This element is met by Dorenbosch. See my discussion of element [12.a] above (Section IX.A.4.g).

v. Element [25.b]

151. **Element [25.b] recites “determining a second context.”** This element is met by Dorenbosch. See my discussion of element [12.b] above (Section IX.A.4.h).

w. Element [25.c]

152. **Element [25.c] recites “automatically switching a communication in progress via a first device to a communication via a second device based on the second detected context.”** This element is met by Dorenbosch.

153. Dorenbosch discloses automatically switching a communication in

progress via a first device (*e.g.*, switching from a “present...call[]” via “transceiver” for “WLAN system”) to a communication via a second device (*e.g.*, switching to a “present...call[]...conducted via” the “transceiver” for “WAN system”) based on the second detected context (*e.g.*, detecting whether “the strength of the WAN signal is unacceptable” or “good”).

154. See my discussion of elements [1.a]-[1.b] and [12.c] above (Section IX.A.4.b-c, i).

155. Dorenbosch teaches the first and second devices, as I explain in connection with elements [1.a]-[1.b], [12.c] (Section IX.A.4.b-c, i), where the WAN transceivers and WLAN transceivers are devices. I note that the equation of the second device to the communication module of the second device is consistent with Vasu’s infringement contentions in the Texas case. There, Vasu points to a “first communication module” as the “first device” and a “second communication module” as the “second device.” *See* Ex. 1012, 143-44.

x. Element [25.d]

156. **Element [25.d] recites “wherein automatically switching is based on detecting the second context being preferred over the first context within a set of known networks or from a newly discovered network.”** This element is met by Dorenbosch. See my discussion of element [12.d] above (Section IX.A.4.j).

y. Element [25.e]

157. Element [25.e] recites “wherein upon activation of a timer, a communication module of the second device changes state from a sleep mode to a stand-by mode.” This element is met by Dorenbosch in view of Donovan.

158. Dorenbosch discloses a communication module of the second device (e.g., “transceiver” for “WAN system”) changes state to a stand-by mode (e.g., “steps necessary to bring up the corresponding hardware and software for” “WAN system”).

159. See my discussion of elements [1.a], [1.c], [12.e], and [25.c] above (Section IX.A.4.b, d, k, w).

160. To the extent the “communication module” must be a sub-component of the “second device,” and not the “second device” itself (e.g., Dorenbosch’s WAN transceiver) Dorenbosch discloses “a communication module of the second device changes state to a stand-by mode” by its “transceiver 404,” which is a subcomponent of its WAN transceiver. As I explain in [1.c] (Section IX.A.4.d), the WAN transceiver is in a stand-by mode while performing the steps “necessary to bring up the corresponding hardware and software.” Dorenbosch, [0038]. The “corresponding hardware” includes transceiver 404, which therefore also enters a stand-by mode.

161. To the extent “stand-by mode” requires the communication module to be capable of actively transmitting or receiving signals—while not yet

communicating—as I explain in [1.c] (Section IX.A.4.d), a person of ordinary skill in the art would have understood that there is a period when the WAN transceiver—including transceiver 404 individually—is able to receive signals but is not yet doing so.

162. Donovan discloses upon activation of a timer (*e.g.*, “enables...the XOSC”) a communication module (*e.g.*, “wireless network communication device”) changes state from a sleep mode (*e.g.*, “transition from low power mode”) to a stand-by mode (*e.g.*, a “wakeup” period). *See, e.g.*, Donovan:

- [0053]: “During the low power mode, the I/O module 90 monitors the I/O input 92. If the I/O input 92 is not triggered during the low power mode, the wireless **network** communications device 48 returns to the high power mode after the counter 88 reaches the end of the low power period. ***In order to return to the active mode***, the ***MAC device 64 enables*** the voltage regulators 68 and 70 and the ***XOSC 54***, respectively. The MAC device 64 activates the first PLL 58. The MAC device next enables the internal clocks 72 and 74. Finally, ***the MAC device 64 instructs*** the BBP 62 and ***the RF transceiver 52 to operate in the active mode.***”
- [0056]: “In step 168, the processor 82 optionally calibrates the low power oscillator 84 using signals generated by the XOSC 54. In step 170, ***the RF transceiver and the BBP are transitioned to the low power state or mode.*** In step 172, the ***internal clocks are disabled and the PLLs, the XOSC and the voltage regulators are shut down.*** Control ends in step 174.”

163. See my discussion of elements [1.c], [12.e], and [25.c] above (Section IX.A.4.d, k, w).

164. Further, consistent with Dorenbosch’s transceiver 404 being the communication module, Donovan discloses the RF transceiver of its wireless network communications device 48 enters a “low power mode,” and after enabling

XOSC 54, the RF transceiver is woken up before entering “the active mode.” Donovan, [0053], [0056].

165. As I discussed in Section IX.A.3, a person of ordinary skill in the art would have been motivated to apply Donovan’s teachings of switching from a sleep mode to a stand-by mode by activating an oscillator in implementing Dorenbosch’s WAN transceiver.

z. Element [25.f]

166. **Element [25.f] recites “the communication module of the second device changes state from the stand-by mode to an active mode before the communication is switched to the communication module of the second device.”**

This element is met by Dorenbosch in view of Donovan.

167. Dorenbosch discloses the communication module of the second device (*e.g.*, “transceiver” for “WAN system”) changes state from the stand-by mode (*e.g.*, “steps necessary to bring up the corresponding hardware and software for” “WAN system”) to an active mode (*e.g.*, circuitry of “transceiver” for “WAN system” activated) before the communication is switched to the communication module of the second device (*e.g.*, “the present...call[] [is] conducted via the WAN system”).

168. See my discussion of elements [1.a], [1.d], [12.f], [25.c], and [25.e] above (Section IX.A.4.b, e, l, w, y).

169. To the extent the “communication module” must be a sub-component

of the “second device,” as I explained above in [1.d], Dorenbosch discloses, after warm-up, and prior to the communication handover, the device enters an active mode to receive the WAN signal, and this includes transceiver 404. Dorenbosch, [0038].

170. Donovan discloses the stand-by mode (*e.g.*, a “wakeup” period).

171. See my discussion of elements [1.c], [12.f], and [25.e] above (Section IX.A.4.d, l, y).

aa. Element [34.pre]

172. **Element [34.pre] recites “A server device comprising.”** This element is rendered obvious by Dorenbosch.

173. To the extent the preamble is limiting, Dorenbosch renders obvious a server device (*e.g.*, “portable wireless device[]”).

174. See my discussion of elements [12.c] and [12.e] above (Section IX.A.4.i, k).

bb. Element [34.a]

175. **Element [34.a] recites “a switching system to switch operation between a communication module and a Wi-Fi communication module, wherein based on a first context and a second context, a communication automatically switches accordingly.”** This element is met by Dorenbosch.

176. Dorenbosch discloses a switching system (*see* [1.a]) to switch operation

(*e.g.*, “handover”) between a communication module (*e.g.*, “transceiver” for “WAN system”) and a Wi-Fi communication module (*e.g.*, “transceiver” for “WLAN system” implementing “IEEE Standard 802.11” protocol), wherein based on a first context (*e.g.*, WAN signal for which a user must pay a “cost”) and a second context (*e.g.*, “WLAN signal strength greater than a predetermined level”), a communication automatically switches accordingly (*e.g.*, switching from a “present...call[]” via “WAN” to a call via “WLAN”). *See, e.g.*, Dorenbosch:

- **Fig. 10:**

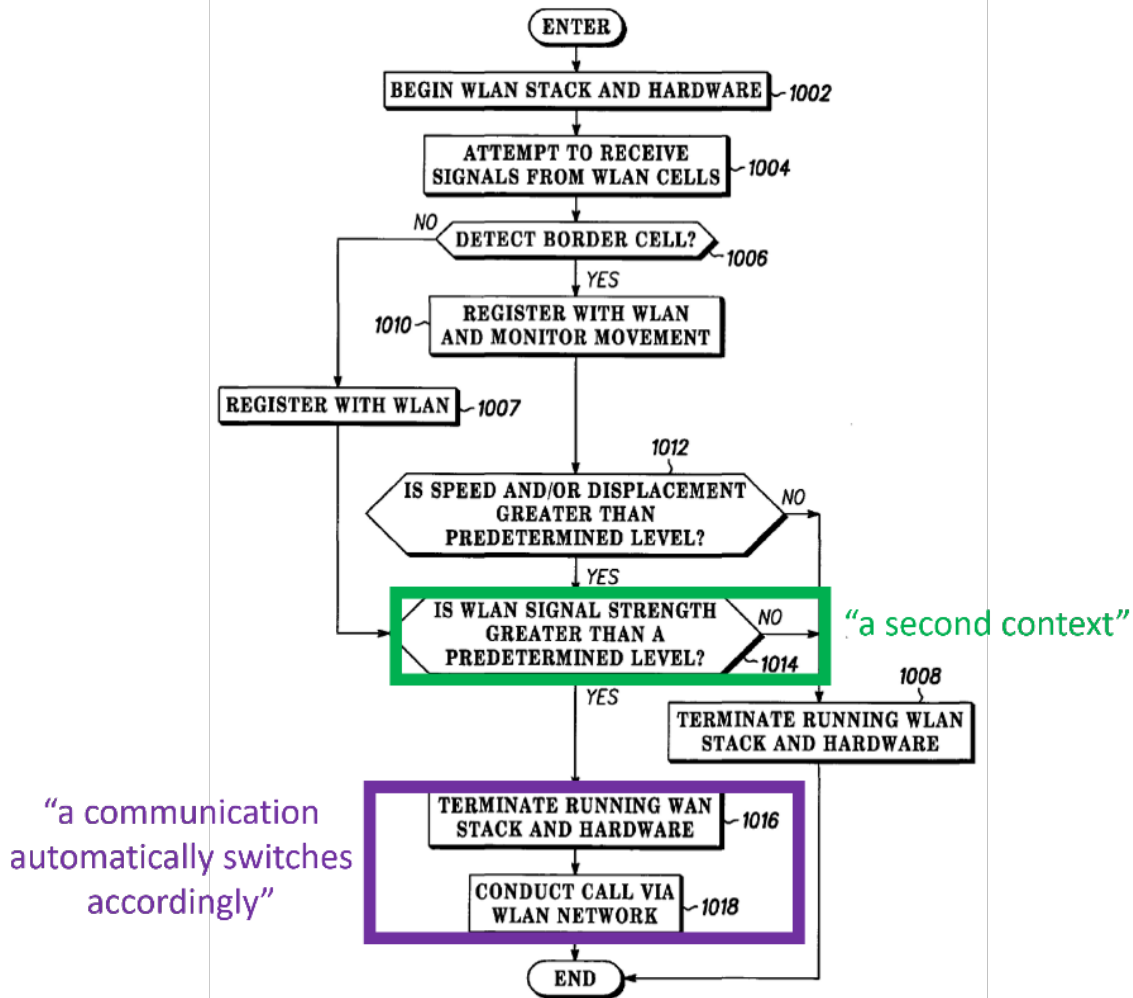


FIG. 10 1000

- [0008]: “Additionally, the handover decision must not be made prematurely to avoid the *service cost associated with* handing over a subscriber to *the macro network* 102 when the SU 106 does not actually leave the WLAN coverage area 104.”
- [0045]: “The unit 306 enters the method, at step 1002 where it begins running the WLAN stack 510 and its associated hardware 404, 406. The unit then attempts to receive signals from WLAN cells at step 1004. *If the unit detects a WLAN border cell, at step 1006, then the unit 306 registers with the WLAN and begins to monitor its movement, at step 1010.* Otherwise, if the unit 306 determines that the unit is within a normal WLAN cell 104, the unit will immediately register with the WLAN, at step 1007, and begin to handover any current call(s) to the WLAN system, (i.e.

the unit will bypass the steps for checking the movement and skip ahead to step 1014). *For a unit 306 that detects a border cell, if the speed and/or displacement exceed predetermined thresholds, at step 1012, then the unit will check the signal strength of the WLAN signal, at step 1014.* Otherwise, the unit 306 again terminates running the WLAN stack 510 and hardware 404, 406, at step 1008, if either the movement information or the WLAN signal strength is insufficient to warrant a handover. *If all the conditions are met (i.e. sufficient signal strength, necessary movement conditions within border cell coverage) then the unit 306 will terminate running the WAN stack 508 and hardware 410, 412, at step 1016, and conducts any present and/or subsequent calls via the WLAN system, at step 1018.”*

- [0049]: “The novel system and related methods for improving WLAN handover behavior and phone battery life provide significant advantages for dual-mode cellular communication systems (WLAN/WAN systems), such as improving the reliability of the handover, thereby *allowing for significant cost savings by allowing more calls to be made over the WLAN.*”

177. See my discussion of elements [1.a] and [1.b] above (Section IX.A.4.b-c).

178. Dorenbosch further discloses handover manager 514 performs a “routine during a call” illustrated in Figure 10. In this routine, when handover manager 514 is connected to a WAN signal, for which a user must pay a “cost” for usage, and detects a “WLAN signal strength greater than a predetermined level” while the speed or displacement of the device exceeds a threshold (*e.g.*, not relatively stationary), handover manager 514 switches to the WLAN to conduct the “present call.” Dorenbosch, [0045], [0049]. The 802.11 Wi-Fi WLAN is preferable because it has sufficient signal strength and there are no charges for use of that network. Dorenbosch, [0049]. Switching is performed automatically because it is performed

without human intervention.

cc. Element [34.b]

179. Element [34.b] recites “wherein automatically switching is based on detecting the second context being preferred over the first context within a set of known networks or from a newly discovered network.” This element is met by Dorenbosch.

180. Dorenbosch discloses automatically switching (*e.g.*, switching from a “present...call[]” via “WAN”) is based on detecting the second context being preferred over the first context (*e.g.*, “WLAN signal strength greater than a predetermined level” is preferred over associated “cost” for WAN network) within a set of known networks (*e.g.*, “WLAN” and “WAN”) or from a newly discovered network (*e.g.*, the WLAN has “sufficient signal strength”).

181. See my discussion of elements [1.b], [12.d], and [34.a] above (Section IX.A.4.c, j, bb).

182. Dorenbosch further discloses the WAN is known because the device is connected to the WAN. A person of ordinary skill in the art would have understood that the 802.11 WLAN would have been known (*e.g.*, a user’s home 802.11 WLAN) or unknown (*e.g.*, when first entering a location with an 802.11 WLAN).

dd. Element [34.c]

183. Element [34.c] recites “wherein upon activation of a timer, the

switching system causes the Wi-Fi communication module to change state from a sleep mode to a stand-by mode.” This element is met by Dorenbosch in view of Donovan.

184. Dorenbosch discloses the switching system (*see* [1.a]) causes the Wi-Fi communication module (*e.g.*, “transceiver” for “WLAN system” implementing “IEEE Standard 802.11” protocol) to change state to a stand-by mode (*e.g.*, “steps necessary to bring up the corresponding hardware and software for” “WLAN system”). *See, e.g.*, Dorenbosch:

- [0038]: “[T]he process of initiating the registration sequence with a communications system, be it a cellular (WAN) system or a local area (WLAN) system, includes the steps necessary to bring up the corresponding hardware and software for that system....”
- [0045]: “FIG. 10 illustrates a procedure used by the subscriber device 306 when moving from WAN coverage to WLAN coverage. ***From time to time, while on the WAN network, the unit 306 will execute this process*** in order to check for coverage of the WLAN system. As with the previously described methods, ***this process will run more often during a call*** than when idle (not on a call). The unit 306 enters the method, at step 1002 where it begins running the WLAN stack 510 and its associated hardware 404, 406. The unit then attempts to receive signals from WLAN cells at step 1004. ***If the unit detects a WLAN border cell, at step 1006, then the unit 306 registers with the WLAN and begins to monitor its movement, at step 1010.***”

185. See my discussion of elements [1.c] and [34.a] above (Section IX.A.4.d, bb).

186. Dorenbosch further discloses while communicating over the WAN, if a “border cell” is detected, a registration process is initiated, which “includes the

steps necessary to bring up the corresponding hardware and software” for the WLAN system. Dorenbosch, [0038], [0045]. As I explained above in [1.c], a person of ordinary skill in the art would have understood that, during this period when the hardware and software are brought up, the device is standing by before it begins communicating.

187. Further, to the extent it is argued that “stand-by mode” requires the WLAN transceiver to be capable of actively transmitting or receiving signals—while not yet communicating—a person of ordinary skill in the art would have understood that Dorenbosch teaches, or at least renders obvious, that after bringing up the WLAN hardware and software, there exists a period when no signals are received, but the WLAN transceiver is able to receive signals. For example, because the process of checking for a WLAN as shown in Fig. 10 is run “from time to time,” where the first step involves “begin[ning] running the LAN stack 510 and its associate hardware 404, 406”(Dorenbosch, [0045]), the mobile device will not know the timing of transmissions for the WAN, and there will be a period during which the WAN transceiver is capable of receiving, but waiting to receive a signal from the WAN. For example, U.S. Patent No. 7,126,926 (filed on September 9, 2000 and issued on October 6, 2006) discloses that beacon signals are sent intermittently by a WLAN. Ex. 1020, 13:8-11 (“To synchronize the stations in a BSS, the base sends out periodic frames called Beacons.”). The beacon signals allow devices to perform

a “Timing Synchronization Function” which allows the system to “synchronize all associated stations,” recognizing a mobile device that is not connected to the network and has not yet received the beacon signals would not know the timing of transmissions in the cellular network. Ex. 1020, 10:33-34. During the period when the mobile device is looking for the WLAN beacon signals, the device would be able to receive signals, but would be listening (in stand-by) until it receives the beacon signals. As but one scenario where this would happen, if the WLAN transceiver wakes up in a region where nobody else is connected to a WLAN (such as in a private home), only the WLAN and the mobile device of the user would be operating. When the WLAN transceiver wakes up, it would listen, and would hear only signals from the WLAN during the periods when the WLAN transmits. And if the mobile device’s WLAN transceiver wakes up during a period when the WLAN is not transmitting, the WLAN transceiver would wait until it hear the signal from the WLAN.

188. Donovan discloses upon activation of a timer (*see* [1.c]) causing the second communication module (*see* [1.c]) to change state from a sleep mode (*see* [1.c]) to a stand-by mode (*see* [1.c]).

189. See my discussion of element [1.c] above (Section IX.A.4.d), which addresses the motivation to apply Donovan’s teachings to Dorenbosch, which teaches the second communication module is the Wi-Fi communication module.

190. As I discussed in Section IX.A.3, a person of ordinary skill in the art would have been motivated to apply Donovan’s teachings of switching from a sleep mode to a stand-by mode by activating an oscillator in implementing Dorenbosch’s WLAN transceiver.

ee. Element [34.d]

191. **Element [34.d] recites “the switching system causes the Wi-Fi communication module to change state from the stand-by mode to an active mode before the communication is switched to the Wi-Fi communication module.”** This element is met by Dorenbosch in view of Donovan.

192. Dorenbosch discloses the switching system (*e.g.*, “processor[] 418” and “main memory 414” having “handover manager 514”) causes the Wi-Fi communication module (*e.g.*, “transceiver” for “WLAN system” implementing “IEEE Standard 802.11” protocol) to change state from the stand-by mode (*e.g.*, “steps necessary to bring up the corresponding hardware and software for” “WLAN system”) to an active mode (*e.g.*, circuitry of “transceiver” for “WAN system” activated) before the communication is switched to the Wi-Fi communication module (*e.g.*, “conducts any present...call[]via the WLAN system” and WLAN transceiver).

193. See my discussion of elements [1.c], [1.d], [34.a], and [34.c] above (Section IX.A.4.d-e, bb, dd).

194. Dorenbosch further discloses the WLAN transceiver is fully activated before communicating over the WLAN system, because the WLAN transceiver is used to receive the WLAN signal to measure its strength.

195. Donovan discloses the stand-by mode (*e.g.*, a “wakeup” period).

196. See my discussion of element [1.c] above (Section IX.A.4.d).

ff. Element [35.pre]

197. **Element [35.pre] recites “A device comprising.”** This element is met by Dorenbosch. See my discussion of elements [1.pre] above (Section IX.A.4.a).

gg. Element [35.a]

198. **Element [35.a] recites “a switching system to switch operation between a first communication module and a second communication module.”** This element is met by Dorenbosch. See my discussion of elements [1.a] above (Section IX.A.4.b).

hh. Element [35.b]

199. **Element [35.b] recites “wherein during an established communication if a preferable context is determined, the established communication is switched to a second communication over a network, wherein the preferable context is found in a set of known networks or in a newly discovered network.”** This element is met by Dorenbosch.

200. Dorenbosch discloses during an established communication (*e.g.*, “present...call[]” via “WLAN”; *see* [1.b]) if a preferable context is determined (*e.g.*,

detecting “the WAN signal is” “good” preferred over “WLAN signal degradation”; *see* [1.b]), the established communication (*e.g.*, “present call” via WLAN; *see* [1.b]) is switched to a second communication over a network (*e.g.*, switched to “present...call[]...conducted via the WAN system”; *see* [1.b]), wherein the preferable context is found in a set of known networks (*e.g.*, “WLAN” and “WAN”; *see* [12.d]) or in a newly discovered network (*e.g.*, “the signal strength of the WAN signal is” “good”; *see* [12.d]).

201. See my discussion of elements [1.b] and [12.d] above (Section IX.A.4.c, j).

ii. Element [35.c]

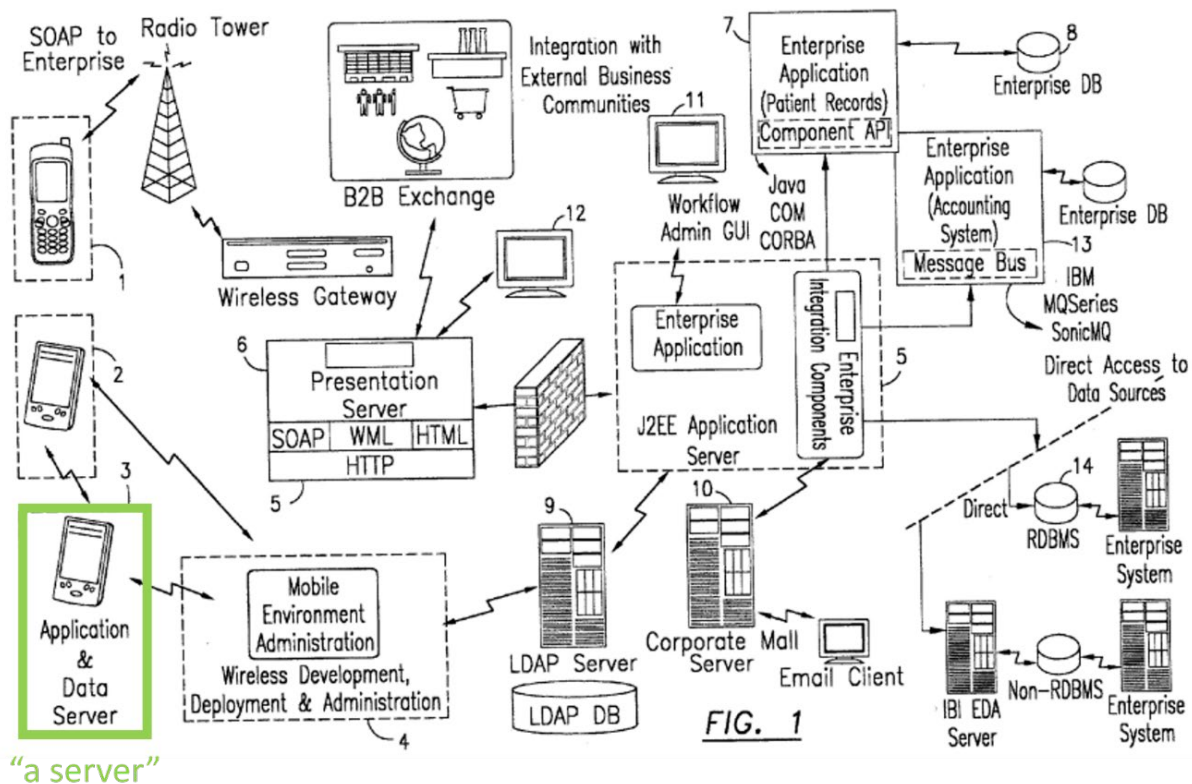
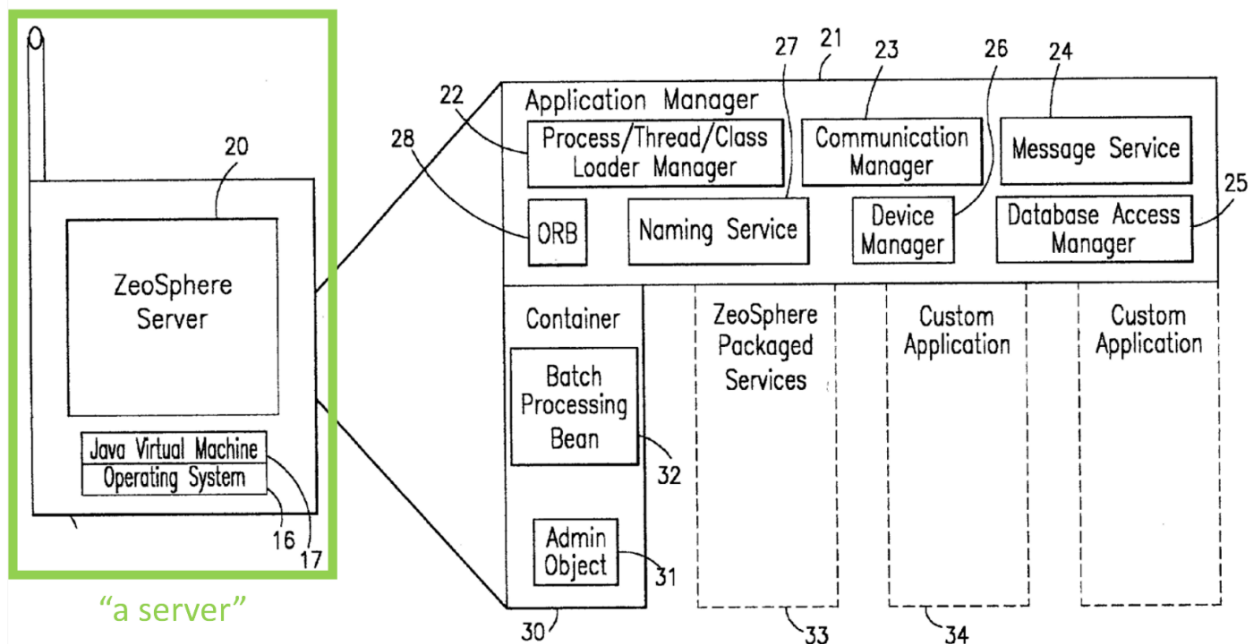
202. **Element [35.c] recites “wherein upon activation of a timer, the switching system causes the second communication module to change state from a sleep mode to a stand-by mode.”** This element is met by Dorenbosch in view of Dorenbosch. See my discussion of element [1.c] above (Section IX.A.4.d).

jj. Element [35.d]

203. **Element [35.d] recites “the switching system causes the second communication module to change state from the stand-by mode to an active mode before a communication is switched to the second communication module.”** This element is met by Dorenbosch in view of Donovan. See my discussion of elements [1.d] above (Section IX.A.4.e).

B. GROUND 2: DeAnna in view of Ground 1 (Claims 12, 23, and 34)

204. Claims 12, 23, and 34 require “a server” or a “server device” for handover. To the extent it is argued that Dorenbosch does not render obvious a server based on the knowledge of a person of ordinary skill in the art , DeAnna discloses a “**Zeosphere server**”—“a lightweight server operable on portable devices such as remote, wireless and handheld hardware devices.” DeAnna, [0022]. DeAnna’s server allows the device to “make” and “process[]” requests over a wireless network, for example, connected to a “Radio Tower.” [0026], [0114], [0120], [0124], Figs. 1-2A. Moreover, DeAnna teaches that its server is carried by a user as a “server-enabled portable or embedded device[]” and adapted for real time availability, with desired minimal service interruptions. DeAnna, [0007], [0121].



205. Like Dorenbosch and Donovan, DeAnna is in the same field as the '996

patent—which includes wireless communications—and is reasonably pertinent to the problems purportedly addressed by the '996 patent—e.g., maintaining a strong network connection. *See* DeAnna, Abstract (“A lightweight application server for use on portable or embedded devices...allowing for remote and rapid deployment and maintenance of applications, objects and features associated with the server-enabled portable or embedded devices. This permits portable devices like PDAs to provide server functionality to each other, in a fully portable network if desired.”), [0022] (“The ZeoSphere mobile platform...provides a robust solution for extending the sharing and processing of data throughout a distributed organization, and empowering a rapid development and deployment environment within that system.”), [0024] (“The ZeoSphere mobile platform...provid[es] intelligent, server functionality to mobile devices, and providing a flexible architecture for changing device features on demand.”), [0121]; *see* Section IX.A.3. For example, DeAnna teaches that “a platoon could stay tightly linked carrying ZeoSphere-enabled wireless PDAs, and rescue parties or firefighters in remote areas could use a variety of platforms like 3G cell phones and PDAs with ZeoSphere servers and GPS-enabled mapping apps to carry out their mission with previously unattainable speed and accuracy of information sharing.” DeAnna, [0121].

206. A person of ordinary skill in the art would have been motivated to apply Dorenbosch’s teachings (as modified by Donovan) to DeAnna’s handheld wireless

server to advantageously create a seamless transfer between networks. A person of ordinary skill in the art would have recognized that the advantages of a fast transition between WAN and WLAN networks to maintain connectivity would be applicable when implementing DeAnna's server. For example, DeAnna describes use cases for "rescue parties" and "firefighters" where network transfer must be fast and accurate with no interruption. DeAnna, [0121]. The paramount desire for no interruptions on "a variety of platforms like 3G cell phones" used by "rescues parties" and "firefighters" is expressly addressed by Dorenbosch, which emphasizes the "critical [need] to transfer a call in progress on one system over to a different system without a noticeable consequence to the end user." DeAnna, [0121]; Dorenbosch, [0005].

207. Moreover, a person of ordinary skill in the art would have had a reasonable expectation of success in applying Dorenbosch's teachings (as modified by Donovan) to DeAnna's handheld wireless server to perform network switching. DeAnna's handheld wireless server is a standard wireless device, operable to use known WAN or WLAN networks and associated technology, such that any known WAN and WLAN techniques—like the switching techniques of Dorenbosch (as modified by Donovan)—would be applicable to DeAnna's handheld wireless server. For example, DeAnna's server is implemented in "3G cell phones and PDAs," and Dorenbosch's mobile subscriber device is implemented on a "cellular [WAN] network." DeAnna, [0121]; Dorenbosch, [0007]. *See also* DeAnna, [0024]. Thus,

Dorenbosch's switching system that "switches back and forth between the WAN and WLAN" is directly applicable to DeAnna's server. Dorenbosch, [0044]. And Dorenbosch discloses its system is implementable "using other computer systems and/or computer architectures," including "portable wireless devices, cellular telephones, and two-Way radios." Dorenbosch, [0030], [0049]. Thus, Dorenbosch envisioned its system being implemented using wireless devices like the 3G cell phones and PDAs of DeAnna. DeAnna, [0121]. In addition, DeAnna's server is platform independent, allowing to be implemented in a wide range of devices. DeAnna, [0024] ("The ZeoSphere mobile platform may advantageously be used with platform independent approaches like that offered by Java, permitting an organization to blend a disparate patchwork of devices like legacy enterprise applications 13, databases 14, administrators 4, 12, and handheld devices 1-3 into a system that can be structured to have all devices function to provide information services.").

208. Accordingly, a person of ordinary skill in the art would have had a reasonable expectation of success in applying Dorenbosch's teachings (as modified by Donovan) to DeAnna's handheld wireless server, and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality.

C. GROUND 3: Iizuka in view of Donovan (Claim 39)

1. Overview of Iizuka (Ex. 1007, U.S. Patent App. Pub. 2005/028254)

209. Iizuka discloses a method that enables a **mobile terminal** “dynamically switch[] between [a] **plurality of communication mediums** during a call,” such as between a **wireless local area network (LAN)** and a **wireless telephone network**. Iizuka, [0014], [0057]. Like the ’996 patent, Iizuka recognizes the problem of “dynamically switch[ing]” between the different types of networks “so as to smoothly continue a call.” *Id.* [0010]. Iizuka addresses this by providing “a mobile terminal, a program for controlling a mobile terminal, a program for a call-management server, and a call-management process for performing wireless communication,” which enable a continuous wireless call by “dynamically switching between [a] plurality of communication mediums during a call.” *Id.* [0014].

210. Figures 1 and 2 of Iizuka, annotated below, illustrate an exemplary system with a **mobile terminal** “connected through a **call-management server 200**,” which functions as an interface server, to **wireless LAN 3** (via wireless LAN access point 23) and **mobile telephone network 10**. *Id.* [0057]-[0059], Figs. 1-2. The **mobile terminal** makes a call to a **telephone** (e.g., **IP telephone 21**) through one of the networks, for example through the **wireless LAN**. *Id.* [0061]-[0062]. When the quality of the call “deteriorates and deviates from a predetermined

criterion during a call through the wireless LAN, the call is switched from a connection through the wireless LAN to a connection through a **wireless telephone network.**” *Id.* [0212]. This allows the system to “dynamically switch the call between a connection through the wireless LAN and a connection through the wireless telephone network.” *Id.*

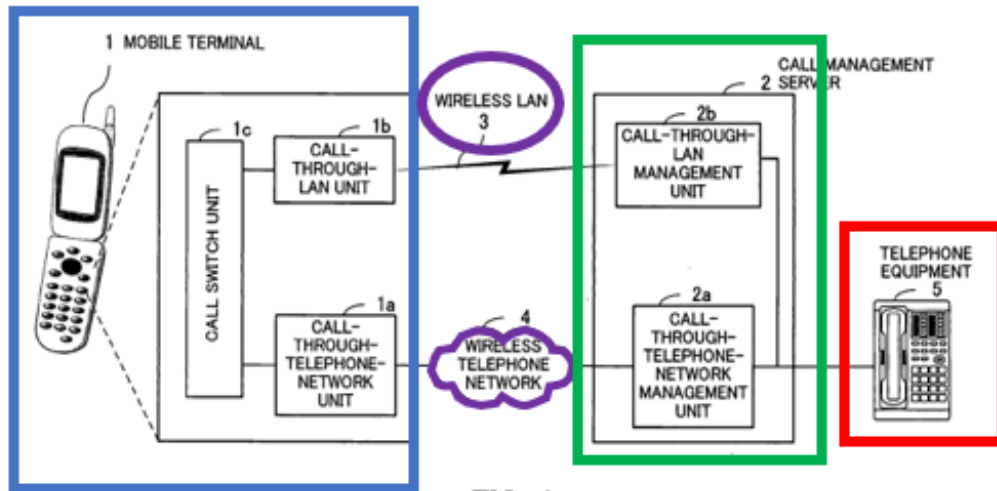


FIG. 1

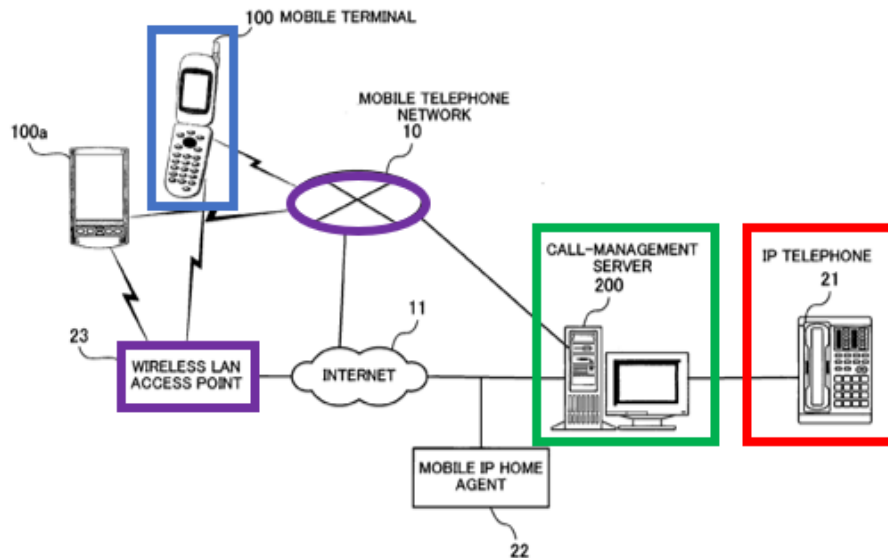


FIG. 2

211. Iizuka describes in detail the process of switching a call from a wireless LAN to a wireless telephone network. Iizuka describes the same switching embodiment in connection with Figure 13, which illustrates functional units of the mobile terminal and call-management server, and Figure 14, which illustrates a sequence diagram for the switching process. Iizuka, [0033]-[0034], [0157]-[0162], [0163]-[0176]. Accordingly, I include parallel citations to the relevant disclosures for both Figures 13 and 14. It also would have been obvious to a person of ordinary skill in the art to use the disclosures of both together because they describe compatible teachings for Iizuka's process of "switching (roaming) from a VoIP call to a voice call through the mobile telephone network." Iizuka, [0033]-[0034].

212. Iizuka's **mobile terminal** makes a call to **IP telephone 21** (i.e., a **first communication link**), which can be a Voice over Internet Protocol (IP) (VoIP) call made "through the **wireless LAN**" which is connected to the internet. *Id.*, [0039], [0061]-[0062], [0109], [0204], Fig. 13; *see also* Iizuka, [0158], [0169]. Thus, the process establishes "wireless communication" (i.e., **first wireless communication link**) between the **mobile terminal** and the **wireless LAN** (via the **wireless LAN access point**). *Id.*, [0061], [0064], Fig. 14 (arrow labelled "S76"); *see also* Iizuka, [0158], [0169].

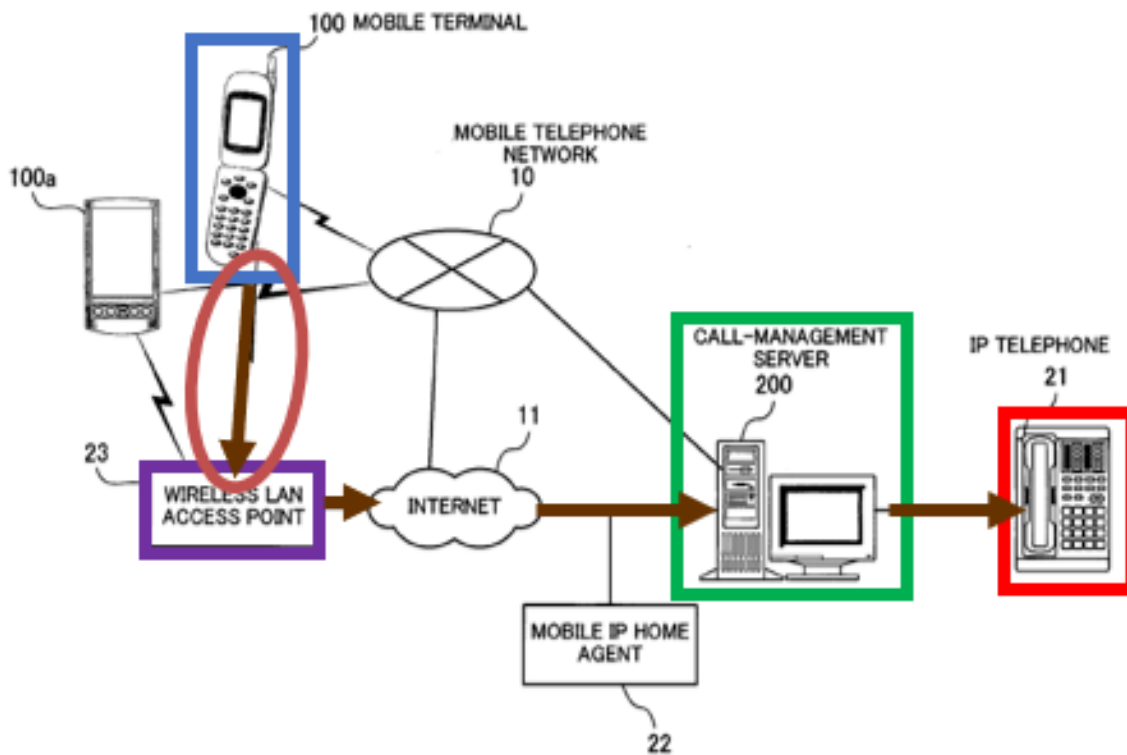


FIG. 2

213. Iizuka's **mobile terminal** includes a **medium monitor unit 117** that “monitors the conditions of the network mediums,” including **monitoring the “intensity of a radio wave”** received from the wireless LAN access point (i.e., the **first wireless communication link**). *Id.*, [0045], [0078], [0105], Fig. 4. During the call, these conditions such as the intensity of the radio wave are monitored to determine “when the condition of the communication deviates from a predetermined criterion.” *Id.*, [0060]-[0061], [0159], Fig. 13; *see also* Iizuka, [0159]-[0160], [0170].

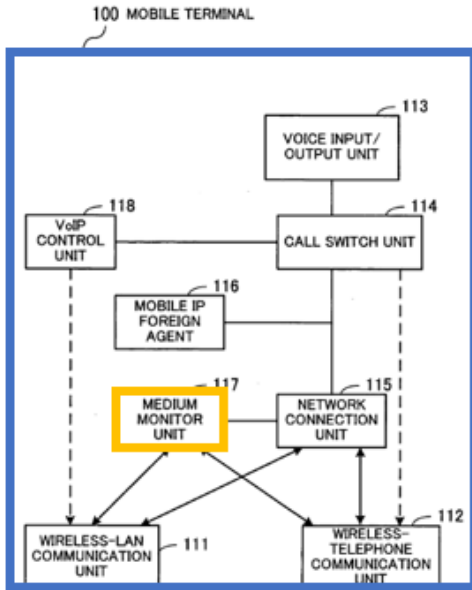


FIG. 4

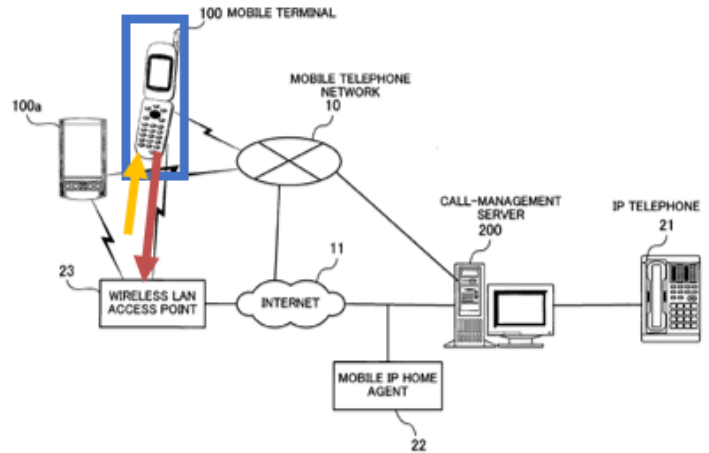


FIG. 2

214. When the signal strength “deviates from a predetermined criterion,” the **mobile terminal** notifies the **call-management server** by “originat[ing] a call to switching processing unit 212 in the call-management server by dialing.” *Id.*, [0159]-[0160]; *see also* Iizuka, [0162], [0170].

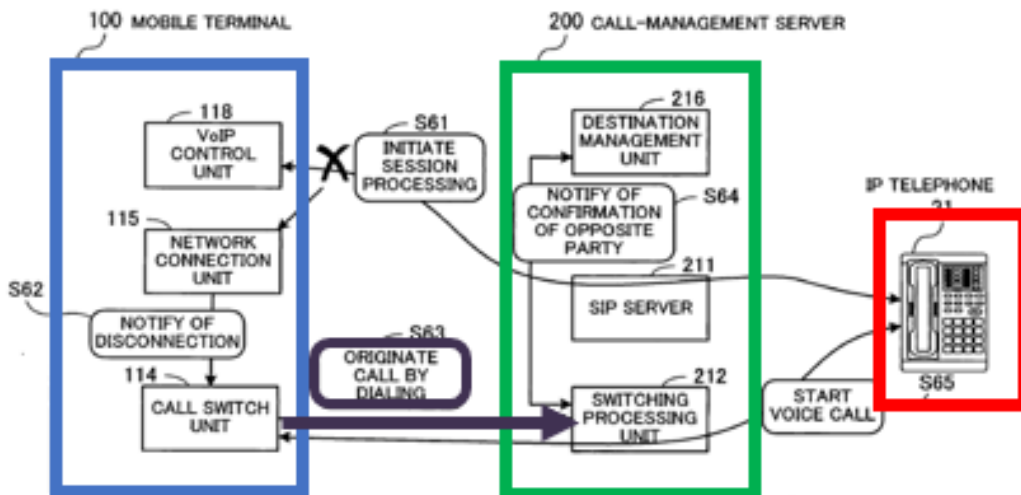


FIG. 13

215. The **call-management server** then establishes a voice call through the mobile telephone network while the VoIP call (over the **first communication link**) “still continues.” *Id.*, [0160]-[0162], [0170]-[0176]. As part of this process of establishing a voice call, the method proceeds in stages. First, an RTP or Real-time Transport Protocol connection (i.e., **second communication link**) “is established between the **IP telephone** [(end destination device)]” and the **call-management server** (interface server) as depicted in Iizuka’s Fig. 14. Iizuka, Fig. 14, [0175].

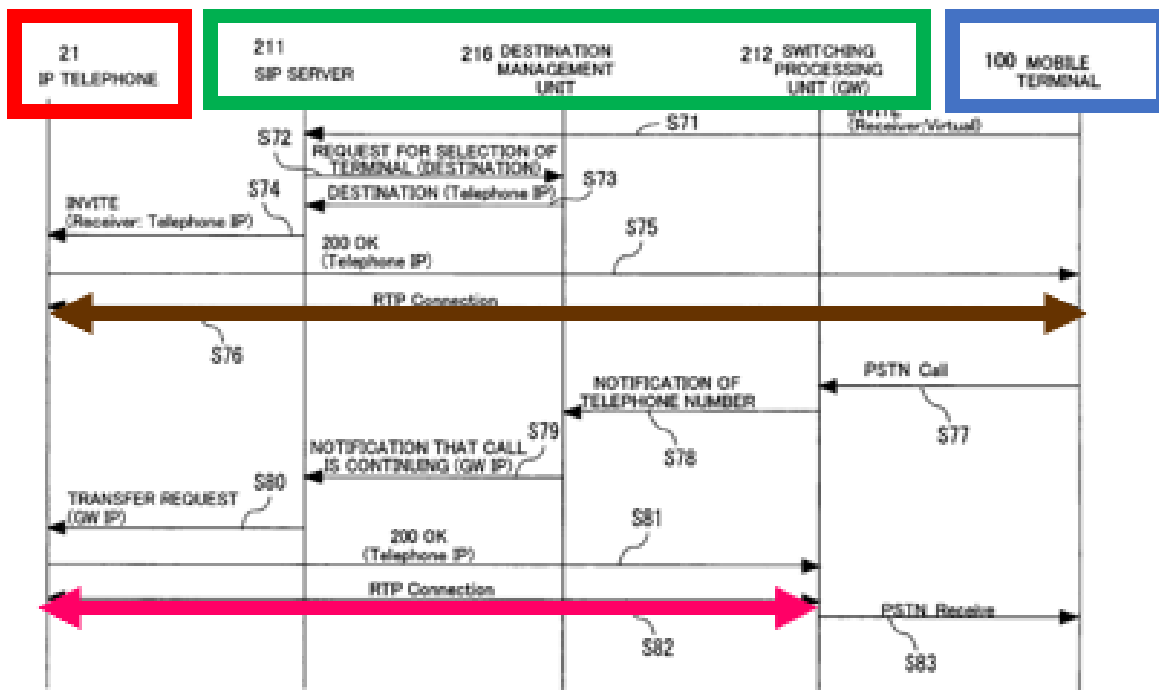


FIG. 14

216. As shown below, after the RTP connection between the **call-management server** and **IP telephone** is established (i.e., **second communication link**), the switching processing unit 212 of the call-management server 200 “returns

a response” to mobile terminal 100. Iizuka, [0176]; *see also* Iizuka, [0162]. Iizuka explains that this response “**establishes a connection through the mobile telephone network 10**” between the **call-management server** and the **mobile terminal**. Iizuka, [0176]; *see also* Iizuka, [0162]. This process thus establishes a “voice call” between the mobile terminal and IP telephone, which uses the mobile telephone network. Iizuka, [0162], [0176].

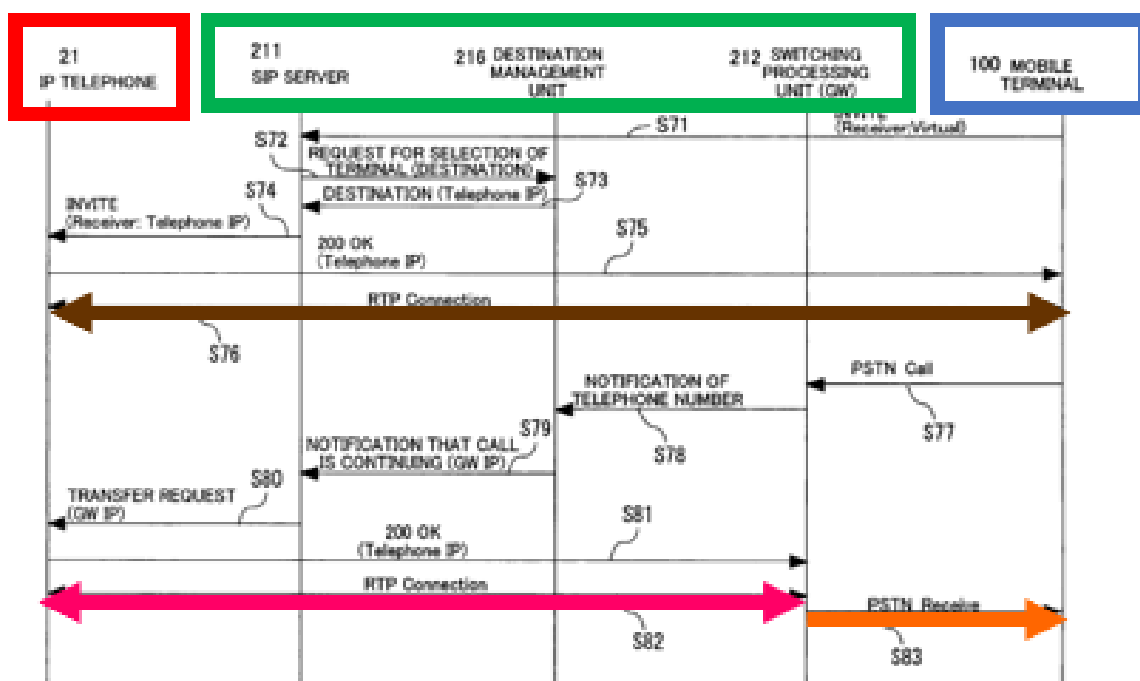


FIG. 14

217. After the voice call is established, the SIP server 211, located within call-management server 200, “disconnects the session which has been established through the Internet 11 between the mobile terminal 100 and the call-management server 200” (i.e., terminates transmission over the **first communication link**) such

that the call can continue through the voice call. Iizuka, [0162]; *see also* Iizuka, [0176].

2. Motivation to Apply Donovan’s Teachings to Iizuka

218. Like Donovan, Iizuka is in the same field as the ’996 patent—which includes wireless communications—and is reasonably pertinent to the problems purportedly addressed by the ’996 patent—e.g., maintaining a strong network connection. *See* Iizuka, [0008] (“[T]he narrow bandwidth of the telephone line is likely to cause a voice interruption or a great delay. Therefore, it is necessary to properly use the VoIP technique...in a network having a great bandwidth such as a wireless LAN, and is not used on a telephone line in a mobile telephone network, a PHS network, or the like which has a narrow bandwidth.”), [0093] (“[W]hen a call is originated by dialing or VoIP from a mobile terminal during a VoIP call or a voice call through the mobile telephone network 10 to or from the same mobile terminal, the destination management unit 216 requests the SIP server 211 and the switching processing unit 212 to establish a connection so that a three-way call is realized. After the connection realizing the three-way call is established, the connection for one of the two calls is disconnected. Thus, it is possible to prevent interruption of communication with the mobile terminal.”), [0205] (“[W]hen the communication medium used in a call is changed, the call-management server 200 temporarily maintains a VoIP call, and the function of a three-way call temporarily maintains

both of the connection for the VoIP call and the connection for a voice call through the mobile telephone network 10. Therefore, it is possible to dispense with the processing for reconnection in accordance with SIP, and dynamically and smoothly switch from a voice call through the mobile telephone network 10 to a VoIP call, or from a VoIP call to a voice call through the mobile telephone network 10, so that no interruption of communication occurs.”); *see* Section IX.A.3. For example, Iizuka contemplates wireless communication systems operable for seamless communications in the least-power intensive manner. *See* Iizuka, [0011]-[0012] (“[W]hen both of the function of realizing the call through a telephone line and the function of realizing the VoIP call through a computer network are on standby in a mobile terminal, the power consumption becomes extremely great.”), [0055] (“[I]t is possible to stop the function of the call-through-LAN unit 1 b during absence of calls, and start a call through the wireless LAN 3 when an incoming call is received through the wireless telephone network 4. Therefore, it is possible to minimize the power consumption in the call-through-LAN unit 1 b during standby, and reduce the power consumption in the mobile terminal 1 during standby.”), [0204] (“Thus, it is unnecessary to continuously operate a wireless LAN device, which consumes great electric power, and therefore the battery lasts longer.”); *see* Section IX.A.3.

219. A person of ordinary skill in the art would have been motivated to apply Donovan’s teachings of a communication module switching from a sleep mode to a

stand-by mode upon activating an oscillator to Iizuka's wireless-telephone communication unit for the same reasons a person of ordinary skill in the art would have been motivated to apply these teachings to Dorenbosch. *See* Section IX.A.3. Donovan explains that in its low power mode "[t]he RF transceiver 52 remains deactivated during the low power mode and does not transmit or receive RF signals." Donovan, [0045]. This allows the communications device to "utilize a small amount of power to ensure a quick transition from the low power mode to the active mode." Donovan, [0045]. While Donovan discusses application of its network communications device 48 including an RF transceiver to a WLAN, a person of ordinary skill in the art would have understood that the power saving and quick transition from low power mode to active mode benefits would be equally applicable to Iizuka's wireless-telephone communication unit 112, which is also a communication device including an RF transceiver. Moreover, Donovan emphasizes the importance of maintaining low power while connected to a network. *See, e.g.,* Donovan, [0004] ("Since the mobile stations are often battery powered, it is important to minimize power consumption to preserve battery life. Therefore, some wireless devices implement a low power mode and an active mode."). Iizuka discloses that the wireless-telephone communication unit can "continue a call by automatically switching communication mediums at the terminal side according to the circumstances, and dynamically switching between the telephone call and the

VoIP call in synchronization with the switching of the communication mediums.” Iizuka, [0203]. A person of ordinary skill in the art would have been motivated to look to Donovan for a warm-up process to apply to the WAN or WLAN transceiver, and understood that deactivating an oscillator and related circuitry in a sleep mode and activating those components as part of the warm-up process advantageously provides the desired reduction in power consumption while allowing quick warm-up to an active state. For example, as Donovan explains, by not completely shutting down the RF transceiver, but instead placing it in a low power mode, this allows “a quick transition” to the active mode, minimizing the delay before the device is able to communicate. Donovan, [0045]. *See also* Donovan [0004] (“During the low power mode, the wireless device shuts down components and/or alters operation to conserve power. Usually, the wireless device is not able to transmit or receive data during the lower power mode.”), [0037] (“To minimize power consumption, the wireless ad-hoc power savings mode according to the present invention allows all of the mobile stations to update each of the other mobile stations in a Basic Service Set (BSS) while minimizing the number of frame transitions that are required by each mobile station. Using the approach described below, the amount of time that each mobile station spends in the low power mode is significantly increased, which reduces the average power consumption of the mobile stations.”); Iizuka, [0203] (“[I]t is possible to continue a call by automatically switching communication

mediums at the terminal side according to the circumstances, and dynamically switching between the telephone call and the VoIP call in synchronization with the switching of the communication mediums.”).

220. A person of ordinary skill in the art would have had a reasonable expectation of success in applying Donovan’s teachings in implementing Iizuka’s wireless-telephone communication unit. First, both Iizuka and Donovan use traditional mobile devices, so the techniques taught in Donovan are interoperable with the wireless-telephone communication unit in Iizuka. Iizuka, [0005] (“In recent years, use of the VoIP (Voice over Internet Protocol) technology for making a voice call through the Internet or an intranet is widely spreading. The VoIP technology enables transmission of voice information and voice calls between terminals by use of data communication protocols in computer networks. Therefore, the VoIP technology can be applied to any networks in which predetermined data communication protocols are used, regardless of whether the networks are wired or wireless.”), [0039] (describing existing telephone equipment); Donovan, [0004] (“Since the mobile stations are often battery powered, it is important to minimize power consumption to preserve battery life. Therefore, some wireless devices implement a low power mode and an active mode....Usually, the wireless device is not able to transmit or receive data during the lower power mode.”), [0014] (describing improvements to existing wireless devices). Additionally, a person of

ordinary skill in the art would have understood that Donovan's wake-up procedure causes the wireless network communications device to become activated, such that the module is ready to communicate, allowing Iizuka's mobile terminal 1 to continue communication over the cellular network. Iizuka, [0047]-[0048], [0051], [0053]; Donovan, [0004], [0037]. For example, Donovan explains that "before the wireless network communications device 48 enters the low power mode, the processor 82 optionally calibrates the low power oscillator 84 using the XOSC 54 to ensure that the low power oscillator 84 accurately tracks the desired low power time period." Donovan, [0048]. This calibration "may be performed every time that the low power mode occurs, periodically, randomly, on an event basis or using any other criteria." Donovan, [0048]. And while Iizuka describes both "activat[ion] [of] the wireless-LAN communication unit" and "activat[ion] [of] the VoIP control unit," Iizuka does not describe the activation process in detail. Iizuka, [0110]-[0111]. A person of ordinary skill in the art would have known that the use of oscillators in transceivers, as described in Donovan, were commonly used to at least effect the transmission and reception of wireless data at a desired frequency. Vern A. Dubendorf, *Wireless Data Technologies Reference Handbook* (2003), at 9-13 (discussing the use of oscillators to facilitate frequency hopping in wireless bridges).

221. Accordingly, a person of ordinary skill in the art would have had a reasonable expectation of success in applying Donovan's teachings of waking up

from a sleep period upon activating an oscillator to Iizuka's mobile device, and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality.

3. Invalidity of Claim 39 Over Iizuka in view of Donovan

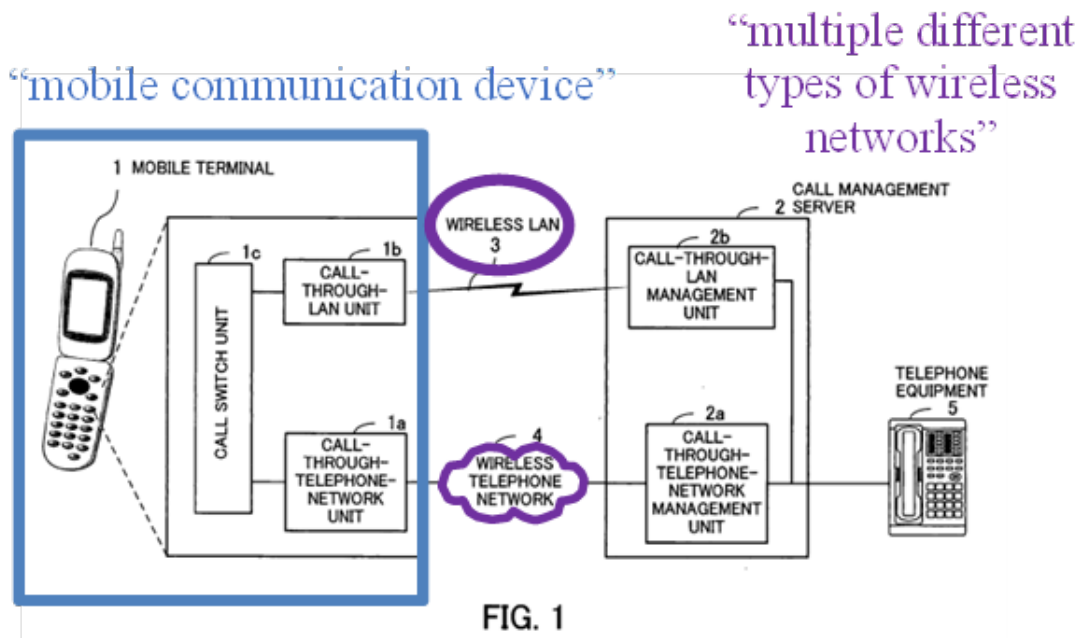
222. As I discuss below, Claim 39 is rendered obvious by Iizuka in view of Donovan. In addition to my discussion in Section IX.C.1-2, the following discussion identifies example disclosures followed by bulleted excerpts that each disclose Claim 39.

a. Element [39.pre]

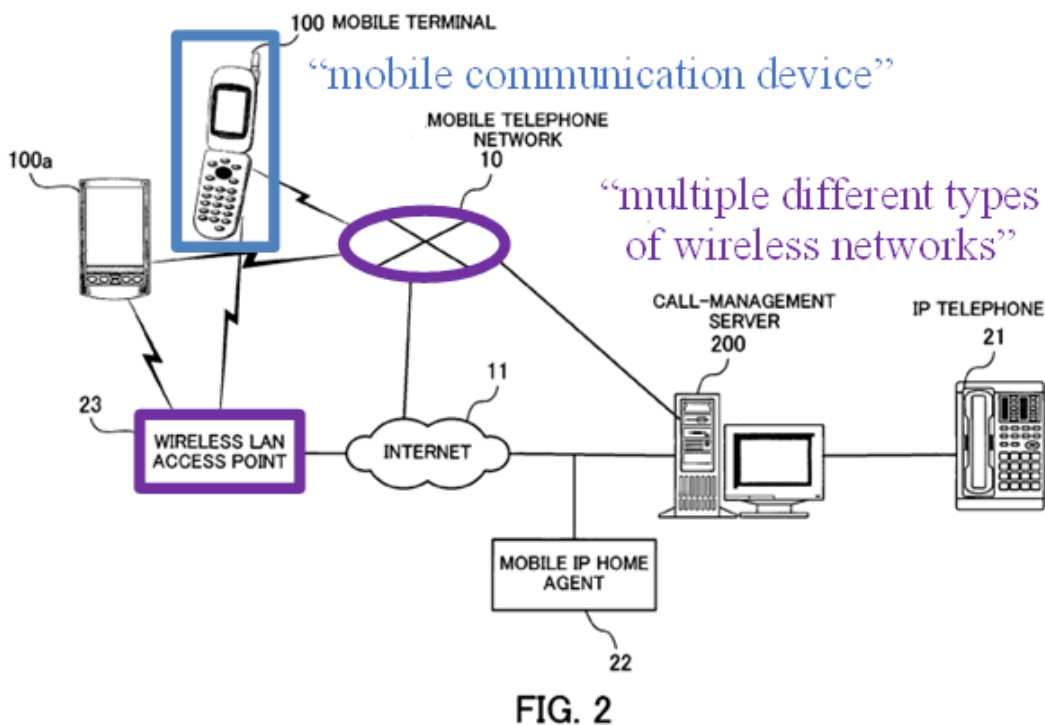
223. **Element [39.pre]** recites “**A method comprising.**” This element is met by Iizuka.

224. To the extent the preamble is limiting, Iizuka discloses a method (*e.g.*, providing “wireless communication”). *See, e.g.*, Iizuka:

- **Fig. 1:**



• Fig. 2:



- [0014]: “The present invention is made in view of the above problems, and the object of the present invention is to provide a mobile terminal, a program for controlling a mobile terminal, a program for a call-management server, and a call-management process *for performing*

wireless communication which are able to use a plurality of communication mediums enabling a wireless call, by dynamically switching between the plurality of communication mediums during a call.”

- [0057]: “FIG. 2 is a diagram illustrating an example of a construction of a system of the embodiment of the present invention. In the present embodiment, *a mobile telephone network 10 and the Internet 11 containing a wireless LAN are provided as the communication mediums through which calls can be made.* An IP telephone 21 is connected through a call-management server 200 to the mobile telephone network 10 and the Internet 11. The IP telephone 21 has a function of making a VoIP call.”
- [0015]: “In order to accomplish the above object, a mobile terminal for making a wireless call is provided. *The mobile terminal comprises: a call-through unit which has a function of making a call through a wireless LAN; a call-through-telephone-network unit which has a function of making a call through a wireless telephone network; and a call switch unit which establishes a connection through the call-through-telephone-network unit and switches from a first call through the call-through-LAN unit to a second call through the call-through-telephone-network unit when a condition of communication realized by the call-through-LAN unit deteriorates and deviates from a predetermined criterion during the first call, and switches from a third call through the call-through-telephone-network unit to a fourth call through the call-through-LAN unit when the condition of communication realized by the call-through-LAN unit is restored to satisfy the predetermined criterion during the third call.*”
- [0212]: “According to the present invention, when the condition of communication through a wireless LAN deteriorates and deviates from a predetermined criterion *during a call through the wireless LAN, the call is switched from a connection through the wireless LAN to a connection through a wireless telephone network.* On the other hand, when the condition of communication realized by the call through-LAN unit is restored to satisfy the predetermined criterion during a call through the wireless telephone network, the call is switched from a connection through the wireless telephone network to a connection through the wireless LAN. Therefore, it is possible to dynamically switch the call between a connection through the wireless LAN and a connection through the

wireless telephone network according to the condition of communication so that the wireless LAN is preferentially used.”

- [0157]: “FIG. 13 is a diagram illustrating processing for ***switching (roaming)*** from a VoIP call to a voice call through the mobile telephone network.”
- [0039]: “FIG. 1 is a conceptual diagram illustrating the present invention which is realized in the embodiment. As illustrated in FIG. 1, a mobile terminal 1 and a call-management server 2 can communicate with each other through two wireless communication mediums, a wireless LAN 3 and a wireless telephone network 4. Telephone equipment 5 is connected to the call-management server 2, so that a call can be made between a user of the telephone equipment 5 and a user of the mobile terminal 1.”
- [0043]: “When the condition of a connection realized by the call-through-LAN unit 1 b deteriorates and deviates from a predetermined criterion ***during a call through the call-through-LAN unit 1 b, the call switch unit 1 c establishes a connection through the call-through-telephone-network unit 1 a, and switches from the call through the call-through-LAN unit 1 b to a call through the call-through-telephone-network unit 1 a.*** When the condition of the connection realized by the call-through-LAN unit 1b is restored to satisfy the predetermined criterion during a call through the call-through telephone-network unit 1a, the call Switch unit 1c Switches from the call through the call-through-telephone-network unit 1a to a call through the call-through-LAN unit 1b.”
- ***See also [0157]-[0176] describing Figures 13 and 14.***

225. Iizuka discloses a method that enables a mobile terminal (including “mobile terminal [1, 100]”) to roam between different types of networks, such as between a wireless local area network (LAN) (including “wireless LAN [3],” which contains “Internet 11”) and a wireless telephone network (including “wireless telephone network 4” and “mobile telephone network 10”). Iizuka, [0014], [0057]. For example, a call initiated over a wireless LAN may be “switched from a

connection through the wireless LAN to a connection through a wireless telephone network.” Iizuka, [0015], [0212].

b. Element [39.a]

226. Element [39.a] recites “**establishing a first communication link between a mobile communication device and an end destination device, wherein the first communication link comprises a first wireless communication link between the mobile communication device and a first wireless network.**” This element is met by Iizuka.

227. Iizuka discloses establishing a first communication link (*e.g.*, establishing a “VoIP call”) between a mobile communication device (*e.g.*, between “mobile terminal [1, 100]”) and an end destination device (*e.g.*, and “telephone equipment 5,” “IP telephone 21”), wherein the first communication link comprises a first wireless communication link between the mobile communication device and a first wireless network (*e.g.*, “VoIP call” includes “wireless communication” between “mobile terminal [1, 100]” and “wireless LAN”). *See, e.g.*, Iizuka:

- **Fig. 1:**

“mobile communication”
device”

“first type of wireless
network”

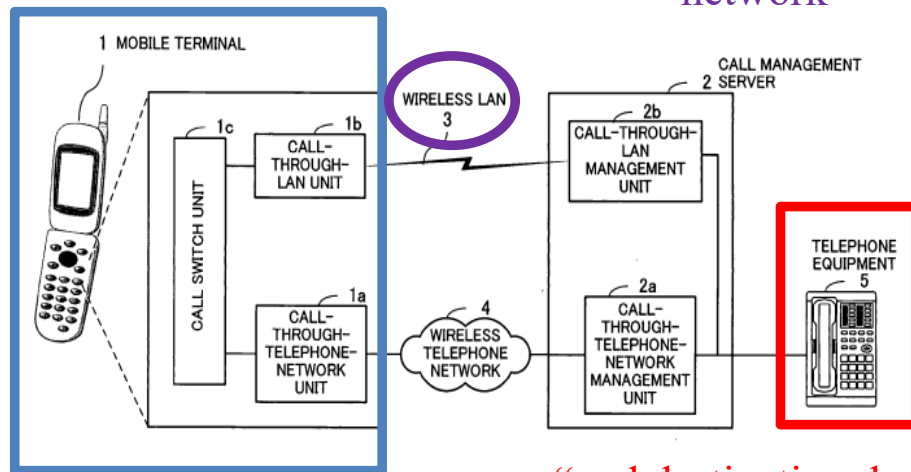


FIG. 1 “end destination device”

- Fig. 2:

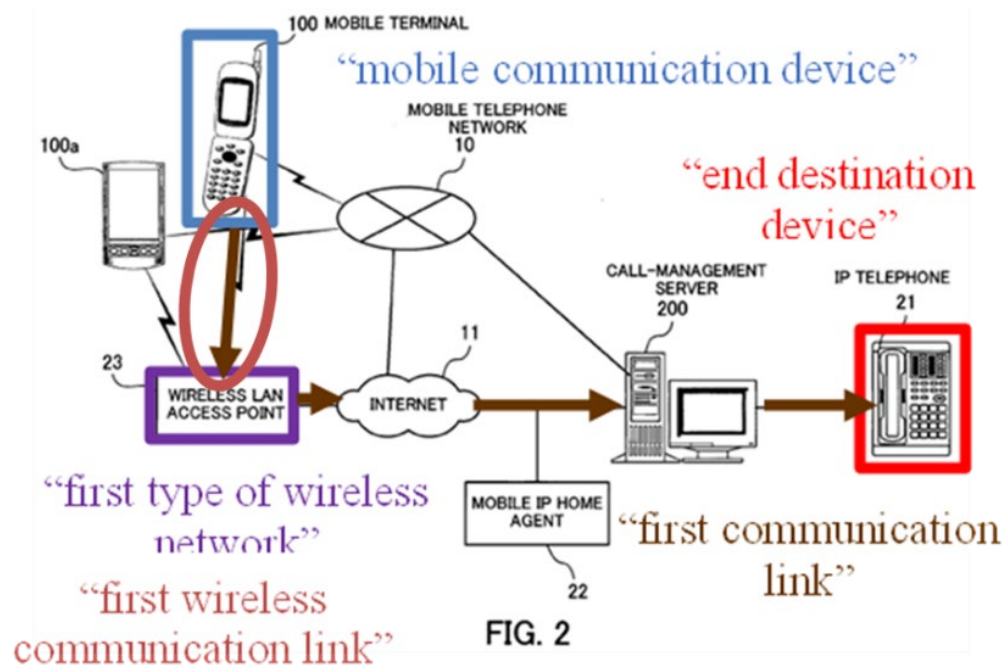
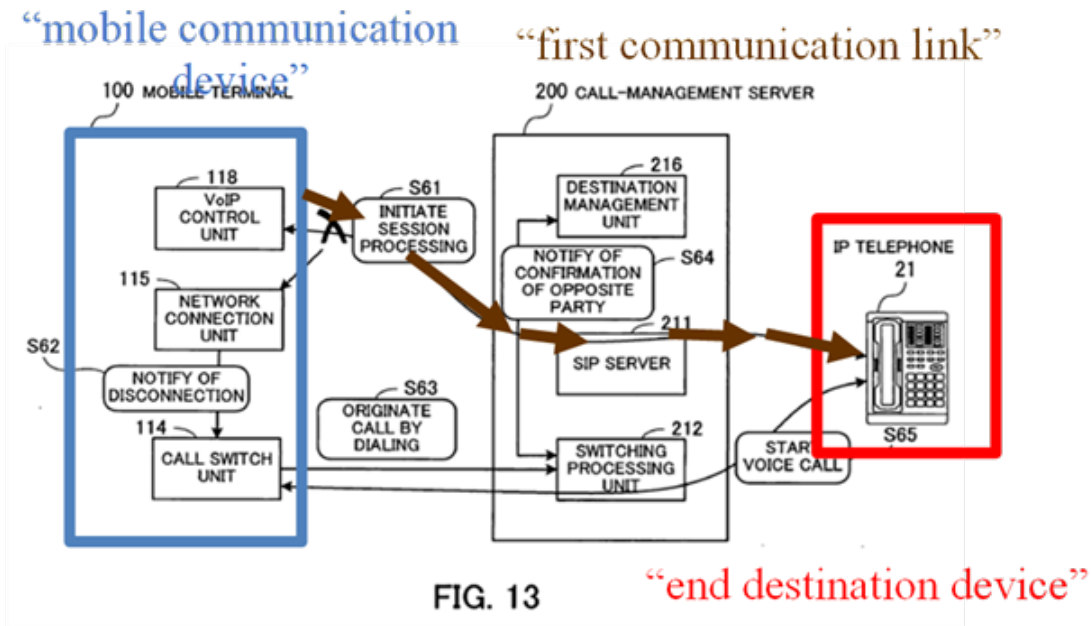
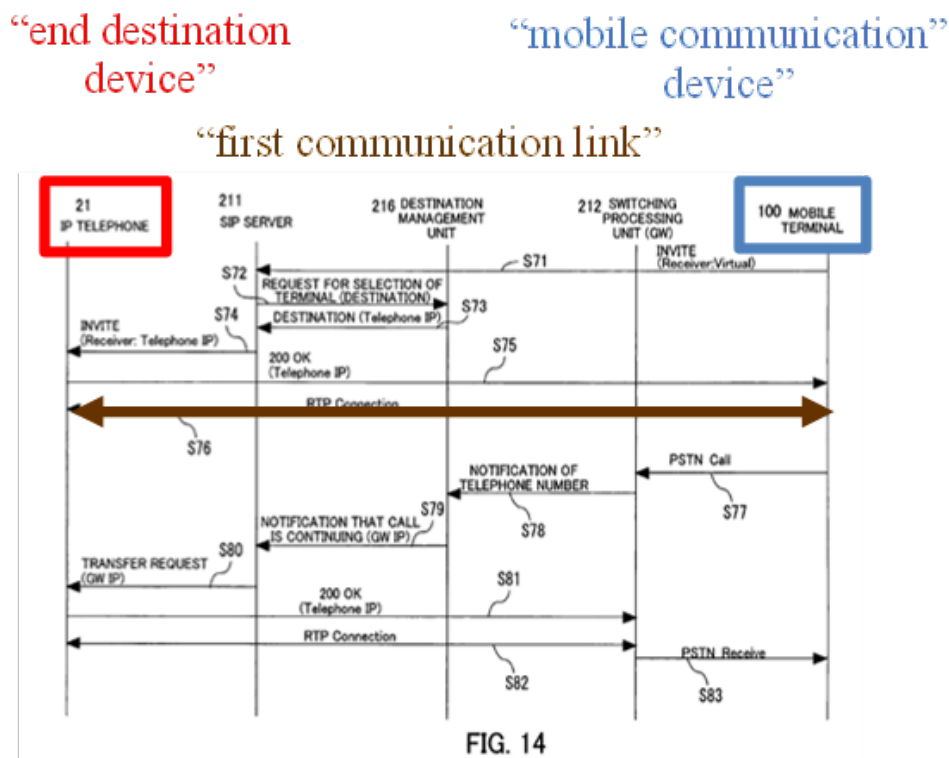


FIG. 2

- Fig. 13:



- Fig. 14:



- [0039]: “As illustrated in FIG. 1, a mobile terminal 1 and a call management server 2 can communicate with each other through two

wireless communication mediums, a wireless LAN 3 and a wireless telephone network 4. Telephone equipment 5 is connected to the call-management server 2, so that *a call can be made between a user of the telephone equipment 5 and a user of the mobile terminal 1.*

- [0049]: “When a connection is established through the wireless telephone network 4 in response to an incoming call, the call-through-LAN management unit 2 b disconnects a corresponding session which has been set between the call-management server 2 and the mobile terminal 1 through the wireless LAN 3. In addition, when the call-management server 2 receives from the mobile terminal 1 information indicating restoration of communication between the call-management server 2 and the mobile terminal 1 through the wireless LAN 3, the call-through-LAN management unit 2 b *establishes a session between the call-management server 2 and the mobile terminal 1 through the wireless LAN 3.*”
- [0058]: “The call-management server 200 is connected to the mobile telephone network 10 and the Internet 11 performs medium conversion between the telephone line and the VoIP, and transfers call data. In addition, *the call-management server 200 establishes and switches connections between the IP telephone 21 and the mobile terminals 100 and 100 a.*”
- [0061]: “The mobile terminals 100 and 100 a each have a function of making a call through the mobile telephone network 10 and a function of making a VoIP call through the Internet 11. *When each of the mobile terminals 100 and 100 a makes a call through the Internet 11, the mobile terminal performs wireless communication with the wireless LAN access point 23,* and establishes a connection between the mobile terminal and the call-management server 200 through the wireless LAN access point 23.”
- [0064]: “The wireless-LAN communication circuit 101 *performs wireless data communication with the wireless LAN access point 23* through an antenna 101 a. The wireless-telephone communication circuit 102 performs wireless data communication with a base station of the mobile telephone network through an antenna 101 b.”
- [0158]: “[Step S61] *After an SIP session is initiated between the mobile terminal 100 and the IP telephone 21, a VoIP call is started.*”

- [0169]: “[Step S76] *A VoIP call between the mobile terminal 100 and the IP telephone 21 is started.*”
- [0088]: “The SIP server 211 manages communication through the Internet 11 using the SIP (Session Initiation Protocol), which is a communication protocol for setting, releasing, and controlling sessions, where each of the sessions is formed with a series of VoIP messages.”
- [0109]: “[Step S14] The call switch unit 114 initiates *a VoIP call through the wireless LAN.*”
- [0204]: “In addition, a standby operation for receiving an incoming call is performed at the wireless-telephone communication unit 112 in the mobile terminal 100, and *a VoIP call is placed by establishing a connection to a network such as a wireless LAN with a network device* when the mobile terminal 100 receives an incoming call.”
- [0169]: [Step S76] A VoIP call between the mobile terminal 100 and the IP telephone 21 is started.”

228. Iizuka discloses establishing a first communication link between the mobile terminal and a telephone. For example, Iizuka discloses establishing a VoIP call between a mobile terminal (including mobile device 1 and mobile device 100) and an IP telephone (including “telephone equipment 5” and “IP telephone 21”). Iizuka, [0039], [0158], [0169].

229. Iizuka further discloses that the VoIP call includes a first wireless communication link between the mobile terminal and a first type of wireless network (a wireless LAN). For example, the VoIP call is “through the wireless LAN.” Iizuka, [0109], [0204], Fig. 2. And when the mobile terminal makes a VoIP call, it “performs wireless communication” with the “wireless LAN access point 23” of the wireless LAN. Iizuka, [0061]; *see also* Iizuka, [0064].

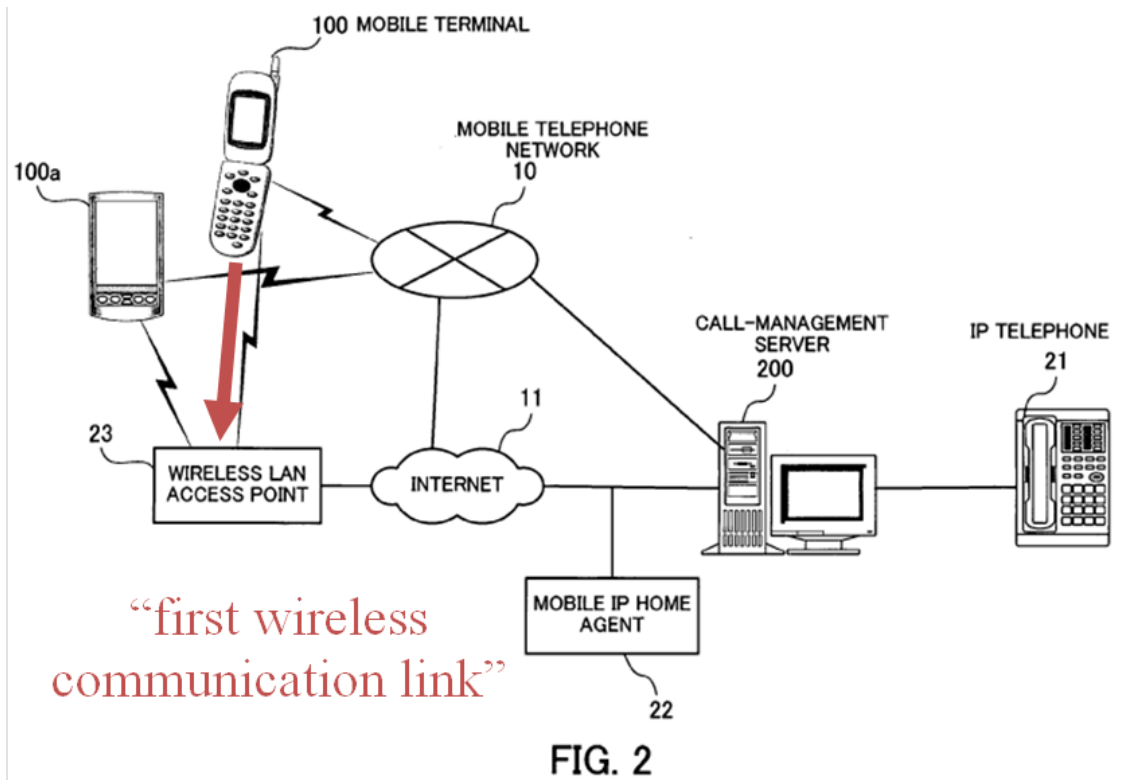
230. To initiate the VoIP call, a Session Initiation Protocol (SIP) session is first established between the mobile terminal and a call-management server (including “call-management server 2” and “call-management server 200”). Iizuka, [0049], [0061], [0088], [0158]; *see also* Iizuka, [0169]. Next, the call management server completes the connection with IP telephone, fully establishing the SIP session between the mobile terminal and the IP telephone. Iizuka, [0058]. The VoIP call is started after this SIP session has been established. Iizuka, [0158]; *see also* Iizuka, [0169]; Figs. 13-14.

c. Element [39.b]

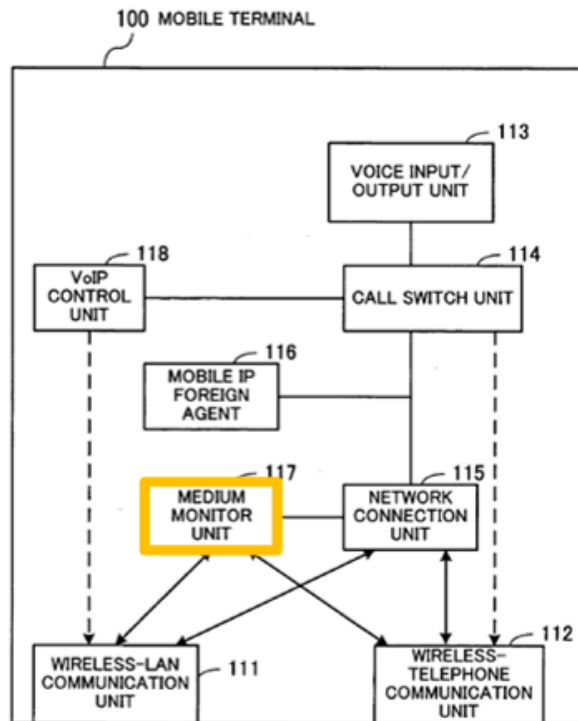
231. **Element [39.b] recites “monitoring a signal strength of the first wireless communication link.”** This element is met by Iizuka.

232. Iizuka discloses monitoring a signal strength of the first wireless communication link (*e.g.*, monitoring “intensity of a radio wave” transmitted from wireless LAN to mobile terminal 100). *See, e.g.*, Iizuka:

- **Fig. 2:**



- Fig. 4:



“monitoring a signal strength”

FIG. 4

- [0045]: “The condition of the connection realized by the call-through-LAN unit 1 b (which is used as a reference for determining whether or not the connection is to be switched) can be determined based on, *for example, the intensities of signals received from an access point, to which the LAN is to be connected.* In this case, a threshold value of the intensities of signals can be determined to be the predetermined criterion.”
- [0078]: “The medium monitor unit 117 monitors the conditions of the network mediums. That is, the medium monitor unit 117 *monitors the conditions of the wireless-LAN communication unit 111 and the wireless-telephone communication unit 112, and passes to the network connection unit 115 information on the conditions of the connections connected to the wireless-LAN communication unit 111 and the wireless-telephone communication unit 112.*”
- [0105]: “Specifically, the call switch unit 114 outputs to the network connection unit 115 a request for information on a communication medium which is currently usable. Then, *the network connection unit 115 receives from the medium monitor unit 117 information indicating the conditions*

of communication at the wireless-LAN communication unit 111 and the wireless-telephone communication unit 112. For example, the medium monitor unit 117 passes to the network connection unit 115 information indicating the intensity of a radio wave which the wireless-LAN communication unit 111 can receive from the wireless LAN access point 23 and information indicating the intensity of a radio wave which the wireless-telephone communication unit 112 can receive from a base station of the mobile telephone network 10.”

- [0060]: “A wireless LAN access point 23 is connected to the Internet 11, and performs communication with the mobile terminals 100 and 100 a through the wireless LAN.”
- [0061]: “The mobile terminals 100 and 100 a each have a function of making a call through the mobile telephone network 10 and a function of making a VoIP call through the Internet 11. When each of the mobile terminals 100 and 100 a makes a call through the Internet 11, the mobile terminal performs wireless communication with the wireless LAN access point 23, and establishes a connection between the mobile terminal and the call-management server 200 through the wireless LAN access point 23.”
- [0106]: “In the present embodiment, the functions of the wireless-LAN communication unit 111 can be stopped during the absence of communication. In this case, *the medium monitor unit 117 confirms the condition of a connection through the wireless LAN* by activating the wireless-LAN communication unit 111.”
- [0159]: “[Step S62] Thereafter, when *communication through the wireless LAN becomes impossible (for example, when the condition of the communication deviates from a predetermined criterion)*, the network connection unit 115 notifies the call switch unit 114 of the condition of the communication.”
- [0170]: “[Step S77] Thereafter, the mobile terminal 100 detects the condition of the radio wave. When the mobile terminal 100 determines that use of the wireless LAN is impossible, the mobile terminal 100 originates a PSTN call to the switching processing unit 212 by dialing.”

233. Iizuka discloses that the mobile terminal monitors the signal strength of communication link between the mobile terminal and the wireless LAN (see [39.a]).

For example, mobile terminal 100 includes a medium monitor unit 117 that “monitors the conditions of the network mediums.” Iizuka, [0078], [0105]. This monitoring process involves detecting the “intensity of a radio wave” received from a wireless access point, including wireless LAN access point 23. Iizuka, [0045], [0105]. A measure of the intensity of a radio wave is a measure of signal strength, and at minimum it would have been obvious to measure signal strength as part of “intensity” in determining whether to switch networks. For example, a person of ordinary skill in the art would have understood that the intensity of a radio wave refers to the amount of power carried by the wave per unit area as it is received, which is correlated to the received signal strength.

234. During the VoIP call (*see* [39.a]), mobile terminal 100 communicates with wireless LAN access point 23 through the wireless LAN, receiving radio waves from wireless access point 23 as part of this communication. Iizuka, [0060]-[0061], [0159]; *see also* Iizuka, [0170]. The mobile terminal’s medium monitor unit measures the signal strength of these radio waves to, for example, determine “when the condition of the communication deviates from a predetermined criterion.” Iizuka, [0159]; *see also* Iizuka, [0170].

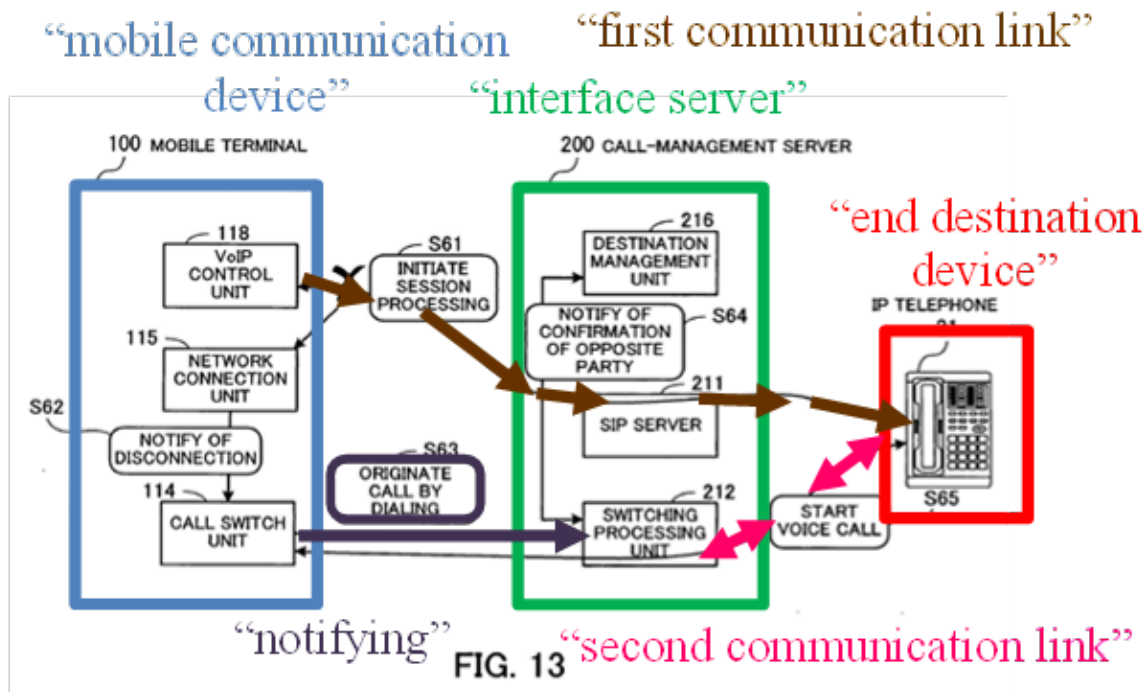
d. Element [39.c]

235. **Element [39.c] recites “when the signal strength drops below a threshold, notifying an interface server and establishing a second**

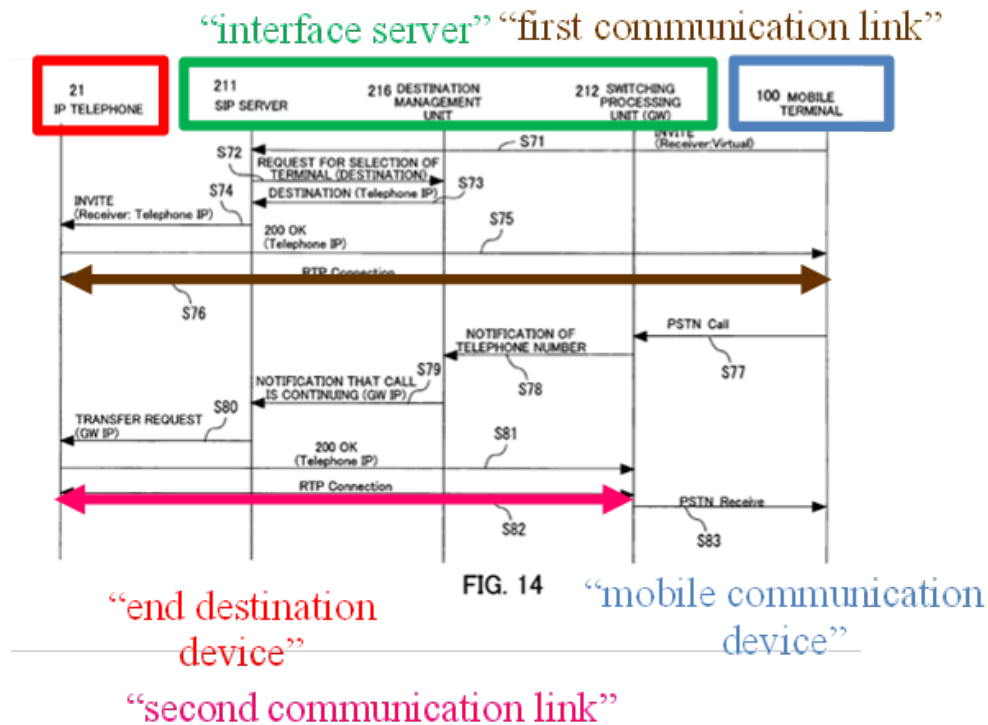
communication link between the interface server and the end destination device without disrupting the first communication link.” This element is met by Iizuka.

236. Iizuka discloses when the signal strength drops below a threshold (*e.g.*, when “intensity of signal[]” is below “predetermined criterion” or “threshold value” such that “communication through the wireless LAN becomes impossible”), notifying an interface server (*e.g.*, “originat[ing] a call to the switching processing unit 212 in the call-management server 200”) and establishing a second communication link between the interface server and the end destination device (*e.g.*, establishing “voice call through the mobile telephone network 10” between call-management server 200 and IP telephone 21) without disrupting the first communication link (“VoIP call” (*see* [39.a]) “still continues” while voice call is being established). *See, e.g.*, Iizuka:

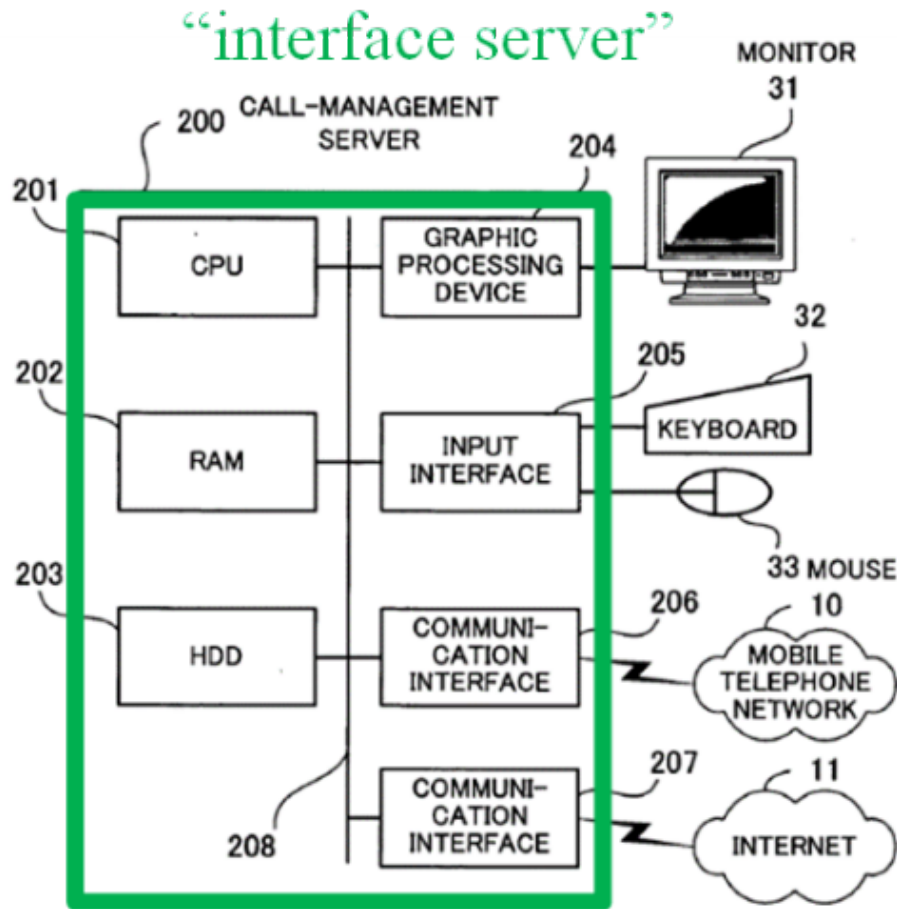
- **Fig. 13:**



• Fig. 14:



- Fig. 5:



- [0159]: “[Step S62] Thereafter, *when communication through the wireless LAN becomes impossible (for example, when the condition of the communication deviates from a predetermined criterion), the network connection unit 115 notifies the call switch unit 114 of the condition of the communication.*”
- [0160]: “[Step S63] *The call switch unit 114 originates a call to the switching processing unit 212 in the call-management server 200 by dialing.*”
- [0175]: “[Step S82] *A connection for originated call is established between the IP telephone 21 and the switching processing unit 212.*”

- [0146]: “[Step S56] The mobile terminal 100 recognizes the call originated by the switching processing unit 212, and detects the condition of the radio wave in the wireless LAN. At this time, the mobile terminal 100 detects that *the condition of the radio wave is not sufficiently good to perform communication (i.e., connection through the wireless LAN is impossible)*, and transmits a PSTN response (“PSTN receive”) to the switching processing unit 212.”
- [0057]: “FIG. 2 is a diagram illustrating an example of a construction of a system of the embodiment of the present invention. In the present embodiment, a mobile telephone network 10 and the Internet 11 containing a wireless LAN are provided as the communication mediums through which calls can be made. *An IP telephone 21 is connected through a call-management server 200 to the mobile telephone network 10 and the Internet 11.* The IP telephone 21 has a function of making a VoIP call.”
- [0058]: “*The call-management server 200 is connected to the mobile telephone network 10 and the Internet 11* performs medium conversion between the telephone line and the VoIP, and transfers call data. In addition, the call-management server 200 establishes and switches connections between the IP telephone 21 and the mobile terminals 100 and 100 a.”
- [0084]: “The communication interface 206 is connected to the mobile telephone network 10, and exchanges data with the mobile terminals 100 and 100 a through the mobile telephone network 10.”
- [0085]: “The communication interface 207 is connected to the Internet 11, and exchanges data with the mobile terminals 100 and 100 a through the Internet 11.”
- [0069]: “FIG. 4 is a block diagram illustrating functions of the mobile terminal 100. *The mobile terminal 100 comprises* a wireless-LAN communication unit 111, a wireless-telephone communication unit 112, a voice input/output unit 113, *a call switch unit 114*, a network connection unit 115, a mobile IP foreign agent (FA) 116, a medium monitor unit 117, and a VoIP control unit 118. These functions are realized by the control circuit 110 controlling the devices around the control circuit 110.”
- [0073]: “The call switch unit 114 activates the VoIP control unit 118 and performs a telephone dialing operation in response to a request from the

user for a call. In addition, when the mobile terminal 100 receives an incoming call, and a communication circuit through an interface network is selected, the call switch unit 114 activates the VoIP control unit 118. Further, *the call switch unit 114 switches calls between the wireless LAN and the wireless telephone network according to the conditions of a connection through the wireless LAN* and a connection through the wireless telephone network. The network connection unit 115 supplies an instruction for the switching operation to the call switch unit 114.”

- [0170]: “[Step S77] Thereafter, the mobile terminal 100 detects the condition of the radio wave. When the mobile terminal 100 determines that use of the wireless LAN is impossible, the mobile terminal 100 originates a PSTN call to the switching processing unit 212 by dialing.”
- [0175]: “[Step S82] A connection for originated call is established between the IP telephone 21 and the switching processing unit 212.”
- *See also* [0171]-[0174]

237. See my discussion of elements [39.a]-[39.b] above (Section IX.A.2.b and IX.A.2.c).

238. Iizuka discloses that the mobile terminal informs an interface server when the signal strength drops below a threshold. For example, mobile terminal 100 monitors the signal strength of the communication through the wireless LAN (*see* [39.b]) to determine when the communication degrades to the point that it becomes “impossible.” Iizuka, [0159], [0170]. This occurs when the mobile terminal detects that the signal strength has weakened sufficiently, and, thus, “deviates from a predetermined criterion.” Iizuka, [0159]; *see also* Iizuka, [0170], [0146]. When this criterion is detected, the mobile terminal 100 notifies the call-management server 200 by “originat[ing] a call to the switching processing unit 212 in the call-

management server 200 by dialing.” Iizuka, [0159]-[0160]; *see also* Iizuka, [0170]. The call-management server 200 is an interface server at least because it interfaces with both the wireless LAN and mobile telephone network (*see* [39.pre]). Iizuka, [0057]-[0058].

239. Iizuka discloses establishing a second communication link between the interface server and the end destination device without disrupting the first communication link. For example, after being dialed, the switching processing unit 212 in call-management server 200 establishes a voice call through the mobile telephone network 10 to IP telephone 21. Iizuka, [0160]-[0162], [0170]-[0175]. This voice call is established while the VoIP call (*see* [39.a]) “still continues.” Iizuka, [0162].

240. As part of this process of establishing a voice call, the method proceeds in stages. A second communication link (an RTP (Real-time Transport Protocol) connection for real-time audio streams) is established between the interface server and the end destination device as depicted by arrow “S82” in Iizuka’s Fig. 14. Iizuka, Fig. 14, [0175]. The subsequent step that redirects this link to the mobile terminal is discussed below in connection with [39.e].

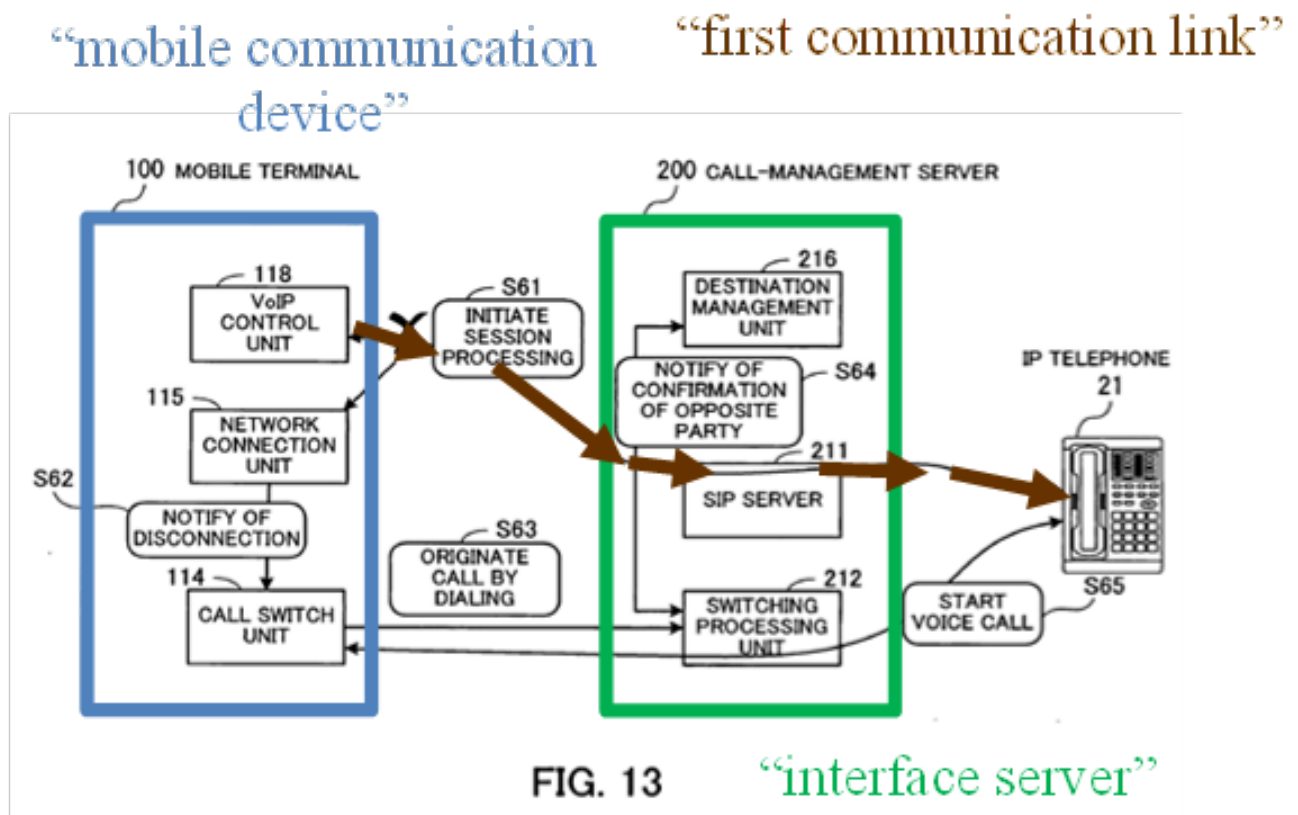
e. Element [39.d]

241. **Element [39.d] recites “notifying the mobile communication device to terminate transmission over the first communication link.”** This element is

rendered obvious by Iizuka.

242. Iizuka renders obvious notifying the mobile communication device to terminate transmission over the first communication link (e.g., notifying mobile terminal to terminate transmission before “SIP server 211” of “call-management server 200” disconnects session that was established through Internet 11 between mobile terminal 100 and call-management server 200). *See, e.g., Iizuka:*

- **Fig. 13:**



- **Fig. 14:**

“interface server” “first communication link”

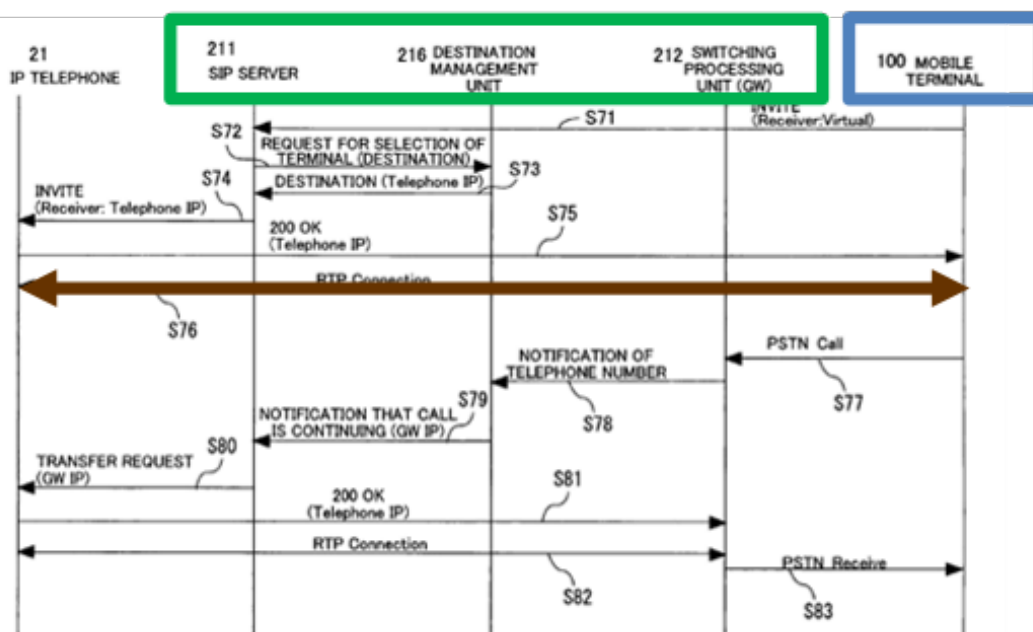


FIG. 14 “mobile communication device”

- [0162]: “[Step S65] The switching processing unit 212 realizes a voice call through the mobile telephone network 10 while the VoIP call which has already been established still continues. Thereafter, *the SIP server 211 disconnects the session which has been established through the Internet 11 between the mobile terminal 100 and the call-management server 200.*”
- [0158]: “[Step S61] After an SIP session is initiated between the mobile terminal 100 and the IP telephone 21, a VoIP call is started.”
- [0052]: “Further, when the condition of the connection realized by the call-through-LAN unit 1 b deviates from the predetermined criterion during a call through the call-through-LAN unit 1 b, the call switch unit 1 c establishes a connection through the call-through-telephone-network unit 1 a, and switches from the call through the call-through-LAN unit 1 b to a call through the call-through-telephone-network unit 1 a. That is, the call-through-telephone-network unit 1 a originates a call to the call-management server 2 through the wireless telephone network 4. In response to the origination of the call, the call-through-telephone-network

management unit 2 a in the call-management server 2 establishes a connection between the mobile terminal 1 and the telephone equipment 5 through the wireless telephone network 4. ***Then, the call-through-LAN management unit 2 b disconnects a corresponding session which has been established between the mobile terminal 1 and the call-management server 2 through the wireless LAN 3.***

- [0176]: “The switching processing unit 212 returns to the mobile terminal 100 a response to the origination of the call by dialing, and establishes a connection through the mobile telephone network 10. Thus, a call between the IP telephone 21 and the mobile terminal 100 becomes possible.”

243. Iizuka discloses terminating transmission over the first communication link (the VoIP call; *see* [39.a]). For example, Iizuka discloses that SIP server 211, located within call-management server 200, “disconnects the session which has been established through the Internet 11 between the mobile terminal 100 and the call-management server 200.” Iizuka, [0162]; *see also* Iizuka, [0176]. Iizuka further discloses that the mobile terminal is involved in the termination process: “call-through-LAN management unit 2b [of mobile terminal] disconnects a corresponding session which has been established between” the mobile terminal and call-management server through the wireless LAN. Iizuka, [0052]. The disconnected session formed one leg of the complete SIP session established between the mobile terminal 100 and the IP telephone 21, as part of the VoIP call. Iizuka, [0158]. By disconnecting the session between the mobile terminal 100 and the call-management server 200, the transmission over the VoIP call is terminated.

244. A person of ordinary skill in the art would have understood, or at

minimum found obvious, that to disconnect (and thereby terminate transmission over) a SIP session with the mobile terminal, the server notifies the mobile terminal by sending a message a SIP BYE message such that the mobile phone knows to disconnect the session. For example, a person of ordinary skill in the art would understand that a SIP BYE message is a typical message used in SIP protocol to allow a mobile terminal to have a synchronized understanding that communication session termination is imminent. As one example, Preston (U.S. Patent Pub. 2002/0126654) discloses that a server (“server module 38”) “will send a SIP BYE message (step 236) to the SIP proxy server 20,” which will then “forward the BYE message to the SIP telephone (step 238).” Ex. 1008, [0043]. Then, the “SIP telephone will respond with a 200 OK (step 240) to the SIP proxy server 20, which will forward the 200 OK to the server module 38 to officially end the communication (step 242).” Ex. 1008, [0043]. As another example, U.S. Patent Pub. 2007/0146475 discloses transmitting a “BYE request signal” to “wireless communication terminal (10B)” followed by a response to finish the connection. Ex. 1021, [0103]; *see also* Ex. 1021, [0119] (disclosing “transmi[ting] a BYE signal to the wireless communication terminal (10B),” to “thereby finish connection.”). Therefore, Iizuka renders obvious notifying the mobile terminal to terminate transmission over the first communication link.

f. Element [39.e]

245. Element [39.e] recites “re-directing the second communication link from the interface server to another mobile communication device, thereby establishing a second wireless communication link between the mobile communication device and a second wireless network.” This element is met by Iizuka.

246. Iizuka discloses re-directing the second communication link (*e.g.*, voice call over RTP connection; *see* [39.c]) from the interface server (*e.g.*, from “call-management server 200”) to another mobile communication device (*e.g.*, to “mobile terminal 100” by providing response), thereby establishing a second wireless communication link between the mobile communication device and the second type of wireless network (*e.g.*, providing response “establishes a connection” to mobile terminal 100 “through the mobile telephone network 10”). *See, e.g.*, Iizuka:

- **Fig. 2:**

“mobile communication device”

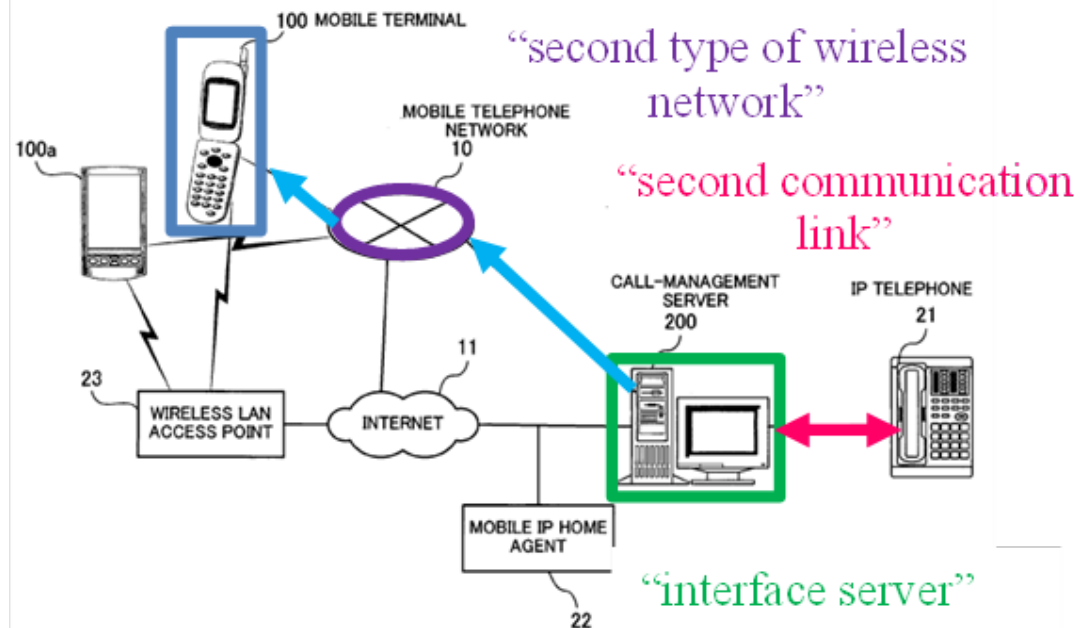


FIG. 2

“second wireless communication link between the mobile communication device and the second type of wireless network”

- Fig. 4

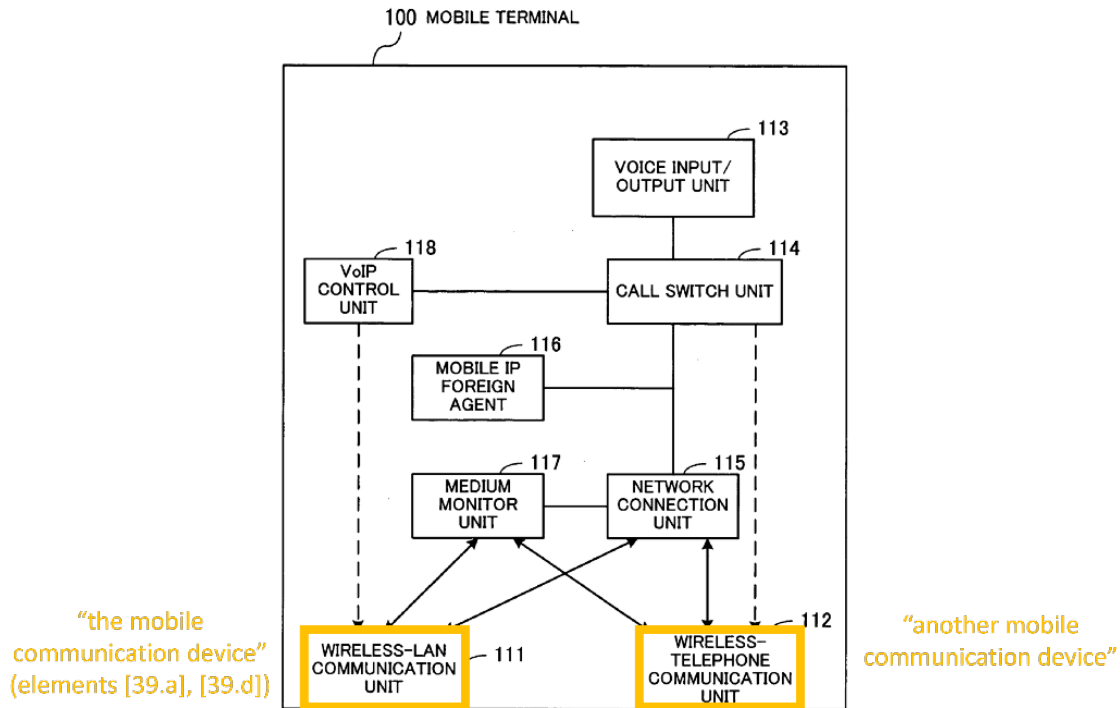
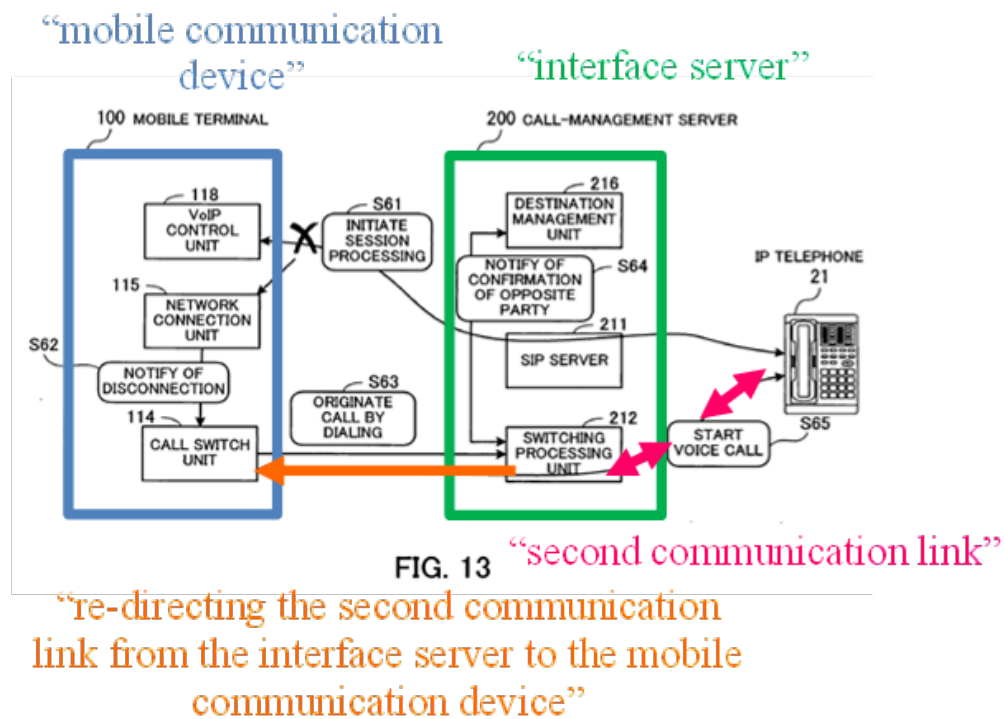
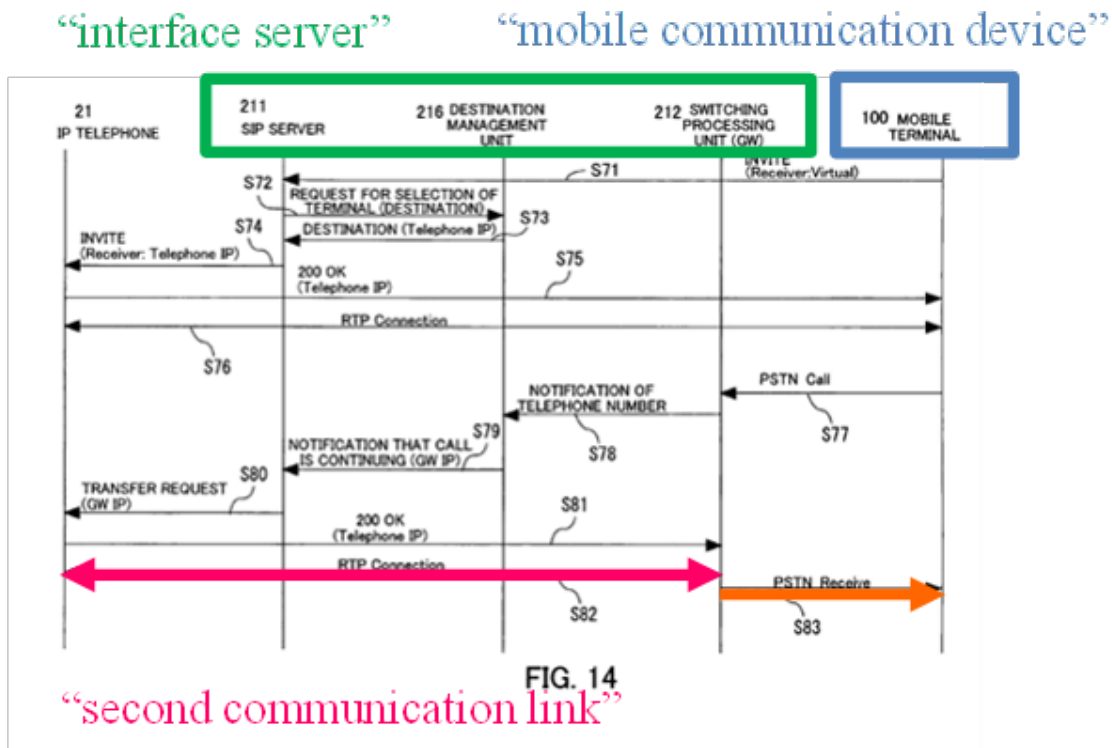


FIG. 4

- Fig. 13:



- Fig. 14:



“re-directing the second communication link from the interface server to the mobile communication device”

- [0160]: “[Step S63] The call switch unit 114 originates a call to the switching processing unit 212 in the call-management server 200 by dialing.”
- [0176]: “[Step S83] The switching processing unit 212 *returns to the mobile terminal 100 a response* to the origination of the call by dialing, and *establishes a connection through the mobile telephone network 10*. Thus, a call between the IP telephone 21 and the mobile terminal 100 becomes possible.”
- [0162]: “[Step S65] The switching processing unit 212 *realizes a voice call through the mobile telephone network 10* while the VoIP call which has already been established still continues. Thereafter, the SIP server 211 disconnects the session which has been established through the Internet 11 between the mobile terminal 100 and the call-management server 200.”

247. Iizuka discloses re-directing the second communication link from the call-management server 200 to mobile terminal 100. For example, after the second communication link between the call-management server 200 and IP telephone 21 is established by making a voice call to IP telephone 21 over an RTP link (*see* [39.c]), the switching processing unit 212 of the call-management server 200 returns a response to mobile terminal 100. Iizuka, [0176]; *see also* Iizuka, [0162]. This response “establishes a connection through the mobile telephone network 10” between call-management server 200 and mobile terminal 100. Iizuka, [0176]; *see also* Iizuka, [0162]. Thus, this response, labeled “PSTN Receive” in step S83 in Fig. 14, establishes the second communication link between the call-management server 200 and mobile terminal 100. Iizuka, Fig. 14, [0176]; *see also* Iizuka, [0162]. As illustrated in Figure 2, the “PSTN receive” process passes through mobile telephone network 10, such that a wireless connection for this communication link is established between mobile terminal 100 and mobile telephone network 10. Thereafter, a voice call between the IP telephone 21 and the mobile terminal 100 through mobile telephone network 100 becomes possible. Iizuka, [0176]; *see also* Iizuka, [0162].

248. To the extent it is argued “another mobile communication device” requires a different mobile communication device than the “mobile communication device” referenced in [39.a] and [39.d], wireless-LAN communication unit 111 is

the mobile communication device because wireless-LAN communication unit 111 communicates with IP telephone 21 as required by [39.a] and communicates with call-management server 200 to receive notifications therefrom. For example, discloses “when the call-management server 200 establishes a connection between the wireless-LAN communication unit 111 and the IP telephone 21, the wireless-LAN communication unit 111 performs communication with the IP telephone 21.” Iizuka [0070], Fig. 4. Thus, when mobile terminal 100 communicates with IP telephone 21 (an end device), wireless-LAN communication unit 111 performs the communication with IP telephone 21 (as required of the “mobile communication device” in [39.a]. In addition, wireless-LAN communication unit 111 “performs communication with the call-management server 200 through the wireless LAN or the Internet 11.” Iizuka, [0070]. Thus, if mobile terminal 100 receives an indication from call-management server 200 that mobile terminal 100 is to stop communication over the wireless-LAN connection, that message is received by wireless-LAN communication unit 111.

249. In addition, wireless-telephone communication unit 112 is “another mobile communication device” to which communication from call-management server 200 described above is re-directed. For example, wireless-telephone communication unit 112 “performs communication with the call-management server 200 through the mobile telephone network 10,” such that “when the call-

management server 200 establishes a connection between the wireless-telephone communication unit 112 and the IP telephone 21, the wireless-telephone communication unit 112 performs communication with the IP telephone 21.” Iizuka, [0071]. Moreover, wireless-telephone communication unit 112 causes itself to perform the steps of [39.f]-[39.g] discussed in detail below.

g. Element [39.f]

250. **Element [39.f] recites “wherein upon activation of a timer, the mobile communication device causes a communication module to change state from a sleep mode to a stand-by mode.”** This element is met by Iizuka in view of Donovan.

251. Iizuka discloses the mobile communication device (*e.g.*, “mobile terminal 100”) and a communication module (*e.g.*, “wireless-telephone communication unit 112”).

252. See my discussion of elements [39.a]-[39.e] above (Section IX.C.3.b-f).

253. Donovan discloses upon activation of a timer (*see* [1.c]) causing a communication module (*see* [1.c]) to change state from a sleep mode (*see* [1.c]) to a stand-by mode (*see* [1.c]).

254. See my discussion of element [39.c] above (Section IX.A.4.d).

255. As I discussed in Section IX.C.2, a person of ordinary skill in the art

would have been motivated to apply Donovan’s teachings of switching from a sleep mode to a stand-by mode to Iizuka’s wireless-telephone communication unit.

h. Element [39.g]

256. Element [39.g] recites “**the mobile communication device causes the communication module to change state from the stand-by mode to an active mode before a communication is switched to the communication module.**” This element is met by Iizuka in view of Donovan.

257. Iizuka discloses the mobile communication device (*see* [39.a]) causes the communication module (*see* [39.f]) to change state to an active mode (*e.g.*, “activates the wireless-telephone communication unit 112”) before a communication is switched to the communication module (*e.g.*, “wireless-telephone communication unit 112” fully activated before call is handed over in S83). *See, e.g.*, Iizuka:

- [0105]: “[N]etwork connection unit 115 *activates the wireless-telephone communication unit 112....*”

258. See my discussion of elements [39.pre]-[39.e] above (Section IX.C.3.a-f).

259. As I explained in my discussion of claim limitation [39.c] (Section IX.C.3.d), mobile terminal 100 “originate[s] a call” to call-management server 200 over a wireless network, which involves “activat[ing]” wireless-telephone communication unit 112 before mobile device 100 completes handover to begin

communications over the wireless telephone network in step S83. Iizuka, [0105], [0114].

260. Donovan discloses the stand-by mode (*e.g.*, a “wakeup” period).

261. See my discussion of element [39.f] above (Section IX.C.3.g).

As I discussed in Section IX.C.2, a person of ordinary skill in the art would have been motivated to apply Donovan’s teachings of a stand-by mode to Iizuka’s wireless-telephone communication unit.

D. GROUND 4: Ground 3 in view of Preston (Claim 39)

262. To the extent it is argued that further disclosure is required of “notifying the mobile communication device to terminate transmission over the first communication link” (limitation [39.d]), Iizuka in view of Donovan and Preston renders obvious this limitation.

263. For example, Preston discloses that a “SIP proxy server” transmits a “SIP BYE message” to “SIP telephone 38.” Preston, [0043]. After receiving such a message and replying with an “OK” message, SIP proxy server proceeds to “officially end the communication.” Preston, [0043]. Thus, Preston discloses that terminating a transmission includes the step of notifying the mobile device in the form of transmitting to it a SIP BYE message.

264. Like Iizuka and Donovan, Preston is in the same field as the ’996 patent—which includes wireless communications systems—and is reasonably

pertinent to the problems purportedly addressed by the '996 patent—e.g., maintaining a strong network connection without compromising communication quality. *See* Preston, [0008], [0018]-[0021], [0044]; *see* Section IX.C.3. For example, both Iizuka and Preston disclose optimal wireless communication sessions with no interruption. Iizuka, [0093], [0162]; Preston, [0020]-[0021] (“The IP network 12 may be coupled to disparate networks, such as the PSTN 14, via a gateway 16 to facilitate communications with circuit-switched telephony devices 18. The gateway 16 will facilitate protocol conversions and data manipulations necessary to establish media flows or call processing between the networks in traditional fashion.”), Fig. 1.

265. A person of ordinary skill in the art would have been motivated to apply Preston’s teachings of transmitting to a mobile terminal “a SIP BYE message” before terminating a SIP session (communication link) to Iizuka’s roaming method to advantageously inform a mobile communication device that it should cease transmitting over the first communication link because the link is being terminated. Iizuka’s call-management server 200 includes a SIP server 211, which manages VoIP communications. Iizuka, [0087]-[0088], [0093]. Iizuka aims to “smoothly” switch an ongoing VoIP call between a mobile terminal and an IP telephone to a voice call, seeking to “prevent [any] interruption[s] of [this] communication,” and further teaches “disconnect[ing] the [SIP] session which has been established

through the Internet 11 between the mobile terminal 100 and the call-management server 200,” but does not provide all of the details regarding the mechanism for terminating the SIP session. Iizuka, [0010], [0033], [0093], [0099], [0162]. In my opinion, a person of ordinary skill in the art would have looked to a reference like Preston, which teaches how to terminate a SIP session (including by transmitting a SIP BYE message from the SIP server to the telephone), in connection with terminating Iizuka’s VoIP call that uses a SIP session managed by a SIP server, in order to disconnect the session as taught by Iizuka. A person of ordinary skill in the art would have understood that explicitly signaling to the mobile terminal to cease communication over that link would have advantageously prevented the mobile terminal from erroneously sending signals that would otherwise have been lost, thus avoiding disruptions to the call. *See, e.g.*, Preston, [0043].

266. In view of the above, a person of ordinary skill in the art would have had a reasonable expectation of success and would have found the application of this functionality in Iizuka’s method to be a straightforward modification, as Iizuka already describes the mobile terminal using the SIP protocol to communicate with, for example, a call-management server that includes a SIP server. Iizuka, [0087]-[0088], [0158], [0162]. Applying Preston’s teachings would have involved the simple step of adding the transmission of a SIP control signal to the overall SIP communication protocol (to the extent Iizuka does not already include it), and a

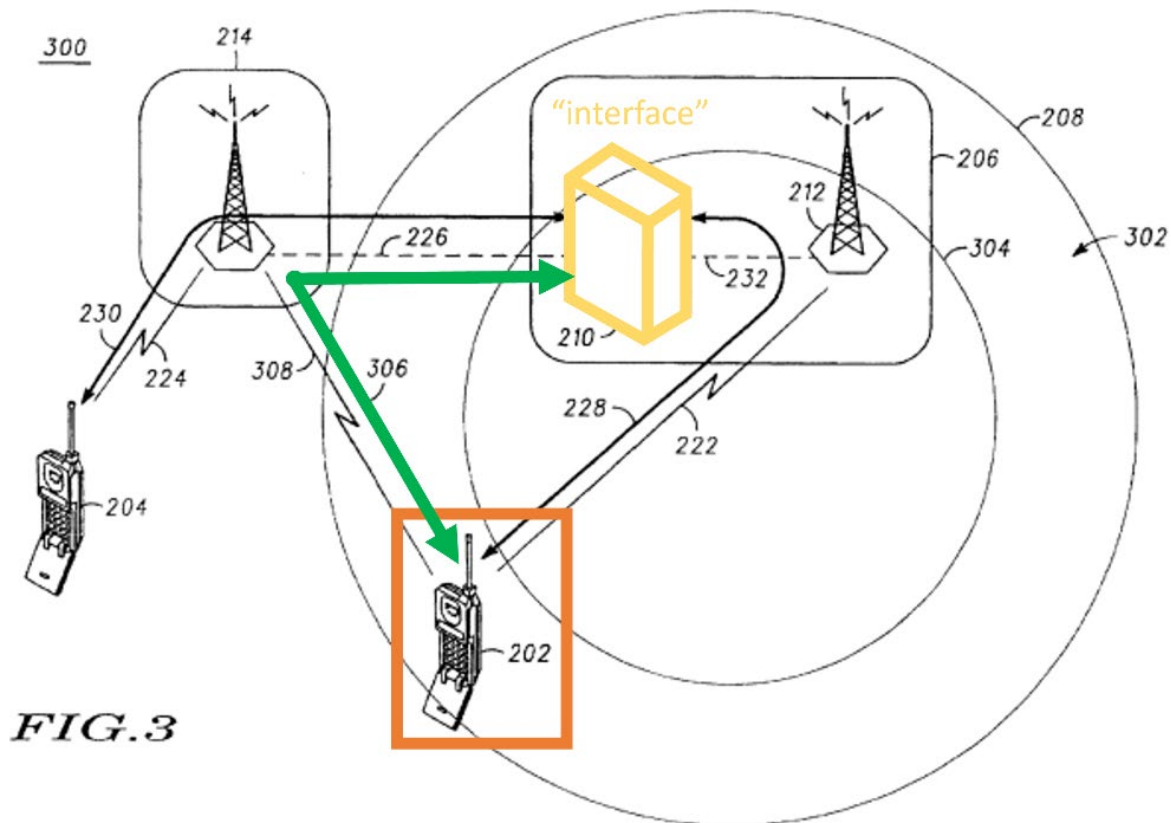
person of ordinary skill in the art would have known such a combination would predictably work and provide the expected functionality. Preston, [0019].

E. GROUND 5: Ground 3 in view of Pan (Claim 41)

1. Overview of Pan (Ex. 1009, U.S. Patent App. Pub. 2004/0002335)

267. Pan discloses **media gateway 210** manages calls carried over communication network 206 (e.g., “WLAN”) and second network 214 with a base station (a cellular network). [0030], [0032]. “The **media gateway 210**, detects that the mobile station 202 has reached the outer boundary 208 by measuring the radio signal strength of the mobile station perceived by the access point 212.” Pan, [0040]. Once “the radio signal strength reach[es] a first predetermined minimum threshold value, **the media gateway 210** determines whether **the mobile station 202** will move back toward the access point 212 such that its signal will improve, or move away from the access point such that communication with the mobile station must be handed-over to the second network 214 in order to maintain the established call.” Pan, [0040]. Pan teaches that “a timer may be set to determine whether the **mobile station 202** will return to coverage area such that its signal will improve, or move outside the range of coverage area such that it must handover to the cellular network.” Pan, [0040]. “Once the communication network 206 detects that the radio signal strength from **mobile station 202** has reached a second predetermined minimum threshold value, which is less than the first predetermined minimum

threshold value, handover procedures are initiated,” and “media gateway 210 commands the mobile station 202 to **place a second call**” via communication link 306. Pan, [0040]-[0042].



2. Motivation to Apply Pan’s Teachings to Iizuka in view of Donovan

268. Like Iizuka and Donovan, Pan is in the same field as the ’996 patent—which includes wireless communications systems—and is reasonably pertinent to the problems purportedly addressed by the ’996 patent—e.g., maintaining a strong network connection without compromising communication quality. *See* Pan, [0026] (“[B]ecause all calls are routed through a media gateway, each handover of a mobile station between a networks is a “make before break” soft handover and control of

each handover is implemented by a media gateway without intervention or control by a carrier network.”); *see* Section IX.C.3. For example, both Iizuka and Pan disclose employing communication interfaces in communications handover systems. Iizuka, [0084]-[0085]; Pan, [0027] (“[T]he media gateway of the present invention does not handover control of a communication with a mobile station to a carrier network. Instead, the media gateway retains control of the communication as the mobile station re-locates from one network to another network. In particular, when a mobile station and a remote station have a call that is directed through the media gateway, the media gateway has one connection to the mobile station and another connection to the remote station.”).

269. A person of ordinary skill in the art would have been motivated to apply Pan’s teachings of an interface to Iizuka’s wireless-telephone communication unit (as modified by Donovan) to cause the wireless-telephone communication unit to wake up to advantageously maintain a connection when the signal received by the network from the mobile device is weak. For example, the signal received from the mobile device at the network may be weak, while the signal received from the network at the mobile device is strong. This could occur, for example, if the phone is unable to communicate with enough power to reach the network with a good quality signal, while the network is able to communicate with sufficient power to reach the phone with a good quality signal. In this scenario, relying on the mobile

device's detected signal strength alone would not indicate the connection is weak. Pan addresses this problem by allowing the network to provide an indication of the signal strength it receives.

270. A person of ordinary skill in the art would have had a reasonable expectation of success and would have found the application of this functionality in Iizuka's system (as modified by Donovan) to be a straightforward modification. First, Iizuka already provides a mechanism for the call management server 200 to communication with the mobile terminal 100, as Iizuka explains its "call management server 200" includes a communication interface 206. Iizuka, [0081]. The "communication interface 206" ("interface") is operable to "exchange[] data with the mobile terminals 100 and 100 a through the mobile telephone network" and "exchange[] data with the mobile terminals 100 and 100 a through the Internet 11." Iizuka, [0084]-[0085]. Second, Iizuka's mobile terminal 100 already includes a call switch unit 114 that relies on signal strength to determine when to switch networks. For example, "the medium monitor unit 117 passes to the network connection unit 115 information indicating the intensity of a radio wave which the wireless-LAN communication unit 111 can receive from the wireless LAN access point 23." Iizuka, [0105]. In this regard, "a threshold value of the intensities of signals can be determined to be the predetermined criterion." Iizuka, [0045]. "Thereafter, when communication through the wireless LAN becomes impossible (for example, when

the condition of the communication deviates from a predetermined criterion), the network connection unit 115 notifies the call switch unit 114 of the condition of the communication.” Iizuka, [0159]. Based on the detected signals strength, the mobile terminal 100 attempts to establish a call via the mobile switch unit 114. Iizuka, [0160] (“Thereafter, when communication through the wireless LAN becomes impossible (for example, when the condition of the communication deviates from a predetermined criterion), the network connection unit 115 notifies the call switch unit 114 of the condition of the communication.”).

271. Accordingly, a person of ordinary skill in the art would have had a reasonable expectation of success in applying Pan’s teachings of switching based on signal strength detection in the network to Iizuka (as modified by Donovan), and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality.

3. Invalidity of Claim 41 Over Iizuka in view of Donovan and Pan

272. As I discuss below, Claim 41 is rendered obvious by Iizuka in view of Donovan and Pan. In addition to my discussion in Section IX.E.1-2, the following discussion identifies example disclosures followed by bulleted excerpts that each disclose Claim 41.

a. Element [41.pre]

273. **Element [41.pre] recites “A method comprising.”** See my discussion

of element [39.pre] above (Section IX.C.3.a).

b. Element [41.a]

274. Element [41.a] recites “**monitoring a context of a first wireless communication link.**” See my discussion of element [39.b] above (Section IX.C.3.c).

c. Element [41.b]

275. Element [41.b] recites “**when a network is detected as available with a second wireless communication link with a context preferable to the first wireless communication link, notifying an interface and establishing the second communication link between the interface and an end destination device without disrupting the first communication link.**” This element is met by Iizuka.

276. Iizuka discloses when a network (*e.g.*, “wireless LAN”) is detected as available (*e.g.*, “communication...is possible”) with a second wireless communication link (*see* [39.c]) with a context preferable to the first wireless communication link (*e.g.*, “use of the wireless LAN is impossible”), notifying an interface (*see* [39.c]) and establishing the second communication link between the interface and an end destination device without disrupting the first communication link (*see* [39.c]). *See, e.g.*, Iizuka:

- **[0107]:** “The network connection unit 115 can determine whether or not communication can be realized through each communication medium (*i.e.*, whether or not to be able to secure a condition of communication which can guarantee a predetermined call quality level through each

communication medium), based on information on the intensity of a radio wave transmitted through the communication medium from the opposite party at one of the wireless-LAN communication unit 111 and the wireless-telephone communication unit 112 connected to the communication medium. Then, the network connection unit 115 notifies the call switch unit 114 *whether or not communication through each communication medium is possible.*”

- [0170]: “[Step S77] Thereafter, *the mobile terminal 100 detects the condition of the radio wave. When the mobile terminal 100 determines that use of the wireless LAN is impossible*, the mobile terminal 100 *originates a PSTN call* to the switching processing unit 212 by dialing.”

277. See my discussion of element [39.c] above (Section IX.C.3.d).

278. Iizuka discloses detecting when the second network is available. The mobile terminal can determine “whether or not communication can be realized through each [network],” which is based on the detected “intensity of a radio wave” (see [1.c]). Iizuka, [0107]; *see also* Iizuka, [0104]. A communication can be realized only when “the conditions of communication” would “guarantee a predetermined call quality level through” that network. Iizuka, [0107]. To guarantee a specific call quality level, the network must be able to meet certain conditions, which include, *inter alia*, parameters such as signal strength (and possible other conditions, such as bandwidth, and latency). If network does not meet certain conditions, then it effectively is unavailable to support communication through it. Thus, a person of ordinary skill in the art would have understood (or at minimum would have found it obvious) that Iizuka’s mobile terminal does not initiate the voice call to re-direct the ongoing VoIP call through the mobile telephone network (the second network)

unless it first detects that communication over the mobile telephone network is possible, which is a determination that the mobile network is available.

279. Iizuka discloses the mobile terminal determines the availability of the mobile telephone network is preferred over the wireless LAN, because the mobile terminal determines “use of the wireless LAN is impossible” based on the radio wave condition, and then starts the switching process. Iizuka, [0170], *see also*, Iizuka, [0159].

d. Element [41.c]

280. **Element [41.c] recites “re-directing the second communication link from the interface to a mobile communication device, thereby establishing the second wireless communication link between the mobile communication device and a second wireless network.”** See my discussion of element [39.e] above (Section IX.C.3.f).

e. Element [41.d]

281. **Element [41.d] recites “wherein upon activation of a timer, the interface causes a communication module to change state from a sleep mode to a stand-by mode, and the interface causes the communication module to change state from the stand-by mode to an active mode before a communication is switched to the communication module.”** Iizuka in view of Donovan and Pan renders obvious this limitation.

282. Iizuka discloses the interface (*e.g.*, “call-management server 200”) and a communication module changes state to an active mode (*e.g.*, “activates the wireless-telephone communication unit 112”) before a communication is switched to the communication module (*e.g.*, “wireless-telephone communication unit 112” fully activated before the call is handed over in S83).

283. See my discussion of elements [39.f]-[39.g] above (Section IX.C.3.g-h).

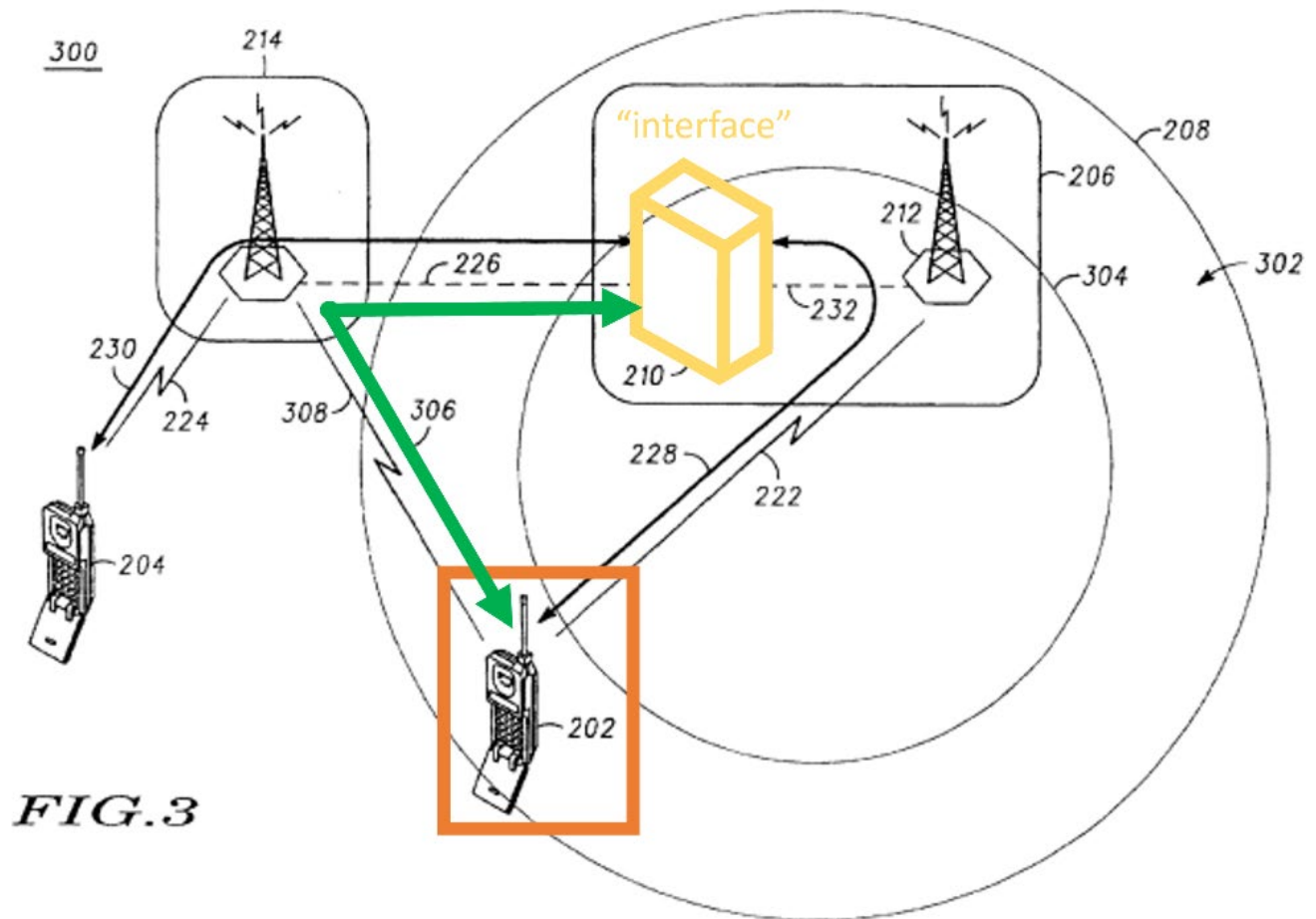
284. Donovan discloses upon activation of a timer (*e.g.*, “enables...the XOSC”) causing the communication module (*e.g.*, “wireless network communication device”) to change state from a sleep mode (*e.g.*, “transition from low power mode”) to a stand-by mode (*e.g.*, a “wakeup” period).

285. See my discussion of element [39.f] above (Section IX.C.3.g), which addresses the motivation to combine with Iizuka.⁵

⁵ I note that, while claim 41 does not specify the location of the timer, the inclusion of the timer inside the phone in this combination is consistent with the ’996 patent, which discloses a timer only inside the phone, such that an interface would not operate “upon activation of” the timer, but would instead cause the communication module to change state upon activation of the timer in the phone. ’996 patent, 4:52-54, Fig. 1.

286. Pan discloses an interface (e.g., “media gateway”) causes a communication module to communicate (e.g., “commands” “mobile station” to initiate handover to “second network” using “transceiver”). See, e.g., Pan:

• **Fig. 3:**



- [0030]: “[T]he communication network 206 may employ...a WLAN based air interface....”
- [0032]: “*The second network 214 includes one or more base stations that provide communication between the media gateway 210 and the remote station 204, and the communication network 206 includes one or more access points 212 that provide communication between the media gateway and the mobile station 202....*”
- [0040]: “[M]edia gateway 210 determines whether the mobile station 202 will move back toward the access point 212....Once the communication

network 206 *detects that the radio signal strength from mobile station 202 has reached a second predetermined minimum threshold value...*handover procedures are initiated.”

- [0042]: “[M]edia gateway 210 *commands the mobile station 202 to place a second call* to the media gateway. In response, *the mobile station 202 calls a predetermined number to establish* the second call and, thus, *the third connection line*, to the media gateway 210.”
- [0041]: “...[A] third connection line, *i.e., the outer mobile line 306...*”
- [0055]: “[M]obile station 202 *includes...second transceiver circuit 606 communicat[ing] with a second network...*”

287. Pan discloses media gateway 210 interfaces with communication network 206 (e.g., “WLAN”) and second network 214. Pan, [0030], [0032]. When mobile station 202 is connected to communication network 206, media gateway 210 makes a handover decision based on signal strength measured at access point 212. Pan, [0040]. Once media gateway 210 determines to perform handover, it “commands” “mobile station 202 to place a second call” with second network 214 using “second transceiver circuit 604.” Pan, [0042].

288. As I discussed in Section IX.A.3, a person of ordinary skill in the art would have been motivated to apply Pan’s interface-directed switching teachings to Iizuka’s system (as modified by Donovan).

289. When applying these teachings to Iizuka in view of Donovan, Iizuka’s call-management server 200 would command mobile terminal 100 to perform the “voice call” (*see* [39.c]) in response to call-management server 200 determining handover is required (based on Pan’s teachings). Then, a timer in Iizuka’s wireless-

telephone communication unit 112 would activate (based on Donovan’s teachings),⁶ and the wireless-telephone communication unit 112 would change state from sleep mode to stand-by mode, and then to active mode. See my discussion of [1.c] above in Section IX.A.4.d.

290. To the extent it is argued that activating the timer must correlate with the interface command, it would have been obvious to use the well-known concept of activating a timer before instructing the mobile terminal to handover (causing the activation of wireless-telephone communication unit 112), such that a subsequent handover instruction cannot issue before the timer expires. In this regard, as I note above in Section IX.E.1, Pan discloses using a “timer” to ensure that a device is actually leaving the coverage area of the network to which the mobile device is current connected to prevent an unwanted handoff. By using such a timer to delay a subsequent handover, this would similarly advantageously and predictably “avoid a condition in which a wireless device...keeps switching back and forth between [networks]” (Dorenbosch, [0044]) thus motivating a person of ordinary skill in the

⁶ While claim 41 does not specify the location of the timer, the ’996 patent discloses it only in the phone—thus, consistent with the ’996 patent, the claimed interface at least covers causing the communication module to change state upon activation of the timer in the phone. ’996 patent, 4:52-54, Fig. 1.

art to apply Pan's teaching of a timer in this manner.

X. SECONDARY CONSIDERATIONS

291. The Challenged Claims of the '996 patent are rendered obvious by the grounds presented herein. In my opinion, the strength of these grounds that I discuss above cannot be overcome by any alleged objective indicia.

292. Although I understand that Patent Owner has raised allegations of secondary considerations in the district court litigation (Ex. 1014, 36-47; Ex. 1015, 11-12), in my opinion Patent Owner has not demonstrated the required nexus between its allegations and the purported invention.

293. In addition, Patent Owner's allegations are conclusory and ostensibly relate to four different patents, but provide no explanation as to any nexus to any particular claim of the four patents, let alone the '996 patent claims. This gap in Patent Owner's analysis further confirms that there is no nexus between the alleged secondary considerations and the Challenged Claims of the '996 patent.

294. In addition to the lack of nexus, it is my opinion that Patent Owner's allegations of secondary considerations do not overcome the evidence of obviousness for the additional reasons set forth below.

295. **Commercial success:** Patent Owner provides no evidence of commercial success. While Patent Owner asserts that such success "will be shown" based on Samsung's own products (Ex. 1014, 37), the success of Samsung's own

products has no nexus to the Claims at least because the accused phone and tablet products include many unrelated features that drive their success.

296. **Long-felt need:** Patent Owner cites portions of U.S. Patent No. 8,886,181's specification as purported evidence of long-felt need, but these explanations are conclusory and self-serving (Patent Owner does not cite any evidence from anyone other than the inventor), and also do not show any alleged need was "long-felt." Ex. 1014, 38-39.

297. **Industry recognition:** Patent Owner cites an award that Samsung received for Wi-Fi Innovation, but Patent Owner has not shown the requisite nexus between that award and the Claims. *Id.*, 39. Patent Owner also argues that praise and recognition is shown by the fact that Vasu patents have been cited during prosecution of other patents, but Patent Owner does not explain how mere citation during prosecution is praise or recognition, and Patent Owner has not shown that any such citation was for any functionality that is in the Claims. *Id.*, 40-47.

298. **Skepticism in the industry:** Patent Owner argues that unidentified contemporaneous publications acknowledged the difficulty of developing the claimed invention, but Patent Owner does explain how purported challenges show "skepticism" and also does not even attempt to explain the requisite nexus to the Claims. *Id.*, 47.

299. **Copying:** Patent Owner argues that Samsung copied Patent Owner's technology, but Patent Owner's argument is conclusory and based only on alleged knowledge of "patents and application that Vasu had filed because they were cited as prior art against [Samsung's] own patent applications"—Patent Owner does not even allege that Samsung was aware of the '996 patent specifically, as opposed to other Vasu patents and application, and does not allege knowledge of the '996 patent before Samsung developed its products. Ex. 1014, 37, 47-53; Ex. 1013, 21-26, 76-77; Ex. 1015, 11-12.

300. To the extent Patent Owner asserts the existence of any additional secondary considerations in its responses, or presents additional evidence or arguments, I reserve my right to address any such evidence.

XI. CONCLUSION

301. In summary, I have concluded that the Challenged Claims are rendered obvious over the prior art references as discussed above. Specifically, in my opinion, for at least the reasons above, the Challenged Claims of the '996 patent obvious.

302. To the extent it is argued that any further disclosure is required for an element in the Challenged Claims that I have identified as being disclosed, a person of ordinary skill in the art would certainly have found that element obvious to include based on the sample explicit disclosure or inherent disclosures and analysis I have identified above.

303. I reserve the right to supplement my opinions in the future to respond to any arguments that Patent Owner or its expert(s) may raise and to take into account new information as it becomes available to me.

304. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

305. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further 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 Title 18 of the United States Code.

306. Executed this 24th day of January 2025, in Greenville, Texas.


Mr. Mark R. Lanning

APPENDIX A

Curriculum Vitae

Mark R. Lanning

4 Eagles Nest
Greenville, TX 75402-9027

Phone: 903-454-3399

Email: mark@telecom-architects.com

Mark R. Lanning

Mark is currently the President of Telecom Architects, Inc., I.N. Solutions, Inc.¹ and Reticle Consulting, LLC. Each of these companies provides professional consulting services and custom software development for one or more particular technical areas. I.N. Solutions (Intelligent Networking Solutions) was established in 1991 with an emphasis on applications design and network architecture engineering for telephone-based switching and Advanced Intelligent Networking systems. Telecom Architects was established in 1999 to provide specialized consulting services to fixed and wireless telecom service providers and their equipment suppliers. Reticle Consulting was created in 2009 to provide specialized consulting services for forensic software analysis and software source code comparison for software misappropriation cases.

Mark has over 35 years of engineering experience in all the development life cycle phases for hardware and software products. He has worked with both network operators and product suppliers regarding network architectures and product development and has acquired key insights into their perspectives and requirements as both suppliers and customers.

While working for three different product suppliers, Mark was directly responsible for the design, development and rollout of new products that have earned combined revenues in excess of one billion dollars for their respective companies. These products include: the DSC/Alcatel Signal Transfer Point (STP) product; the Telinq/ADC M13 transmission multiplexer and analyzer products; and the Tandem/HP Service Control Point (SCP), Service Management System (SMS); Service Creation Environment (SCE) products and their applications.

Since starting I.N. Solutions in 1991, Mark has worked with Motorola, Sprint, Nextel, and British Telecom (BT) to roll out some of the most successful telecom applications and network expansions worldwide. Mark was directly involved in the design of Sprint's Common Channel Signaling System 7 (SS7) network and the design and rollout of its FON (calling card) and 800 number services.

Mark was also the program manager responsible for the design and rollout of BT's Advanced Cellular Network (ACN) that used AIN functionality. BT's ACN was one of the largest cellular networks in the world and also includes advanced corporate virtual private network (VPN) and pre-pay validation services.

After completing BT's ACN network upgrade in 1992, I was the program manager and lead network architect for BT's (Cellnet) GSM cellular network design, rollout, testing and upgrades. In this role, I was responsible for defining, implementing and testing all aspects of its GSM network that included the Network Switches (MSCs and Tandems for PSTN connections), Base Station Subsystems (BSC and BTS), Short Message Service Center (SMSC), Home Location Registers (HLRs), Visitor Location Registers (VLRs), Authentication Center (AuC), Equipment Identity Register (EIR), cell phones (Mobile Station-MS) from multiple suppliers, Voice Message Systems, Subscriber Information Module (SIM) programming and distribution, Operation and Support System (OSS), and prepay and post-pay billing system interfaces. The network phases began with voice calling then later added mobile terminated and mobile originated Short Message Service (SMS) functionality and ultimately included adding the GPRS advanced data capabilities for both the GSM network and its cell phones.

¹ I.N. Solutions Inc. is no longer active.

Beginning in 1998, Mark and the Telecom Architects (TAI) team were contracted by Nextel to design their 2.5G cellular iDEN switching, VoIP dispatch network² and its TDM/SONET transmission networks. After completion of the 2.5G network design, Mark and the TAI team performed a large part of the qualification, testing and rollout phases for new equipment suppliers and their applicable products into Nextel's network.

Before starting his own consulting company in 1991, Mark was initially employed as individual contributor on both hardware and software development projects, later worked as a manager on hardware and software development groups that varying in size from 5-20 engineers and eventually held several executive management positions with responsibility of over 200 engineers.

Hardware and Software Development Experience

Mark's hardware and software experience began in 1974 while in the US Army Signal Corps. Mark was initially trained as a hardware technician on data and voice crypto (encrypted transmission) communications equipment. After achieving the "top graduate" award at three different hardware and software training schools, Mark received a Top Secret security clearance and was transferred to the Army Security Agency (ASA). His assignment with the ASA included joint software development with the National Security Agency (NSA) and the white house communications staff. The software development was done on "state of the art" computer and communication systems built by DEC and GE using assembly language.

From 1978-1983, Mark worked as both a hardware and software development engineer for IT&T Defense Communications. The majority of his time was spent on building a new store and forward message switching system that was used by the white house, US embassies worldwide and two major US airlines. DEC PDP-11 and PDP-15 computers were coupled together and operated in conjunction with custom IT&T hardware for this system. The system architecture was traditional mini-computer architecture with sixteen front-end communications computers to interface with hundreds of modems and perform various communications protocols. The software was written in DEC assembly language. Many different types of communications protocols and state of the art modems were used with this system.

In 1983, Mark was hired as hardware and software development engineer by Digital Switch Corporation (now a part of Alcatel) and was later promoted to design and development manager responsible for their initial SS7 protocol and Signal Transfer Point (STP) products. The STP product performed packet switching for thousands of messages per second between telephone switches for the purpose of connecting normal phone calls worldwide and support of advanced telephony services. The STP was designed to have a fault tolerant hardware and software architecture to provide 24x7 operation and provided interfaces to various telephone company management and support systems. A typical configuration of the STP product included at least 200 separate microprocessor boards working in a closely coupled distributed system architecture. Communications between the processors was performed over parallel hardware buses using DSC's proprietary operating system. Mark was also responsible for development of all the communication protocols the STP would require to communicate with other switching, operations and administration systems. These protocols were X.25, X.75, SS7 MTP/SCCP/TCAP and FTP. The hardware used was Zilog Z-8000 and Motorola 68xxx family microprocessors. The software was written in assembly and C languages.

² Also referred to as the Nextel push-to-talk, dispatch or walkie-talkie feature that did not require a voice bearer channel.

In 1985, Mark was hired by Teling Inc. (now part of ADC) as their director of software development and was later promoted to vice president of hardware and software development. Teling was a venture capital start-up company, and their initial two products were high speed digital TDM transmission multiplexers and analyzers mainly used by telecom network operators and service providers. The hardware consisted of multiple Motorola 68xxx family processors replicated different types of custom designed high-speed gate arrays. The software was distributed and written in C and assembly language.

In 1987, Mark joined the Telecom Division of Tandem Computers, Inc. (now part of HP) as their Vice President of hardware and software development. Tandem Telecom was a new division that built products for telephone companies that leveraged its fault tolerant Guardian and Unix based computer systems. The initial products built under Mark's direction were a Service Control Point (SCP), Service Management System (SMS) and Service Creation Environment (SCE). Although these product names are unique to Intelligent Networking telephony systems, they use state of the art hardware and software to perform many standard functions. The SCP system performs on-line transaction processing for the telephone switches in a network. These transactions support phone company services like 800 number translation, calling card number validation and home location register (HLR) functionality for cellular networks. The SCP was a fault tolerant multiple processor system capable of supporting hundreds of globally located nodes with multiple processors in each node. Each SCP required specialized communications software and hardware that was build by Tandem Telecom. The full suite of commercial communications software was supported including X.25, TCP/IP and SS7. The software was written in C, C++ and assembly language. The SMS system was build to manage multiple SCP systems, update the software applications and keep their multi-million record databases synchronized. The SMS software was written in C and C++. The SCE was telephone service authoring tool used by telephone company personnel to modify or create new services on their network without requiring them to be intimately familiar with the underlying system or detailed programming. The SCE software ran on Unix or PC Windows operating systems and was written in C++ and C and the most advanced software development workbench software.

Program and Project Management Experience

Mark has been directly involved with formal project management concepts and tools since 1984. Most, if not all, the projects listed above were managed using project management concepts and tools. The main techniques used for these projects were PERT and CPM. Mark either generated the initial PERT chart and staff assignments for each project or was directly involved in defining the program logic and assignments to be used. Since 1984, every project that Mark has been responsible for has included formal product life cycle documentation, requirements tracking, problem reporting and resolution.

Since 1991, Mark has been responsible for some large development and network architecture projects with a budget in excess of \$100 million each. Two of these projects were for British Telecom's cellular network division called Cellnet. The initial project, ACN, was an on-line transaction processing (OLTP) system responsible for real-time dialed digit translation for every phone call in the Cellnet network and was required to perform thousands of transactions per second. The second project replaced Cellnet's batch-oriented billing system with a distributed real-time call detail record collection and on-demand rating and billing system. Both of these systems required custom development for a majority of the software that was done by different companies located across multiple countries and continents. The ACN project lasted about four years and involved over 100 software development personnel located in Texas, Nebraska, California, Sweden, Spain, Finland and England. The billing system project lasted more than three years and required over 600 developers at its peak that were located in England, Colorado, Texas and Sweden. Both of these systems were 24x7 mission critical to completing wireless calls and

billing.

Mark and members of the Telecom Architects group have developed innovative methods for requirements definition, design, modeling and documentation of large telecommunications networks. Some of this methodology has been published by Wireless Review Magazine.

In 1977 and 1978 Mark obtained a Private Pilot, Commercial, Instrument, and Flight Instructor ratings.

Mark received a BS in Computer Science degree from Southern Methodist University in 1983 and has been a visiting lecturer at SMU on various data and voice telecommunications subjects.

Industry Memberships

Member of IEEE and IEEE Standards Association.

Member of ACM (Association for Computing Machinery).

Telecom Standards Definition

Mark is one of the Advanced Intelligent Network (AIN) and Signaling System Number 7 (SS7) pioneers. He was a contributing member of the first ANSI T1X1 standards group that defined and approved the initial North American AIN and SS7 requirements and was actively involved with this group for three years. These standards were later adopted by the ITU.

Telephony Systems

Mark has been directly involved with the development and/or detailed functional analysis of the following systems: DSC/Alcatel DEX-STP, DEX-400, DEX-600 and MegaHub circuit switches; Nortel DMS circuit switch for class IV and MSC applications; Ericsson AXE circuit switch for class IV, MSC and HLR applications; Lucent's 5ESS circuit switch in class IV, class V and MSC applications; Tandem/HP SCP, SMS, SCE and HLR.

Mark has also been intimately involved with the design, analysis and/or network implementation of many different PSTN and cellular network elements including at least: MSC, VLR, HLR, BSC, BTS, SMSC, MMSC, GGSN/SGSN, eNodeB, and RNC.

Network Design Experience Summary

Mark has extensive telecommunications network design experience for both North American and European fixed and wireless networks. He has participated in the creation of RFIs and RFPs and the evaluation of supplier responses; negotiated supplier equipment contracts; written requirements for custom hardware and software features and has led engineering teams in the design and rollout of new networks and network expansions. These network designs included LANs, WLANs, WANs, TDM and SONET transmission networks, signaling system 7 (SS7) networks, ATM/IP data switching/routing, mission critical on-line transaction processing enterprise networks and voice switching networks using traditional circuit switches, soft switches and media gateways.

Software Development Languages and Tools

Assembly language for DEC PDP-11, PDP-15, Zilog Z-80 & Z-8000, and Motorola 68xxx processors.
Fortran IV and Fortran 77.
Cobol.
Pascal.
Basic and Visual Basic
C and C++
X Windows, Motif and SmallTalk Toolkits
Microsoft Office FrontPage
Java and JavaScript

Publications

Mark Lanning and David Sanders, "In Sync" Wireless Review. January 15, 2000.

Technical Expert Experience for Cases Filed Since 2018.01.01

Barkan Wireless IP Holdings, L.P. v. Samsung and Verizon. C.A. No. 2:18-cv-28-JRG. Before the United States District Court for the Eastern District of Texas, Marshall Division. On behalf of Samsung and Verizon.

Genband U.S. LLC and Sonus Networks, Inc. v. Metaswitch Networks Ltd and Countersuit. Cause No. DC-17-03697. Before the District Court of Dallas County, Texas, 134th Judicial District. Case regarding Internet and switching devices. On behalf of Genband.

Maxell, Ltd. v. Huawei Technologies Co. Ltd. et al. C.A. No. 5:16-cv-00178–RWS (Filed Nov. 2016). Before the United States District Court for the Eastern District of Texas, Texarkana Division. On behalf of Huawei. Inter Partes Review of U.S. Pat. Nos. 6,973,334, 6,983,140, and 7,324,487.

Zest Labs Inc et al v. Wal-Mart Inc. C.A. No. 4:18–cv–00500–JM (Filed Aug. 2018). Before the United States District Court for the Eastern District of Arkansas, Little Rock Division. Provided deposition and trial testimony. On behalf of Zest.

Zomm, LLC v. Apple Inc. C.A. No. 4:18-cv-04969–HSG (Filed Apr. 2018). Before the United States District Court for the Northern District of California, Oakland Division. On behalf of Apple. Inter Partes Review of U.S. Pat. No. 8,351,895. Provided multiple deposition testimony.

Sol IP, LLC, v. AT&T Mobility LLC. C.A. No. 2:18-cv-526-RWS-RSP (Filed 2018). Before the United States District Court for the Eastern District of Texas, Marshall Division. On behalf of AT&T.

Packet Intelligence LLC v Nokia Solutions and Networks U.S. LLC. C.A. No. 2:18-cv-00382-JRG (Filed Aug. 2018). Before the United States District Court for the Eastern District of Texas, Marshall Division. On behalf of Nokia.

Carucel Investments L.P. v. General Motors Company, et. al. C.A. No. 3:18–cv–03332 (Filed Dec. 2018). Before the United States District Court for the Northern District of Texas, Dallas Division. On behalf of Carucel. Provided multiple deposition testimony.

Rembrandt Wireless Technologies, L.P. v Apple Inc. C.A. 2:19-cv-00025-JRG (Filed Jan. 2019). Before the United States District Court for the Eastern District of Texas, Marshall Division. On behalf of Apple. Inter Partes Review of U.S. Pat. Nos. 8,023,580 and 8,457,228.

Optis Wireless Technology, LLC, Unwired Planet, LLC, and Panoptis Patent Management, LLC v Apple Inc. C.A. No. 2:19-cv-66. (Filed Feb. 2019). Before the United States District Court for the Eastern District of Texas, Marshall Division. Provided deposition and trial testimony. On behalf of Apple.

Cellular Evolution LLC v. T-Mobile US, Inc. et al., C.A. 2:19-cv-232-JRG (Filed Jun. 2019). Before the United States District Court for the Eastern District of Texas, Marshall Division. On behalf of T-Mobile.

DataQuill Limited v. TCL Communication Technology Holdings Limited et al., C.A. 2:19-cv-03394-AB-PLA (Filed Apr. 2019). Before the United States District Court for the Central District of California, Los Angeles Division. On behalf of TCL.

Huawei Technologies Co. Ltd. v Verizon Communications, Inc., et. al., C.A. 2:20-cv-00030 (Filed Feb. 2020). Before the United States District Court for the Eastern District of Texas, Marshall Division. On behalf of Verizon. Provided deposition and trial testimony.

Synkcloud Technologies, LLC v Adobe, Inc. CA 6:19-cv-00527-ADA (Filed Sep. 2019). Before the United States District Court for the Western District of Texas, Waco Division. On behalf of Adobe.

Castlemorton Wireless, LLC v. Verizon Communications Inc. et. CA 6:20-cv-00035-ADA (Filed Jan. 2020). Before the United States District Court for the Western District of Texas, Waco Division. On behalf of Verizon and Charter Communications.

Confidential Arbitration case on behalf of Nokia regarding cellular devices.

IPCom v. Verizon (Nokia). CA 2:20-cv-323 (Filed 2020.10.01.). Before the United States District Court for the Eastern District of Texas, Marshall Division. Also included petitioner IPRs. On behalf of Verizon and Nokia. Provided IPR deposition testimony.

IPCom v. AT&T (Ericsson). CA 2:20-cv-323 (Filed 2020.10.01.). Before the United States District Court for the Eastern District of Texas, Marshall Division. Also included petitioner IPRs. On behalf of AT&T and Ericsson. Provided IPR deposition testimony.

Philips v. Thales et al. ITC Investigation No. 337-TA-1240. Before the ITC. Also, declarations for Patent Owner IPRs. On behalf of Philips. Provided deposition and hearing testimony.

Sisvel S.p.A. v. TCL Communication Technology Holdings Limited et al., CA 1:20-cv-00654-MN. Before the United States District Court for Delaware. On behalf of TCL. Provided IPR deposition testimony.

Godo Kaisha IP Bridge 1 v Ericsson Inc. CA 2:21-cv-213-JRG. Before the United States District Court, Eastern District of Texas. On behalf of Ericsson.

Aegis 11 S.A. v Hisense Co. Ltd. CA 1:20-cv-03891-MHC. Before the United States District Court, Northern District of Georgia. On behalf of Hisense.

CommWorks Solutions, LLC v Comcast Cable Communications, d/b/a Xfinity, et al. CA 6:21-cv-00366. Before the Western District of Texas, Waco Division. On behalf of Comcast.

Collision Communications, Inc. v Ericsson. CA 2:21-cv-00327. Before the United States District Court, Eastern District of Texas. On behalf of Ericsson.

TQ Delta, LLC v. Nokia. CA 2:21-cv-309-JRG. Before the United States District Court, Eastern District of Texas. On behalf of Nokia and CommScope.

Maxell v Lenovo and Motorola Mobility. ITC Investigation No. 337-TA-1312/1324. On behalf of Lenovo and Motorola Mobility.

Smart Mobile Technologies LLC v. Apple Inc. CA 6:21-cv-00603-ADA. Before the United States District Court, Western District of Texas. On behalf of Apple.

Telecom Network Solutions, LLC v. AT&T Inc., et al. CA 2:21-cv-00415-JRG (Lead Case). With member cases CA 2:21-cv-00416-JRG and CA 2:21-cv-00418-JRG. Before the United States District Court, Eastern District of Texas. On behalf of T-Mobile.

VoIP-Pal.com v Verizon Wireless Services, LLC, et al. CA 16-cv-00271. Before the United States District Court in Nevada. On behalf of AT&T.

LG Electronics v TCL Electronics. CA 2:22-cv-00122-JRG. Before the United States District Court, Eastern District of Texas. Included IPR2023-00869 for U.S. 10,499,431 and IPR2023-00866 for U.S. 9,788,346. On behalf of TCL Electronics.

Howlink Global LLC v AT&T et al. and Verizon Communications, Inc. et al. CA 2:22-cv-00040. Before the United States District Court, Eastern District of Texas. On behalf of AT&T and Verizon (Ericsson and Nokia).

Ex-Parte Reexamination of U.S. Patent No. 9,137,830. On behalf of United Patents, Inc.

Silent Communication, LLC v Adobe Inc. CA 6:22-cv-00527. Before the United States District Court, Western District of Texas. On behalf of Adobe.

Mitsubishi Electric Corporation and Sisvel International S.A. v TCL Communication Technology Holdings Limited, et al. Case No. 8:22-CV-01073-GW-DFM. Before the United States District Court, Central District of California. Included IPR2023-00957 for U.S. 9,635,656 and IPR2023-00997 for U.S. 10,200,976 and IPR of U.S. 8,971,279. On behalf of TCL.

Ex-Parte Reexamination of U.S. Patent No. 7,924,802. On behalf of United Patents, Inc.
Case active as of 05/31/2024.

Dali Wireless, Inc. v. Cellco Partnership D/B/A Verizon Wireless et al., Case No. 6:22-cv-00104-ADA. Before the United States District Court, Western District of Texas.

Dali Wireless, Inc. v. AT&T Corp. et al. Case No. 2:22-CV-12-RWS-RSP. Before the United States District Court, Eastern District of Texas.

Dali Wireless, Inc. v. T-Mobile US, Inc., et al., Case No. 2:22-cv-414. Before the United States District Court, Eastern District of Texas.

All three above cases are on behalf of Ericsson.

Genghiscomm Holdings, LLC v. TCL Communication Inc., Case No. 2:23-cv-08949. Before the United States District Court, Central District of California. On behalf of TCL.

Zest Labs Inc et al v. Wal-Mart Inc. C.A. No. 4:18-cv-00500-JM (Filed Aug. 2018). Before the United States District Court for the Eastern District of Arkansas, Little Rock Division. This listing is for the second trial. On behalf of Zest. Case still active as of 01/20/2025.

Cerence Operating Company v. Samsung Electronics Co. Ltd. And Samsung Electronics America, Inc., Case No. 2:23-cv-00482. Before the United States District Court, Eastern District of Texas, Marshall Division. Includes IPRs for the 7,395,078 and 8,081,993 patents. On behalf of Samsung.
Case still active as of 01/20/2025.

Pegasus Wireless Innovation LLC v. Verizon Wireless et al., Case No. 2:23-cv-00640-JRG (Lead Case). Before the United States District Court, Eastern District of Texas, Marshall Division. Includes IPRs for the 10,181,931 and 11,405,942 patents. On behalf of Verizon. Case still active as of 01/20/2025.

Pegasus Wireless Innovation LLC v. AT&T Corp. et al., Case No. 2:23-cv-00638-JRG. Before the United States District Court, Eastern District of Texas, Marshall Division. On behalf of AT&T. Case still active as of 01/20/2025.

Vasu Holdings, LLC v. Samsung Electronics Co., Ltd. et al., Case No. 2:24-cv-00034-JRG-RSP. Before the United States District Court, Eastern District of Texas, Marshall Division. Includes IPRs for the 8,886,181, 10,206,154, 10,368,281 and the 10,419,996 patents. On behalf of Samsung. Case still active as of 01/20/2025.

Marble VOIP Partners LLC v. Microsoft Corporation. Case No. W-22-cv-00076-ADA. Before the United States District Court, Western District of Texas, Waco Division. On behalf of Microsoft. Case still active as of 01/20/2025.

Pegasus Wireless Innovation LLC v. Verizon Wireless et al. (i.e., Google), Case No. 2:23-cv-00640-JRG (Lead Case). Before the United States District Court, Eastern District of Texas, Marshall Division. Includes IPR for the 10,594,460 patent. On behalf of Google. Case still active as of 01/20/2025.

Headwater Research LLC v. Verizon Communications, Inc. et al. Case No. 2:23-cv-00352-JRG-RSP. Before the United States District Court, Eastern District of Texas, Marshall Division. On behalf of Verizon. Case still active as of 01/20/2025.

Headwater Research LLC v. T-Mobile USA Inc., et al. Case No. 2:23-cv-00379-JRG-RSP (Lead case). Before the United States District Court, Eastern District of Texas, Marshall Division. On behalf of T-Mobile. Case still active as of 01/20/2025.

APPENDIX B (LIST OF MATERIALS CONSIDERED)

Exhibit No.	DESCRIPTION
1001	U.S. Patent No. 10,419,996 (“’996”)
1002	File History of U.S. Application No. 15/921,275 (“’996FH”)
1004	U.S. Patent App. Pub. 2005/0048977 (“Dorenbosch”)
1005	U.S. Patent App. Pub. 2005/0063348 (“Donovan”)
1006	U.S. Patent App. Pub. 2003/0084056 (“DeAnna”)
1007	U.S. Patent App. Pub. 2005/0282541 (“Iizuka”)
1008	U.S. Patent App. Pub. 2002/0126654 (“Preston”)
1009	U.S. Patent App. Pub. 2004/0002335 (“Pan”)
1010	U.S. Patent App. No. 15/480,293 (“’293-App”)
1012	Plaintiff Vasu Holdings, LLC’s 5/15/2024 Infringement Contentions, Including Appx. F-1
1013	Plaintiff Vasu Holdings, LLC’s Objections and Responses to Defendants Samsung Electronics Co., Ltd, and Samsung Electronics America, Inc.’s First Set of Interrogatories (Nos. 1-25)
1014	Plaintiff Vasu Holdings, LLC’s Supplemental Objections and Responses to Defendants Samsung Electronics Co., Ltd, and Samsung Electronics America, Inc.’s Interrogatories (Nos. 1-5, 8, 9, 13-15, 19-22, 25)
1015	Plaintiff Vasu Holdings, LLC’s Objections and Responses to Defendants Samsung Electronics Co., Ltd, and Samsung Electronics America, Inc.’s Second Set of Interrogatories (No. 26)
1016	Vern A. Dubendorf, Wireless Data Technologies (2003)
1017	Gregory P. Pollini, Trends in Handover Design (March 1996)
1018	U.S. Patent No. 6,567,383 (“Böhnke”)

Exhibit No.	DESCRIPTION
1019	U.S. Patent No. 7,298,716 (“Abraham”)
1020	U.S. Patent No. 7,126,926 (“Bjorklund”)
1021	U.S. Patent App. Pub. 2007/0146475 (“Inoue”)
1022	Timer, The IEEE Standard Dictionary of Electrical and Electronics Terms (6th ed., 1996)
1023	Server, McGraw-Hill Dictionary of Computing & Communications (6th ed., 2003)
1024	Server, Modern Dictionary of Electronics (7th ed., 1999)
1025	Oscillator, McGraw-Hill Dictionary of Scientific and Technical Terms (6th ed., 2003)

* I also considered any additional materials referenced in my declaration.