IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *Inter Partes* Review of:	)
U.S. Patent No. 7,804,891	)
Issued: Sep. 28, 2010	)
Application No.: 10/594,985	)
Filing Date: Mar. 30, 2005	)

For: **Device and Method for Judging Communication Quality and Program Used for the Judgment**

DECLARATION OF HARRY V. BIMS IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 7,804,891

Google
Exhibit 1003

Table of Contents

I. Introduction and Qualifications

1. I, Harry Bims, have been retained as an expert witness on behalf of Google LLC ("Google" or "Petitioner") to provide my opinion concerning the validity of Claims 1-9 of U.S. Patent No. 7,804,891("the '891 patent," which I understand has been filed as Exhibit 1001) in support of the Petition for *Inter Partes* Review of the '891 patent.

2. I am being compensated for my time in connection with this IPR at my rate of $850 per hour. My compensation is not dependent in any way upon the outcome of this matter.

3. My opinions are based on my study, experience, and background discussed below, informed by my extensive experience regarding the subject matter of the '891 patent and the related prior art. For more than 30 years, since approximately 1981, I have studied, designed, and worked in the field of telecommunications, including wireless communications. During this period, I have designed and implemented various products involving cellular communication technology.

II. Qualifications

4. My findings are also based on my education as an electrical engineer. I received a B.S. in Computer and Systems Engineering from Rensselaer Polytechnic Institute in 1985.

5. I received an M.S. in Electrical Engineering in 1988 and a Ph.D. in Electrical Engineering in 1993, both from Stanford University. As a graduate student, I studied the principle of Digital Communications theory, including data modulation and demodulation, signal constellations and lattices, channel estimation, equalization, filtering, precoding, synchronization, and trellis coding.

6. My Ph.D. thesis addressed the application of trellis coding and precoding to a digital modulation system, and was titled "Trellis Coding for Multi-Level, Partial Response Continuous Phase Modulation with Precoding."

7. After receiving my Ph.D. in 1993, I worked for Glenayre Technologies – Wireless Access Group, where I worked on applications for wireless communication, including inventing, designing, and building a patented two-way pager test system and co-developing a wireless application protocol.

8. In January of 1999, I launched a technology consulting company, Protocomm Systems Inc., which focuses on the development of advanced wireless communications protocols and related software implementations for wireless product companies.

9. From 1999 to 2001, I was also the Director of Software Architecture for Symmetry Communications System. In this position, I was responsible for the software architecture for core SGSN (Serving GPRS Support Node) and GGSN (Gateway GPRS Support Node) products for the GPRS (Generic Packet Radio

Services) market. I also held management responsibility for the Firmware, Hardware, Performance, and Systems Engineering Groups.

10. In 2001, I developed a business plan for building network infrastructure for Institute of Electrical and Electronics Engineers ("IEEE") 802.11 standard ("Wi-Fi") enterprise networks, and then later that year founded AirFlow Networks, Inc. where I invented and received eleven patents on a distributed antenna system design for wireless networks, based on the 802.11 wireless local area network specification.

11. I am currently the President of Protocomm Systems, LLC and Bims Laboratories, LLC, both of which I founded. As the President of Bims Laboratories, I perform technical research in wireless technology standards, such as UMTS, LTE/4G, 5G, Wi-Fi, Bluetooth, and other network communication protocols. I am named as an inventor of twenty-four telecommunications related patents.

12. In addition, I am a named Technical Expert and former Vice-Chair and Secretary of the IEEE 802.16 Working Group, which develops technical standards for the wireless protocol commonly known as WiMax. I am also a voting member of the IEEE 802.11 Working Group (which develops technical standards for WiFi), and the IEEE 802.15 Working Group (which develops standards for a variety of specialty wireless networks). Within the IEEE 802.15 Working Group, I

am the technical editor for IEEE 802.16t, an amendment to the WiMAX standard that supports long-range wireless networks for the railroad industry. Within the IEEE 802.11 Working Group, I routinely participate and vote on discussions relating to the design of wireless communications, including packet prioritization, transmission, acknowledgment, and retransmission.

13. Attached as Appendix A is my curriculum vitae, which includes a more detailed statement of my professional qualifications, including education, publications, honors and awards, professional activities, consulting engagements, and other relevant experience.

III. Summary Of Materials Reviewed And Considered

14. In preparing this Declaration, I have reviewed the ’891 patent and considered the documents identified below in light of the general knowledge in the relevant art. In forming my opinions, I relied on my education, knowledge, and experience and considered the level of ordinary skill in the art as discussed below.

Ex.	Description
1001	United States Patent No. 7,804,891 (“the ’891 patent”)
1002	File History for United States Patent No. 7,804,891 (“’891 FH”)
1004	EIA/TIA Interim Standard IS-54-B (“IS-54-B”)
1005	U.S. Patent 6,519,740 to Mårtensson (“Mårtensson”)
1006	Advanced Vocoder Idle Slot Exploitation for TIA IS-136 Standard by Ernest Nanjung Yeh (“Yeh”)
1007	U.S. Patent 5,555,257 to Dent (“Dent”)

Ex.	Description
1008	U.S. Patent 5,255,343 to Su ("Su")
1011	Simon Haykin, Communication Systems (4th ed. 2001) ("Haykin")
1014	BlackBerry 7230, GSMArena, https://www.gsmarena.com/blackberry_7230-1009.php.
1015	RIM BlackBerry 7230 (T-Mobile) review, CNET, https://www.cnet.com/reviews/rim-blackberry-7230-t-mobile-review/ (Sep. 24, 2003).

15. My opinions are additionally guided by my appreciation of how a person of ordinary skill in the art ("POSITA") would have understood the claims of the '891 patent at the time of the invention, which I have been asked to assume is March 31, 2004.

IV. Understanding of Legal Standards

16. I am not an attorney, and I do not opine on matters of law. However, I have been informed by counsel of certain legal standards, which are set forth below. I have applied those standards in my analysis in this declaration. The material in this section has been supplied to me by counsel.

17. I have been informed by Counsel that the validity analysis is a two-step process. First, the patent claims are construed to ascertain their proper scope. Second, the construed claims are compared to the identified prior art to determine if the claims are valid over the prior art.

A. Claim construction

18. I have been informed by Counsel that the claims of a patent define the limits of the patentee's exclusive rights. I have been informed by Counsel that to determine the scope of the claimed invention, courts typically construe claim terms, the meaning of which the parties may dispute. I have been informed by Counsel that claim terms should generally be given their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of filing of the patent application, after reading the patent and its prosecution history. I also have been informed by Counsel that a basic tenet of claim construction presumes that different words in a claim have different meanings, unless there is evidence to the contrary.

19. I have been informed by Counsel that claims must be construed in light of, and consistent with, the intrinsic evidence. In this context, I have been informed by Counsel that intrinsic evidence includes the claims themselves, the written disclosure in the specification, and the patent's prosecution history, including prior art that was considered by the United States Patent and Trademark Office ("USPTO"). I have been informed by Counsel that the specification is always highly relevant to the claim construction analysis and often is the single best guide to the meaning of a disputed term. I have been informed by Counsel that extrinsic evidence may also be considered when construing claims and may

include, for example, technical dictionaries, technical publications and books, treatises, and expert testimony.

20. I have been informed by Counsel that when claim limitations use "means for" language, they must be construed to cover the corresponding structure or acts in the specification and equivalents thereof. I have been informed by Counsel that these are referred to as "means-plus-function" claim limitations. I understand from Counsel that whether the specification sets forth structure corresponding to the function is ascertained from the perspective of a POSITA and whether a POSITA would understand the specification to disclose such structure to perform the claimed function. As I have been informed by Counsel, a structure in the specification is corresponding if the specification clearly links the structure to the function in the claim and the corresponding structure must actually perform the recited function.

B. Obviousness

21. I have been informed by Counsel that patent claims can be deemed invalid if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the pertinent art. While such conclusions are often based on more than one piece of prior art, only one is required. It is not sufficient that a collection of prior art references merely recites

the various elements of a challenged patent claim. Rather, as I have been informed by Counsel, the prior art must present the elements in a manner that is consistent with their arrangement or use in the challenged claims. I have been informed by Counsel that obviousness cannot be based on the hindsight combination of components selectively culled from the prior art.

22. I have been informed by Counsel that a person having ordinary skill in the art (POSITA) is a hypothetical person who is presumed to have known the relevant art at the time the invention was made. I have been informed by Counsel that the condition "at the time the invention was made" is imposed to rule out impermissible hindsight. I also have been informed by Counsel that an expert is to analyze the prior art from the perspective of a person of ordinary skill in the art at the time the invention was made, and not simply to provide his/her own personal conclusions.

23. I also have been informed by Counsel that an obviousness determination includes several factual inquiries, including (1) determining the scope and content of the prior art; (2) ascertaining the differences between the claimed invention and the prior art; (3) resolving the level of ordinary skill in the pertinent art; and (4) taking into consideration any objective indicia of nonobviousness.

24. I have been informed by Counsel that obviousness must be determined as of the date of the invention (i.e., the effective filing date or priority date of the patent). Thus, in considering the reason or motivation to combine references, it is essential to avoid using hindsight. For example, the problem examined when considering obviousness is the general problem that confronted the inventor before the invention was made, not the specific problem solved by the invention. Defining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to obviousness. Further, an overly narrow statement of the problem can represent a form of hindsight, because often the inventive contribution lies in defining the problem in a new revelatory way. Similarly, an assertion that a person of ordinary skill could combine the references, rather than that they would have been motivated to do so, is an impermissible form of hindsight. Moreover, knowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references to reach the particular claimed invention.

25. I have been informed by Counsel that a motivation to solve a problem (or issue) is not the same as a motivation to have combined references. I have been informed by Counsel that whether a skilled artisan would be motivated to make a combination includes whether he/she would select particular references in order to combine their elements.

26. I have been informed by Counsel that the analysis of the motivation to combine should be explicit. Additionally, it must include articulated reasoning with rational underpinnings to support the conclusion of obviousness. Providing a full explanation of the motivation to combine the references and the reasonable expectation of success is a necessary component of the obviousness inquiry, as inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. However, conclusory statements fail to adequately explain why a person of ordinary skill would have a motivation to combine the potential prior art references.

27. I have been informed by Counsel that common sense, common wisdom, and common knowledge may be used to support a motivation to combine, so long as the use of common sense in the analysis is explained with sufficient reasoning. But, common sense can only be used to supply a limitation missing from the prior art where the technology is unusually simple and straightforward.

28. I also have been informed by Counsel that evidence suggesting reasons to combine cannot be viewed apart from evidence suggesting reasons not to combine. In analyzing motivation, both advantages and disadvantages must be considered. Teaching away, for example, is a statement in the prior art that either (i) discourages one from following the path of the claimed invention, or (ii)

encourages one to follow a path that diverges from the path of the claimed invention. The concept of teaching away bears directly on whether there was a reason to combine prior art. Known disadvantages in prior art technology or devices which would naturally discourage a search for new inventions may also be taken into account in determining obviousness.

V. Person of Ordinary Skill in the Art ("POSITA")

29. I understand that a person of ordinary skill in the art ("POSITA") is a hypothetical person who is presumed to be aware of all pertinent art, possesses conventional wisdom in the art, is a person of ordinary creativity, and has common sense. I understand that this hypothetical person is considered to have the normal skills and knowledge of a person in a certain technical field (including knowledge of known problems and desired features in the field).

30. I have been asked to focus my analysis on claims 1-9 of the '891 patent, and prior art relating thereto, from the perspective of such a person at the time of the alleged inventions. I understand that the application (U.S. Serial No. 10/594,985) resulting in the '891 patent was filed on March 30, 2005, by Kabushiki Kaisha Kenwood, which claims priority to a Japanese patent application filed March 31, 2004.

31. It is my opinion that a person of ordinary skill in the art around March 31, 2004 would have had at least a bachelor's degree in electrical engineering or

computer engineering, and two years of work experience in the field of wireless communications. Such experience would have exposed the POSITA to concepts including transmitting data, demodulation, decoding, error detection and correction, and bad frame masking. This description is approximate, and a higher level of education or skill might make up for less experience, and vice-versa.

32. As of March 31, 2004, I would have qualified as at least a POSITA, and my opinions herein are informed by my own knowledge based on my personal experiences and observing others of various skill levels (including those above and below the level of a POSITA).

33. My opinions below are not restricted to the precise definition of a POSITA above. The claims of the ’891 patent are directed to common demodulation, error detection, and bad frame masking techniques using known algorithms, decoding methods, software, and hardware that were well-known in the art and taught by numerous prior art references, including the references discussed below. Thus, my opinions below would apply under any reasonable definition of a POSITA.

VI. The ’891 Patent

A. Summary of the ’891 Patent

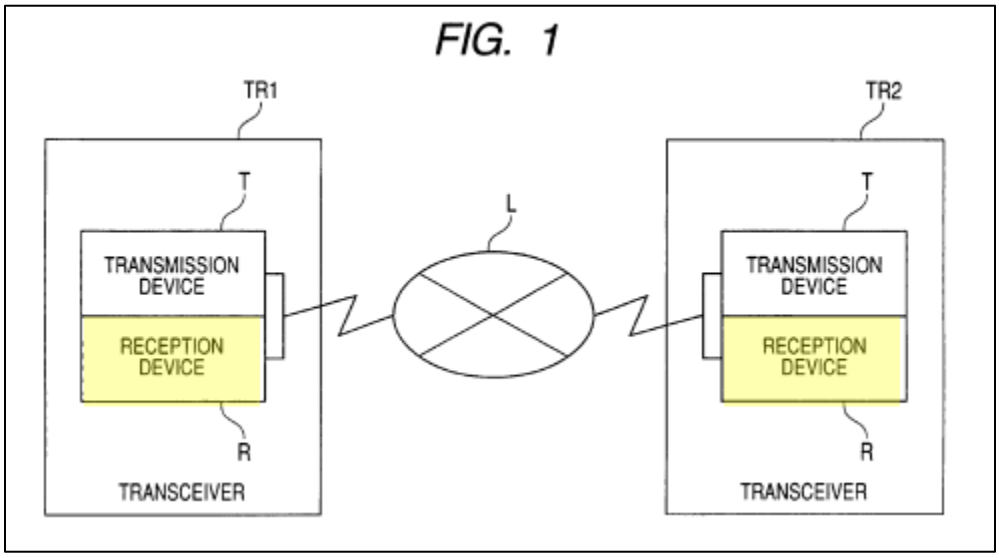
34. The ’891 patent is entitled “Device and method for judging communication quality and program used for the judgment.” The specification

explains that technologies for transmitting voice data were known in the art and provides the example of the Association of Radio Industries and Business standard "Personal Digital Cellular Telecommunication System RCR STD-27 Revision J" from May 30, 2002. Ex. 1001 ('891 patent), 1:14-20. The '891 patent explains that, at the time of invention, developments related to encoding technologies have allowed voices to be transmitted in real time at a much lower bit rate using a small amount of code on transmission channels whose communication quality may not be good. *Id*., 1:20-26. The specification explains that "[w]hen voice data is transmitted at a low bit rate, a small amount of bit errors may have serious effects on the quality, and therefore, it is essential to accurately detect or correct the errors." *Id*., 1:27-30.

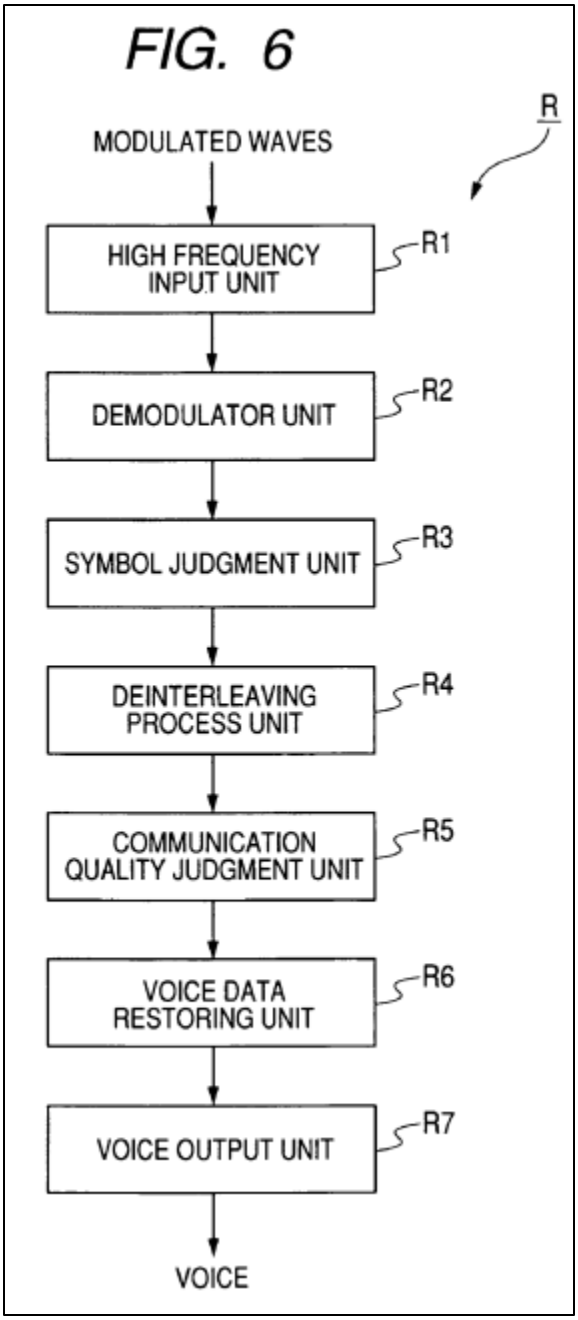
35. The specification goes on to explain various known techniques for detecting errors, such as using cyclic redundancy checking ("CRC") and forward error correction ("FEC"), but purports to provide a method and system to "accurately or rapidly judg[e] the communication quality with a simple construction." *Id*., 2:7-53.

36. Essentially the '891 patent discloses a reception device R (e.g., as shown by the reception devices in Fig. 1 below) which includes units for receiving and transmitting data, including "a high frequency input unit R1, a demodulator unit R2, a symbol judgment unit R3, a deinterleaving process unit R4, a

communication quality judgment unit R5, a voice data restoring unit R6, and voice output unit R7." *Id*., 8:54-61.



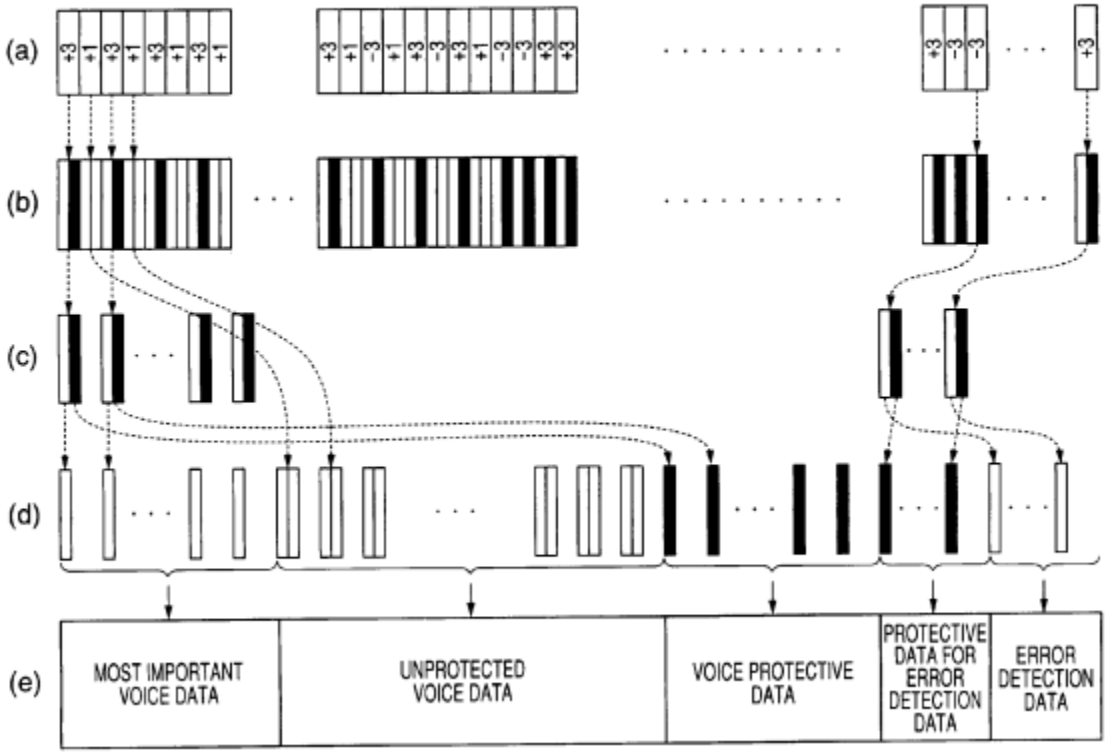
Id., FIG. 1 (annotated). The arrangement of the reception device is shown below in Fig. 6:



Id. FIG. 6. The device demodulates data and judges it "[b]ased on a[n] instantaneous value at a Nyquist point of each of baseband signals." *Id*., 9:26-34. The data is then deinterleaved and sent to a "communication quality judgment . . . [which] performs a bad frame masking process on the data depending on the

presence of an error in the most important voice data contained in the data and/or the number of abnormal bits contained in the protective data in the data, and provide it to the voice data restoring unit R6." *Id*., 10:45-54. Figure 7 below shows the symbol judgment unit R3, which "judges the symbol represented by a symbol section containing the Nyquist point and, based on the judgment, reproduces data (FIG. 7 (b)) corresponding to the interleaved frame generated by the interleaving process unit T3 in the transmission device T." *Id*., 9:26-34.

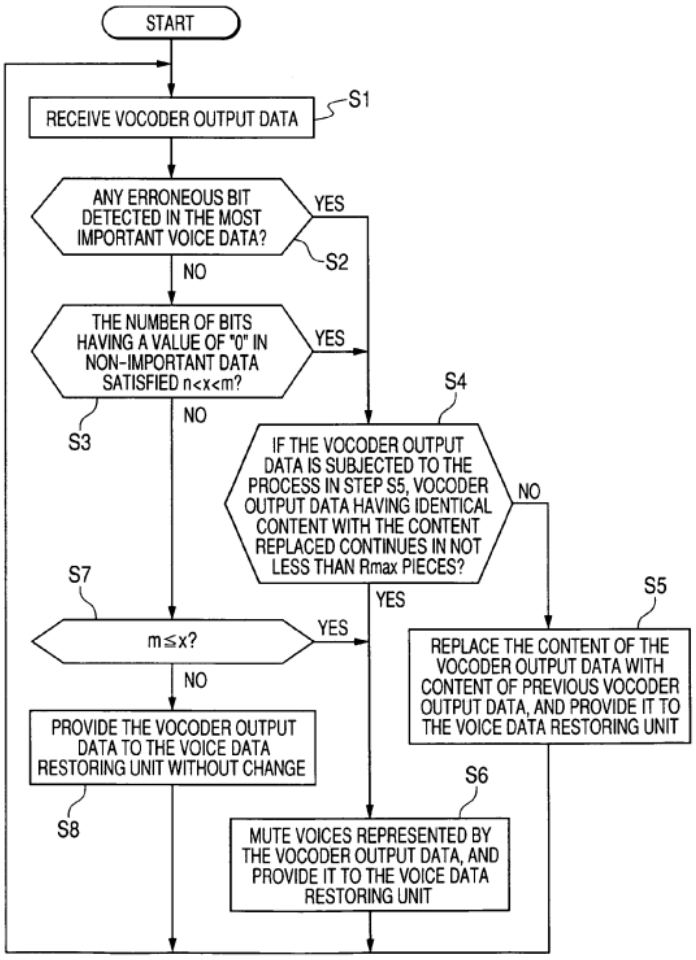
FIG. 7



Id. FIG. 7.

37. Figure 8 below depicts the bad frame masking process performed by the communication quality judgment unit R5. "[T]he number x of erroneous bits in the protective data is indicative of the poorness of communication quality of the transmission channel L." *Id*., 11:46-48. If "there is no erroneous bit in step S2, the communication quality judgment unit R5 identifies how many bits have a value of '0' (incorrectly though it would normally have a value of '1') in the protective data in the vocoder output data received in step S1, and determines whether or not x satisfies the relationship (n<x<m) with respect to a predetermined lower limit n and a predetermined upper limit m (where n is an integer not less than 0, and m is an integer greater than n)." *Id*., 10:63-11:6. Any protective data in the vocoder output data that is either protective data for error detection data or protective data voice protective data is transmitted with the value of '1', thus any such bits received with a value of '0' are presumed to have been received in error. *Id*., 6:46-50, 7:24-31.

FIG. 8



Id. FIG. 8.

38. The ’891 patent explains that the process in Figure 8 includes detecting whether an erroneous bit is included within important voice data, and when voice data does not need correction, it is provided without change (e.g., in step S8 of Figure 8). However, when voice data does require correction, the ’891 patent further explains the voice data may be muted or otherwise corrected before

output to a vocoder (e.g., in step S5 or step S6 of Figure 8) as audible voice. *See id*., 10:45-12:10; 13:32-47.

39. When analyzing the ’891 patent according to its priority date of March 31, 2004, it is my opinion that the features recited in the challenged claims were all well-known, as shown below, by IS-54-B, Mårtensson, Yeh, and Dent, and other references, and would have been obvious to a POSITA. Therefore, I am of the opinion that the challenged claims should not have been allowed.

VII. Claim Construction

40. In my analysis, I have applied the below meanings of the claim terms of the ’891 patent as a POSITA would have understood the them in the context of the patent at the time of its priority date. However, the opinions that I provide in this declaration would remain true under any reasonable construction of the claim terms in the ’891 patent, including plain meaning.

1. “symbol judging means” (claims 1-7)

41. I understand the functions for this term to include: (1) obtaining a baseband signal representative of a sequence of multilevel symbols and (2) judging the symbol represented by the baseband signal. I understand the corresponding structure for function (1) is a demodulator, and equivalents thereof. *See* Ex. 1001 (’891 patent), 9:5-12 (“The demodulator unit R2 is composed of a well known detection circuit for detecting the frequency modulated waves . . . to restore the

baseband signal to the symbol judgement unit . . . [and] may be composed of a process, a memory that stores a program executed by the processor, and the like."). I understand that the corresponding structure for function (2) is a processor, a memory that stores a program executed by the processor, and the like in a receiver that judges the instantaneous value of the baseband signal at the Nyquist point against threshold values and determines a symbol value of the section depending on the result, and equivalents thereof. *See id*., 9:13-10:4, 13:1-6, 14:30-43.

2. "communication quality judging means" (claims 1-7)

42. It is my opinon that the function for this term includes: judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged by the symbol judging means by identifying a number of redundant bits having a predetermined value or the number of redundant bits missing the predetermined value among the redundant bits contained in the symbol that contains a bit belonging to the protected portion. I understand the corresponding structure is a processor, a memory that stores a program executed by the processor, and the like that receives a bit string derived from symbols obtained from a demodulated signal and checks the value of bits and compares the number of bits having or missing a predetermined value to threshold values, and equivalents thereof. *See id*., 9:13-25, 10:45-54, 10:63-12:10; *see also id*. 12:43-57, 13:1-6, FIG. 8.

3. "data changing means" (claims 1-7)

43. I understand the function for this term is making a predetermined change to the data to be transmitted represented by the symbol used in the judgment. I understand the corresponding structure is "a processor, a memory that stores a program executed by the processor, and the like" for replacing data, muting data, substantially destroying data, and attenuating data, and equivalents thereof. *See id*., 9:13-25, 10:45-54, 11:7-12:19, 13:1-6, 13:32-14:2, FIG. 8. For replacing data, the specification says the "content of the vocoder output data received" is replaced "with content of previous vocoder output data that has been received immediately before the vocoder output data of interest." *Id*., 11:16-25; *see also id*., 11:59-67. For muting or substantially destroying data, the specification says the content is changed "such that it represents a silent state." *Id*., 11:26-34; *see also id*., 12:1-10. For attenuating, the specification says "the attenuation ratio applied to vocoder output data immediately before the vocoder output data whose gain is to be reduced, so that voices are reproduced in such a way that when vocoder output data having erroneous content continues, sound volume is reduced as the continuation becomes longer." *Id*., 13:32-47.

4. "means for externally obtaining a parameter" (claim 2)

44. It is my opinion that the function for this term is externally obtaining a parameter that defines at least a portion of the condition. The condition is the

predetermined condition recited in claim 1, whereby "if the communication quality judged by the communication quality judging means does not satisfy [the] predetermined condition," the data changing means makes a predetermined change to the data to be transmitted. Ex. 1001 ('891 patent), claim 1. I understand the corresponding structure is a receiver compatible with a switch, keyboard, or other input devices for inputting parameters, and equivalents thereof. Ex. 1001 ('891 patent), 14:3-16; *see also id*., 13:1-6.

VIII. Overview of the Technology and Prior Art

A. Technology Background

1. Demodulation

45. The purpose of communications systems is to transmit messages from a physically separated source to a destination. Ex.1011 (Haykin), 19. To accomplish this, a "transmitter modifies the message signal into a form suitable for transmission over the channel," which is known as modulation. *Id*. "The receiver re-creates the original message signal from a degraded version of the transmitted signal after propagation through the channel," which is known as demodulation. *Id*. 19-20. It is unavoidable that there will be some noise and distortion in the received signal. *Id*. 20. Different modulation schemes limit the effects of noise and distortion, such as continuous-wave modulation and pulse modulation. *Id*. In continuous-wave modulation, a sinusoidal wave is used as the carrier wave of the message signal. *Id*. Two types of continuous-wave modulation, frequency

modulation and phased modulation, use instantaneous frequency or phase of the carrier. *Id*.

46. Signal constellations for demodulation were well-known to a POSITA in 2004. Ex.1011 (Haykin), 362-373. They are used to compare the ideal versus received value of a signal. *Id*.

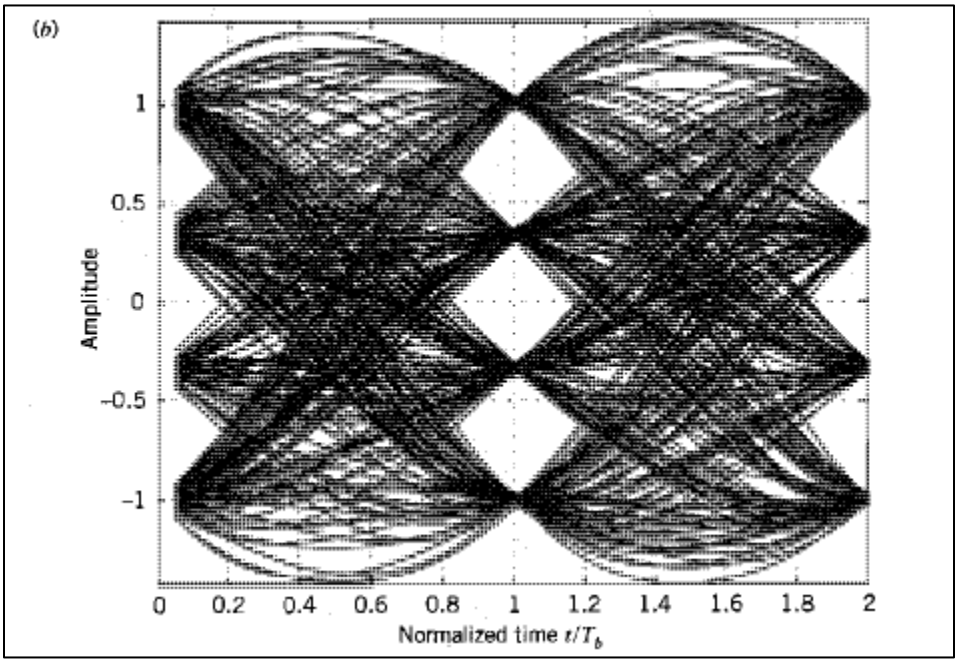
47. In a digital pulse modulation scheme, "the message signal is represented in a form that is discrete in both time and amplitude, thereby permitting its transmission in digital form as a sequence of '*coded pulses.*'" *Id*. 183. The sampling process "is basic to all pulse modulation systems." *Id*. 184

48. A key contributor to communications systems was Harry Nyquist. "In 1928, Harry Nyquist published a classic paper on the theory of signal transmission in telegraphy. In particular, Nyquist developed criteria for the correct reception of telegraph signals transmitted over dispersive channels in the absence of noise. Much of Nyquist's early work was applied later to the transmission of digital data over dispersive channels." Ex.1011 (Haykin), 27; *see also id*. 187-91, 212-13, 218-21, 227-29, 236-38, 261-75, 282-97, 426-31. Nyquist's theorem is a fundamental principle in the field of signal processing for accurately representing a continuous signal in discrete form.

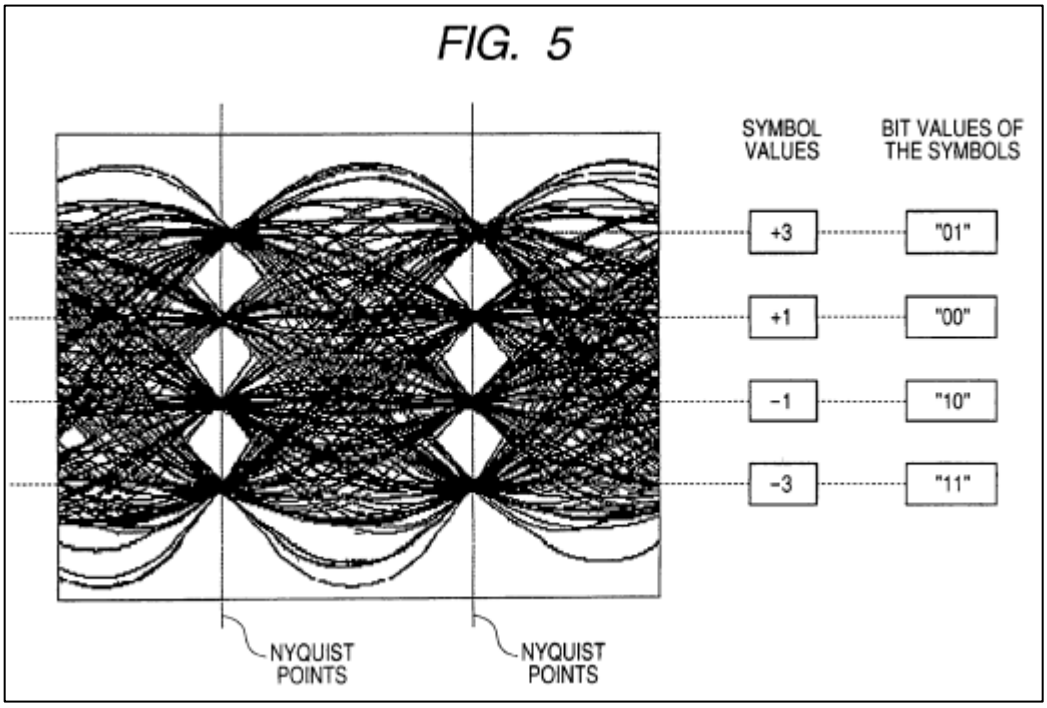
49. Commonly known to a POSITA is the "*Nyquist rate*" which is the "sampling rate of 2W samples per second for a signal bandwidth of W Hertz," and

"its reciprocal 1/2W (measured in seconds)," called the "*Nyquist interval*." *Id*. 188. For *pulse-code modulation*, the "signal is sampled at a rate slightly higher than the Nyquist rate." *Id*. 227. The *sampling theorem* "states that a strictly band-limited signal with no frequency components higher than W Hz is represented uniquely by a sequence of samples taken at a uniform rate equal to or greater than the Nyquist rate of 2W samples per second." *Id*. 236.

50. Further, eye patterns are tools well-known in the art for evaluating system performance to assess "the effects of channel noise and intersymbol interference on the performance of a baseband pulse-transmission system." *Id*. 293. Figure 4.34*b* depicts an eye diagram for a system with channel noise corrupting the received signal, with a SNR of 20 dB. *Id*.



51. As shown below, the eye pattern is like that of Fig. 5 of the '891 patent showing an exemplary eye pattern of a baseband signal. Ex. 1001 ('891 patent), 4:41-42, 7:41-8:2.



52. The '891 patent discloses demodulation, which was a well-known concept years before the earliest priority date of the patent (March 2004). For example and as shown in the figures above, in judging communication quality, the "receiving device measures an instantaneous value at a Nyquist point (where instantaneous values of the baseband signal are converged on any of multiple predetermined ideal values representative of symbols (the ideal value is also referred to as symbol value)) of the baseband signal obtained by demodulating the received FSK modulated wave, and judges the communication quality based on the

difference between the measured value and the ideal value." Ex. 1001 ('891 patent), 1:49-60.

53. The '891 patent also admits that "[t]he demodulator unit R2 is composed of a well known detection circuit for detecting the frequency modulated waves, and it detects the FSK modulated waves provided by the high frequency input unit R1 to restore the baseband signal. It then provides the restored baseband signal to the symbol judgment unit R3. The demodulator unit R2 may be composed of a processor, a memory that stores a program executed by the processor, and the like." Ex. 1001 ('891 patent), 9:5-12.

2. Bit Error Rate (BER)

54. "The goal of a communication system designer is to configure a system that transports a message signal form a source of interest across a noisy channel to a user at the other end of the channel" such that "[t]he message signal is delivered to the user both efficiently and reliably, subject to certain design constrains: allowable transmit power, available channel bandwidth, and affordable cost of building the system." Ex.1011 (Haykin), 23. Digital communication systems commonly measure reliability in terms of "*bit error rate* (BER) or *probability of bit error*" measured at the receiver output. *Id*., 23. The smaller the BER, the more reliable the system is. *Id*., IS-54-B discloses a BER measurement technique. Ex. 1004 (IS-54-B), 103-04.

55. Various methods were known to a POSITA to decode signals, assess bit information, and detect transmission errors. There are many types of error-control coding techniques that were well-known to a POSITA in 2004 (e.g., linear block codes, cyclic codes, convolutional codes, turbo codes, low-density parity check codes). Ex.1011 (Haykin), 626; *see also* Ex. 1001 ('891 patent), 13:6-14.

56. Forward error correction (FEC) was well-known by POSITAs by 2004 and is an error control technique used for data integrity. Ex.1011 (Haykin), 626. In FEC, a "discrete source generates information in the form of binary symbols. The *channel encode* in the transmitter accepts message bits and adds *redundancy* according to prescribed rule, thereby producing encoded data at a higher bit rate. The *channel decoder* in the receiver exploits the redundancy to decide which message bits were actually transmitted. The combined goal of the channel encoder and decoder is to minimize the effect of channel noise." *Id*., 626-27. The '891 patent admits that FEC was known in the art. *See* Ex. 1001 ('891 patent), 1-2, 13:6-14. IS-54-B teaches use of FEC. Ex. 1004 (IS-54-B), 162-63.

57. Cyclic redundancy check (CRC) code is another type of error detection that the '891 patent admits was known in the art. Ex. 1001 ('891 patent), 1-2; Ex.1011 (Haykin), 652-653. IS-54-B also teaches use of CRC. *See, e.g.,* Ex. 1004 (IS-54-B), 2, 60-61, 74-75.

58. As was known by a POSITA, soft-decision coding offers "significant improvement in performance over hard-decision decoding by taking a probabilistic rather than an algebraic approach." Ex.1011 (Haykin), 630.

59. The Viterbi algorithm is an example of an algorithm that has long been used for soft-input-hard-output decoding of bit errors by performing a maximum likelihood sequence estimation in the decoding of trellis codes. *Id*., 693. Viterbi's methods were introduced in 1967 and were well-known to a POSITA in 2004. *Id*., 694; *see also id*., 661-67. IS-54-B also teaches use of the Viterbi algorithm for decoding demodulated, and de-interleaved data using soft channel information. Ex. 1004 (IS-54-B), 74. The use of trellis codes in a GSM communication system was the topic of my PhD dissertation, which described a method for soft-input-hard-output decoding of trellis codes in such a system.

3. Protecting Bits

60. By 2004, protecting bits in various manners was well-known to a POSITA. For example, techniques for protecting bits included convolutional coding, Reed-Solomon coding, or bit repetition. *See, e.g*., Ex. 1008 (Su), 1:28-30; *id*., 3:32-34. Communication protocol standards at the time implemented various classes of bits with various levels of protection. For example, IS-54-B discloses class 1 bits which are convolutionally encoded and class 2 bits which are not convolutionally encoded. Ex. 1004 (IS-54-B), 60; *see also id*., 61-69.

61. Another well-known mechanism for protecting bits against noise was the use of channel coding to insert redundant bits into the transmitted data stream in a controlled matter. Ex.1011 (Haykin), 560.

4. Hamming Distance

62. The Hamming distance is a metric that dates back to the 1950s. Ex.1011 (Haykin), 694. The Hamming distance involves identifying the minimum number of differing binary symbols. *Id*., 661. The first used error-correcting codes were Hamming codes. *Id*., 694.

63. Calculating the Hamming distance entails comparing bits that form a valid Hamming codeword to the received bits, which may be an invalid Hamming codeword due to bit errors. The result of this comparison is a determination of the number of bits that differ between the two codewords, and their locations in the codeword. This error vector result can then be used to correct the errors in the received data bits as long as the number of bits in error does not exceed half the minimum Hamming distance between valid codewords in the Hamming code that is being used. For errors that exceed half the minimum Hamming distance but are less than the minimum Hamming distance, error correction cannot be performed on received Hamming codewords, but the number of bit errors that were determined can still be compared against a threshold. Codewords can be systematic or nonsystematic. When the codewords are systematic redundant bits are used.

B. Prior Art

1. Overview Of IS-54-B (Ex. 1004)

64. The reference I refer to as "IS-54-B" is the EIA/TIA Interim Standard, Cellular System Dual-Mode Mobile Stations – Base Station Compatibility Standard published by the Telecommunications Industry Association in April 1992. Ex. 1004 (IS-54-B). IS-54-B "forms a compatibility standard for cellular mobile telecommunications systems" and its "purpose is to ensure that a mobile station can obtain service in any cellular system manufactured according to [the] standard." *Id*. i. In Section 2, the IS-54-B standard discloses mechanisms for obtaining a baseband signal, processing the signal, checking for transmission errors, and correcting data. *See, e.g., id*. at 73-76. IS-54-B utilizes Viterbi convolutional decoding, a CRC check for errors, and a bad frame masking process to change data depending on whether errors are present. *Id.* 75-76. IS-54-B would have been known to POSITAs in the field of the '891 patent, and regularly consulted by POSITAs developing telecommunications systems in accordance with prevalent standards by 2004.

65. IS-54-B describes a differentially encoded quadrature phase shift keying modulation scheme, which uses a constant amplitude, phase constellation as shown in Figure 2-1 below:

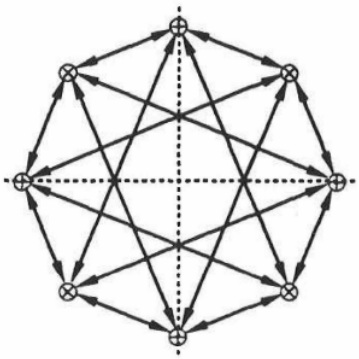
2.1.3.3 Digital Voice and Data Signals

2.1.3.3.1 Modulation

The modulation method used is known as $\frac{\pi}{4}$ shifted, differentially encoded quadrature phase shift keying.

The modulation scheme uses the phase constellation shown in Figure 2–1. Note that Gray code is used in the mapping; two di-bit symbols corresponding to adjacent signal phases differ only in a single bit. Since most probable errors due to noise result in the erroneous selection of an adjacent phase, most di-bit symbol errors contain only a single bit error. Note also, the rotation by $\frac{\pi}{4}$ of the basic QPSK constellation for odd (denoted ⊕) and even (denoted ⊗) symbols.

Figure 2–1



The information is differentially encoded; symbols are transmitted as changes in phase rather than absolute phases. A block diagram of the differential encoder is shown in Figure 2–2. The binary data stream entering the modulator, b_m, is converted by a serial-to-parallel converter into two separate binary streams (X_k) and (Y_k). Starting from bit 1 in time of stream b_m, all odd numbered bits form stream X_k and all even numbered bits form stream Y_k.

Id. 19. In the modulation scheme describe above, "each symbol carries 2 bits of information." *Id*. 7.

66. After data is demodulated, as described above, the data is de-interleaved. *Id*. 74. Various convolutional decoding methods were well-known in the art, and IS-54-B references the "Viterbi algorithm in conjunction with the use of soft channel information," as an example. *Id*. Then, "[a]fter decoding the class 1 bits, the received CRC bits are checked to determine if an error has been detected

in the 12 most perceptually significant bits in each frame." *Id*. The CRC check is "a process in which a desired sequence of bits is encoded in a prescribed manner to enable detection and correction of bit errors." *Id*. 2

67. The IS-54-B system provides a bad frame masking system based on a 6-state machine, which uses the CRC comparison to check for errors. *Id*. The "CRC comparison failure can occur because the data was corrupted by channel errors or because a FACCH message was transmitted in place of the speech data." *Id*. The bad frame masking system is used to prevent the degradation of speech quality. *Id*.

68. The state machine starts with state 0, which is the error free state of the system. The system stays in this state unless a CRC error is detected and with "each successive speech frame detected in error, the state machine moves to the next higher numbered state." *Id*. 75. "States 1 and 2 are simple frame repeats. States 3, 4 and 5 repeat and attenuate the speech. State 6 completely mutes the speech." *Id*. 74. The details of the state machine are further shown below:

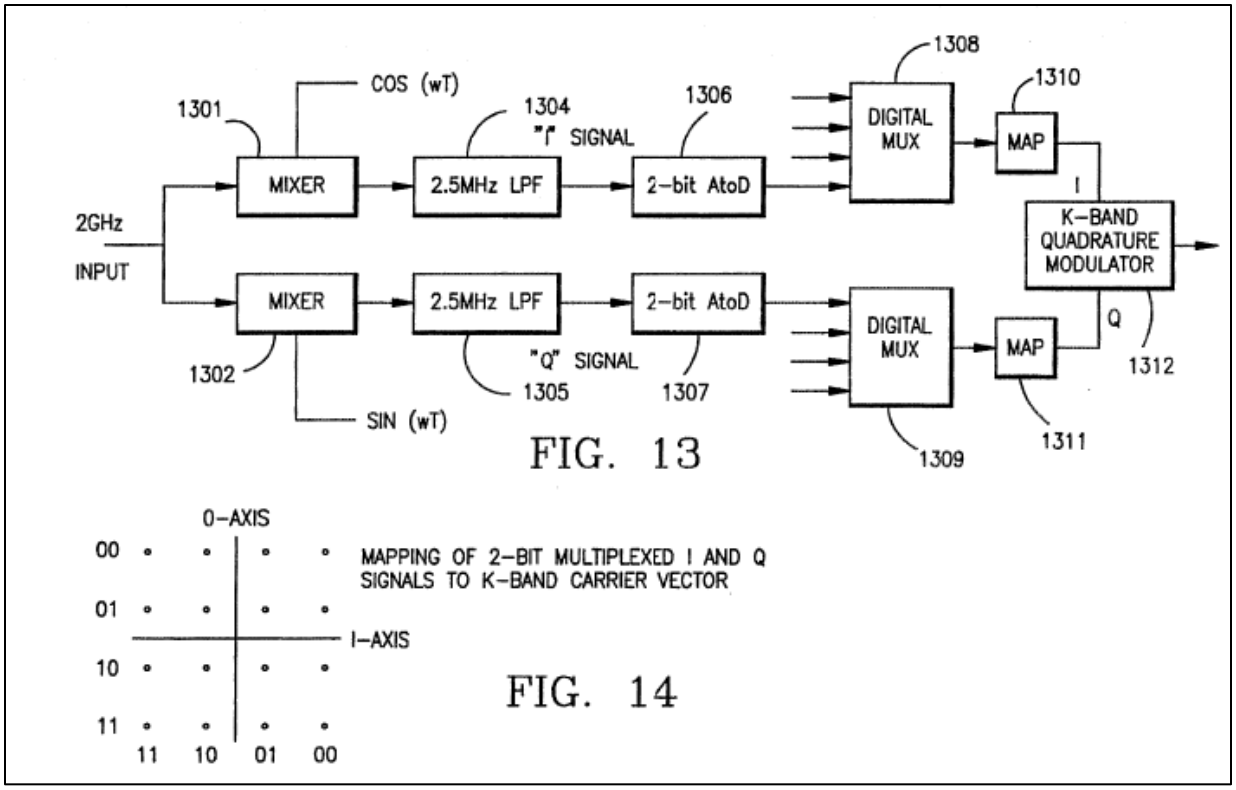
State 0 –	No CRC error is detected. The received decoded speech data is used.
State 1 –	A CRC error has been detected in the frame. The parameter values for R(0) and the LPC bits are replaced with the corresponding values from the last frame that was in state 0. The remaining decoded bits for the frame are passed to the speech decoder without modification.
State 2 –	same action is taken as in state 1.
State 3 –	As in state 1 and 2, a frame repeat is done, except that the value of R(0) is modified. A 4 dB attenuation is applied to the R(0) parameter, i.e. if R0 of the last state 0 frame is greater than 2, then R0 is decremented by 2 and repeated at this lower level.
State 4 –	same as state 3. R(0) is again attenuated by 4 dB, so now the level is as much as 8 dB from the original value of the R(0).
State 5 –	R(0) is attenuated an additional 4 dB.
State 6 –	Again the frame is repeated, but this time R(0) is set to zero, totally muting the output speech. Alternatively, comfort noise could be inserted in place of the speech signal.

Id. 75.

2. Dent (Ex. 1007)

69. The reference that I refer to as "Dent" is U.S. Patent 5,555,257 to Dent. It was filed on May 16, 1995, and issued September 10, 1996. Ex. 1007. Paul W. Dent is the only named inventor. *Id*. On its face, it is assigned to Ericsson GE Mobile Communications Inc. *Id*.

70. Dent relates to "a radio communication system and method for minimizing co-channel interference." *Id*., Abstract. Dent teaches cellular communication system procedures that include transmitting and receiving signals. Dent's teachings include standard techniques for converting a baseband signal and demodulating it. *Id*., 15:32-42; FIGs. 13, 15. An exemplary modulator in Dent's disclosures is depicted below in Fig. 13:



Dent discloses, among other things, filtering baseband signals at the Nyquist rate, which allows for more accurate construction. *Id*. 15:32-42.

3. Yeh (Ex. 1006)

71. The reference that I refer to as "Yeh" is a thesis entitled "Advanced Vocoder Idle Slot Exploitation for TIA IS-136 Standard" by Ernest Nanjung Yeh and was submitted to the Department of Electrical Engineering and Computer Science on June 26, 1998 in partial fulfillment of the requirements for the degrees of Bachelor of Science in Electrical Engineering and Computer Science and Master of Engineering in Electrical Engineering and Computer Science at the Massachusetts Institute of Technology. It bears a stamp of July 14, 1998 from Massachusetts Institute of Technology. POSITAs at the time of the '891 Patent

would have regularly consulted research by students at MIT, which was (and is) one of the more prominent universities developing signal processing techniques used in the telecommunications fields, and therefore POSITAs would have known to consult MIT materials for relevant research in the field of the '891 patent, and would have had access to and reviewed research like the Yeh thesis.

72. Yeh introduces a modification of the IS-136 digital cellular standard, which is a later version to, and backwards compatible with, IS-54 B. IS-136 and Yeh's teachings are thus backwards compatible with IS-54-B. Ex. 1006 (Yeh), Abstract. Yeh was motivated to achieve the goal of optimizations for "voice quality improvement." *Id*. 7. In particular, Yeh introduces an "Advanced Vocoder Idle Slot Exploitation (ADVISE)" modification "in which base stations can transmit auxiliary coded (redundant) bits on otherwise unused time slots to assist certain subscriber units." *Id*. 2. Yeh proposes a scheme to overlay to existing IS-136 forward error correction (FEC) design. *Id*.

73. In more detail, Yeh describes using a detection threshold to determine how to further process data. *Id*. 39-41. For example, Yeh uses "the Hamming distance metric [which] provides a higher detection rate and a lower false-alarm rate . . . [and] is computationally simple, and requires only minor modifications of [] existing firmware." *Id*. 53.

4. Mårtensson (Ex. 1005)

74. The reference that I refer to as "Mårtensson" is U.S. Patent 6,519,740. It was filed on May 15, 1998, and issued February 11, 2003. Ex. 1005. Jan Mårtensson is the first-named inventor. *Id*. On its face, it is assigned to Telefonaktiebolaget LM Ericsson. *Id*.

75. Mårtensson relates to a method for detecting bits in a radio communication systems, particularly within the GSM mobile communication system. It teaches a method of improving the detection of bits "called pulse5 bits which are not protected with channel coding." Ex. 1005 (Mårtensson), Abstract. Mårtensson teaches that, in the enhanced full rate (EFS) transmission in GSM, these pulse5 bits are protected through repetition. *Id*. These pulse5bits are protected by repetition are shown in Fig. 6 below:

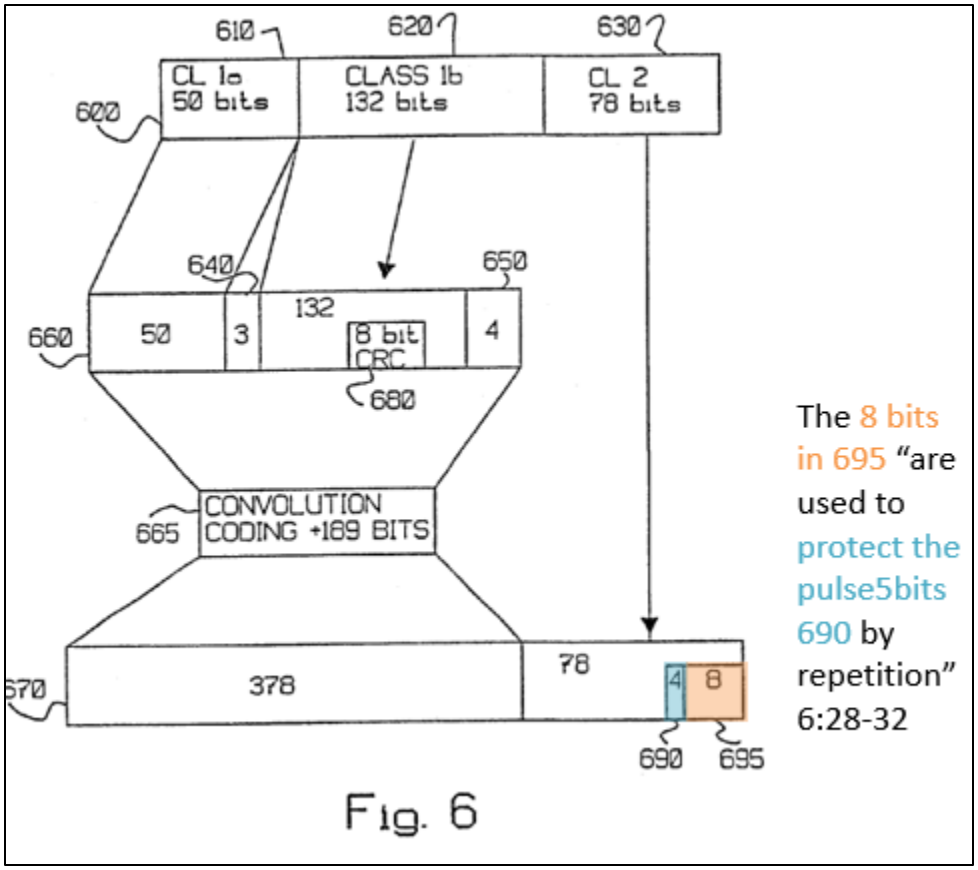
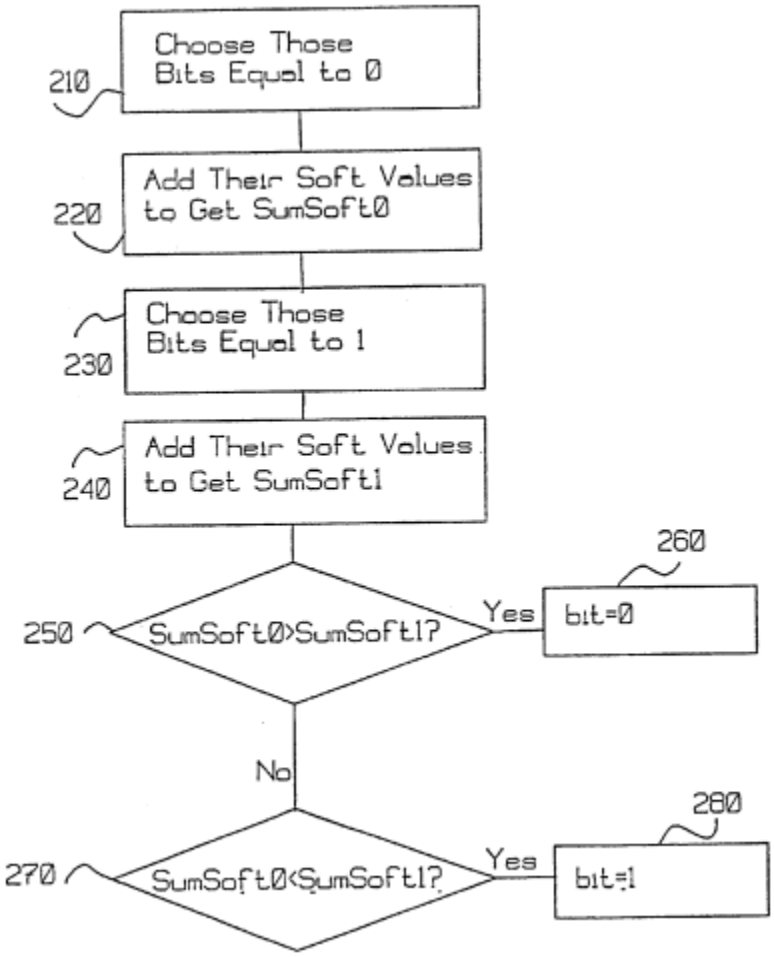


Fig. 6

Id. Fig. 6 (annotated).

76. Mårtensson teaches that the GSM system utilizes a Viterbi equalizer which provides "soft values" of the bits in addition to the bits themselves. Id. 1:58-65. These "soft values" are a "measure of the reliability [of the bit] in the form of a probability that the bit is indeed equal to 0 or 1." *Id*. 1:62-63. Mårtensson's invention utilizes available soft information and uses it to improve accuracy in determining the value of the pulse5 bits over traditional majority decision methods. *Id*. 2:19-29, 2:58-67. This process is shown in Fig. 7 below:



Id.

C. A POSITA would have been motivated to combine IS-54-B, Dent, Yeh, and Mårtensson

77. It is my opinion that IS-54-B, Dent, Yeh, and Mårtensson are analogous art to the '891 patent. The '891 patent "relates to a device and method for judging communication quality in a [wireless] communication system." '891 patent 1:7-10; *see also id*. 15:28-32. The '891 patent aims to accurately judge communication quality of the transmission channel (e.g., by detecting errors) in a "simple" manner. Ex. 1001 ('891 patent), Abstract, 1:27-30, 2:48-53, 4:25-29,

15:28-32. In particular, the ’891 patent describes judging the communication quality of the transmission channel based on “the number of data missing a predetermined value . . . among protective data having the predetermined value . . .” as “the result from simple processes.” Ex. 1001 (’891 patent), 12:43-57; *see also id*. Abstract, 1:27-30, 2:48-53, 4:25-29, 15:28-32.

78. IS-54-B is in the same field of endeavor as the ’891 patent. IS-54-B discloses “a compatibility standard for cellular mobile telecommunications systems” using time-division multiple access (TDMA). Ex. 1004 (IS-54-B), i. IS-54-B seeks “to ensure that a mobile station can obtain service in any cellular system manufactured according to this standard.” *Id*. As such, IS-54-B discloses channel and signal quality measurements. *Id*. 1-3, 106.

79. Dent is also in the same field of endeavor as the ’891 patent. Dent relates to a “communication system and method for minimizing co-channel interference.” Ex. 1007 (Dent), Abstract. Dent’s disclosure discusses transmitting and receiving signals, and Dent’s invention is also applicable to TDMA systems (a type of cellular system). *Id*. 10:61-11:18; *see also id*. Abstract.

80. Yeh is also in the same field of endeavor. Yeh’s teachings relate to voice quality improvement. Ex. 1006 (Yeh), 7. Yeh discloses a modification to the IS-136 digital cellular standard, which is a later version of IS-54-B. *Id*. Abstract. Yeh’s proposed implementations are also “backward-compatible, so that old

handsets without [Yeh's modification] support can continue to operate." Ex. 1006 (Yeh), 53. Like IS-54-B, Yeh (and IS-136) supports time-division multiple access (TDMA). *Id*. 9; *see also id*. 7.

81. Mårtensson is also in the same field of endeavor as the '891 patent. Mårtensson is titled "Bit Detection Method in a Radio Communications System." Mårtensson discloses an improvement for protecting bits not protected with channel coding through bit repetition in a manner that improves the reliability of the bit decision. Ex. 1005 (Mårtensson), 1:7-15, 2:19-29. Mårtensson describes a GSM system which uses TDMA. *Id*. 6:10-27.

1. Reasons to Incorporate Dent's Teachings of Judging a Symbol as an Alternate to IS-54-B's Teachings of Judging a Symbol

82. As explained above in § VIII.A.1, *supra*, modulation is a fundamental concept in the field of wireless communications that was well-known in the art well-before 2004. There are several different types of modulation schemes. *Id*. Demodulating a carrier signal and determining what symbols were communicated using that signal are fundamental processes within those modulation schemes. *Id*.

83. To a POSITA, the modulation teachings of IS-54-B and Dent are substantively similar in that they teach modulation schemes for judging symbols. § VIII.A.1, *supra*. A POSITA reviewing IS-54-B's quadrature phase shift keying (QPSK) modulation scheme using phase constellation implementations would have known of other references describing modulation schemes with additional details

to achieve the same results of obtaining a signal and determining the symbols communicated using that signal. §§ VIII.A.1, VIII.B.1-2 *supra*.

84. A POSITA considering IS-54-B would have found it obvious to use the additional details in Dent's disclosures to fill in gaps not expressly disclosed in IS-54-B for obtaining a signal and determining the symbols communicated using that signal. §§ VIII.A.1, VIII.B.1-2, *supra*. For example, Dent expressly discloses using Nyquist principles in its symbol judgment, which was a known technique in the art for signal processing. Ex. 1007 (Dent), 15:32-42. A POSITA would have been incentivized to use such techniques to improve accuracy; for example, Dent teaches that "[s]ampling at least at the Nyquist rate allows the signals to be faithfully reconstructed from the samples." *Id*.; § VIII.A.1, *supra*. As described in § VIII.A.1, *supra*, using Nyquist principles and the Nyquist rate dates back about one hundred years, and these sampling techniques were known by a POSITA. Additionally, a POSITA would have recognized that using Nyquist sampling as Dent discloses ensures system operability. § VIII.A.1, *supra*. Using Nyquist sampling allows the band-limited, continuous signal to be adequately converted into a digital signal. This approach including filtering to avoid aliasing of adjacent frequencies to the band-limited signal, which would otherwise introduce errors in demodulation.

85. Dent teaches "radio communication systems with increased capacity," that are able to "exploit the potential capacity increases which would be realized using discrimination" between independently modulated signals. Ex. 1007 (Dent), 1:10-11, 3:46-58. Dent further teaches an antenna that "receives signals from a plurality of mobile phones distributed between the various beams", where the received signals are "composite signals" from each beam containing signals from a plurality of mobile phones. *Id*., 8:19-30. These composite signals are then downconverted to baseband signals, where the bandwidth of the baseband signal frequency range matches the bandwidth of the composite signal. *Id*.

86. In one embodiment, Dent teaches that the amplitude and phase of the signal can be first digitized before using digital filters to separate the individual channels for each mobile phone in the composite signal. *Id*., 10:18-42. Dent teaches a matrix processor as a type of digital filter, where there is one matrix processor per individual channel to process the digitized beam signals and separate the mobile phone transmissions for further voice channel processing. *Id*., 10:43-50.

87. In another embodiment, Dent teaches a 2 GHz signal that is downconverted to a baseband signal with a desired bandwidth of 5 MHz, thus requiring a Nyquist rate sampling of 5 mega samples per second to allow the signal to be "faithfully" reconstructed from the samples. *Id*., 16:42-43, 15:19-37. This

allows voice channels to be modulated on a satellite K-band carrier with "substantially no bandwidth expansion of the signal". *Id*., 16:48-64.

88. When reading Dent, a POSITA would thus understand that sampling at the Nyquist rate is a bandwidth-efficient sampling rate that allows for a faithful reconstruction of the voice channel signal for subsequent use in any context where it is needed.

89. A POSITA would have used the demodulation scheme disclosed in IS-54-B or in Dent to achieve predictable results. Although a POSITA would understand IS-54-B to teach judging a symbol, as an additional teaching with further detail, a POSITA would have incorporated Dent's teachings of judging a symbol. Doing so would have been nothing more than the use of a known technique (Dent's teachings of using Nyquist principles in its symbol judgment) to improve a similar method (IS-54-B's symbol judging) in the same way, and a POSITA would have had a reasonable expectation of success in doing so. For example, implementing these teachings would have required nothing more than predictable hardware and software changes to a system implementing IS-54-B, which would have been within the level of skill in the art at the time, and to the extent additional hardware was needed, such components were known at the time as well. For example, the circuitry generating samples from the received signal

input, would have its sampling rate adjusted to the Nyquist rate, and its associated anti-aliasing filter would have its bandwidth adjusted to Nyquist rate.

2. Reasons to Incorporate Yeh's Teachings of Using Thresholds

90. A POSITA considering Yeh would have been motivated to combine its teachings with IS-54-B. IS-54-B relies upon whether a CRC check flags an error to determine how to further process data. A POSITA would have been motivated to apply Yeh's use of thresholds to determine whether or not a predetermined condition was satisfied and how to further process data.

91. In particular, Yeh's use of thresholds would have allowed a POSITA more flexibility when determining what predetermined change to make to correct for errors in the data, according to how the judged communication quality falls within the thresholds. Using thresholds to flexibly determine whether to make various changes to correct errors in the data was a well-known method used by POSITAs designing telecommunications systems. For example, a POSITA understood that a CRC checksum, hash value, or any error detection code such as a Hamming code can be utilized to determine if the number of errors has exceeded a threshold, and determine whether it is necessary to perform an error correction algorithm.

92. A POSITA considering Yeh would have been motivated to use its teachings because its "detection algorithm using dual-threshold-mode with the

Hamming distance metric provides a higher detection rate and a lower false-alarm rate[,]" and is "computationally simple, and requires only minor modifications of the existing firmware." Ex. 1006 (Yeh), 53. Thus, a POSITA would have recognized an express teaching, suggestion, or motivation in Yeh to apply Yeh's use of thresholds as a predetermined condition for its simplicity, higher detection rate, lower false-alarm rate, and need for only minor modification.

93. The combination would have been nothing more than an obvious combination of prior art elements according to known methods to yield predictable results. IS-54-B is a TDMA mobile digital cellular standard. IS-136 is later version of that TDMA mobile digital cellular standard, upon which Yeh is intended to modify with backward compatibility in mind. Ex. 1006 (Yeh), 7, 9. IS-136 is backward compatible with IS-54-B. Accordingly, incorporating Yeh's enhancements to IS-136, which is backwards-compatible with IS-54-B, would have been obvious to a POSITA, and a POSITA would have reasonably expected success in combining the teachings because of the backward compatibility. For example, implementing these teachings would have required nothing more than software changes to a system implementing IS-54-B, which would have been within the level of skill in the art at the time, and to the extent additional hardware was needed, such components were known at the time as well.

3. Reasons to Incorporate Mårtensson's Teachings of Judging Communication Quality of a Transmission Channel

94. Techniques for detecting transmission errors were well-known in the art before 2004. § VIII.A.2, *supra*. For example, IS-54-B assesses the channel quality using a state machine based on CRC checks. The "CRC comparison failure can occur because the data was corrupted by channel errors or because a FACCH message was transmitted in place of the speech data." Ex. 1004 (IS-54-B), 74. Mårtensson also discloses a CRC for error detection amongst bits. Ex. 1005 (Mårtensson), 1:25-34, 6:18-27 ("An 8-bit cyclic redundancy check (CRC) [] is used for error detection among the class 1*b* bits, while the other 8 bits [] are used to protect a group of class 2 bits known as pulse 5 bits.").

95. Techniques for reliably detecting bits were also well-known in the art before 2004. § VIII.A.2, *supra*. For example, both the GSM system that Mårtensson improves upon, and the TDMA system IS-54-B covers, utilize Viterbi equalization for demodulating a trellis-coded signal. Ex. 1004 (IS-54-B), at 74; Ex. 1005 (Mårtensson), 1:58-64, 5:11-27. A Viterbi equalizer provides "soft" information as a measure of reliability of each bit. Ex. 1005 (Mårtensson), 5:11-27. Mårtensson uses the probabilistic soft information about bits to better detect the value of the bit. The performance of probability and reliability of the soft values of the bits reflects the communication quality of the transmission channel. § VIII.A.2, *supra*. IS-54-B explains "[a]ny decoding technique for convolutional codes may be

used" and "[m]ay be decoded using Viterbi algorithm in conjunction with the use of soft channel information," which includes the use of Viterbi equalization to decode a trellis code. Ex. 1004 (IS-54-B), 74.

96. A POSITA considering Mårtensson would have been motivated to combine Mårtensson with IS-54-B. IS-54-B teaches soft-input-hard-output Viterbi decoding (Ex. 1004 (IS-54-B), 74), and Mårtensson teaches using information available from the Viterbi equalizer to better determine the reliability of the pulse5 bits not protected by channel coding. Thus, the IS-54-B system already provides soft values for Viterbi decoding and a POSITA wanting to improve quality and reliability of the IS-54-B system and considering Mårtensson, would have applied Mårtensson's uses of the soft information to reliably detect bits in the IS-54-B system. *See* §§ VIII.A.2, VIII.B. 4 *supra*. This would have improved the communication quality of the combined system.

97. The combination would have been obvious as nothing more than the use of a known technique (Mårtensson's bit detection disclosures) to improve similar devices in the same way (IS-54-B's TDMA wireless communication system). *See* §§ VIII.A.2, VIII.B.3-4 *supra*. Mårtensson discloses checking the value of individual bits and provides for "the detection of bits which are protected by repetition, and which, along with their repetitions, have soft values available which give a measurement of the reliability of their received values." Ex. 1005

(Mårtensson), 1:7-10. To a POSITA seeking to improve the communication quality assessment of IS-54-B's disclosures, Mårtensson provides additional details. A POSITA would have also had a reasonable expectation of success in combining the teachings because soft-input-hard-output Viterbi decoding of a trellis code is a known technique and the soft information provided by the Viterbi equalizer exists in the IS-54-B system. Ex. 1004 (IS-54-B), 74. And, as Mårtensson notes, its teachings may be used in broader applications beyond GSM. Ex. 1005 (Mårtensson), 3:1-3. For example, implementing these teachings would have required nothing more than software changes to a system implementing IS-54-B, which would have been within the level of skill in the art at the time, and to the extent additional hardware was needed, such components were known at the time as well.

4. Reasons to Incorporate Mårtensson's Teachings of Protecting Portions of Bit Strings Though Repetition

98. Protecting portions of bit strings was well-known in the art. § VIII.A.3, *supra*. A POSITA would have been familiar with providing portions of bit strings with various levels of protection in various ways, such as through channel coding or bit repetition. § VIII.A.3, *supra*.

99. A POSITA considering Mårtensson would be motivated to incorporate its teachings because Mårtensson's teachings are directed to an improvement of protecting a bit portion not protected by channel coding, by adding

protection to that portion that is a bit repetition of 1's,in a manner that improves the reliability of bit detection. Ex. 1005 (Mårtensson), 6:18-7:20; *see also id*. 2:19-29.

100. A POSITA would have been motivated to incorporate Mårtensson's teachings of protected portions of bit strings protecting bits through the repetition of 1's in the lower bits of the symbol modulation to increase protection of bits to better judge and manage communication quality of the IS-54-B system because Mårtensson's invention relies on soft information from Viterbi equalization. Although soft information is provided for in the IS-54-B system, it is not utilized, and Mårtensson's teachings provide a desirable use for such soft information (e.g., to improve performance and provide a measurement of reliability). *See* Ex. 1005 (Mårtensson), 2:58-67; 6:27-7:20.

101. In the below discussion of individual claims I may also provide further rationale for combining IS-54-B, Dent, Yeh, and Mårtensson for specific features and limitations.

IX. A POSITA would have found claims 1-9 obvious in view of IS-54-B, Dent, Yeh, and Mårtensson

102. For the reasons discussed below, it is my opinion that 1-9 of the '891 patent would have been obvious to a POSITA.

A. Independent Claim 8

103. Independent claim 8 recites a communication quality judging method, which I have reproduced below with labels to aid my analysis.

> 8. **[Preamble]** A communication quality judging method, the method comprising the steps of:
>
> **8[a]** obtaining a baseband signal representative of a sequence of multilevel symbols and judging the symbol represented by the baseband signal;
>
> **8[b]** judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged in the symbol judging step; and
>
> **8[c]** changing data if the communication quality judged in the communication quality judging step does not satisfy a predetermined condition, to make a predetermined change to the data to be transmitted represented by the symbol used in the judgment,
>
> **8[d]** wherein at least a portion of a bit string is distinguished as a protected portion, the bit string constituting data to be transmitted represented by the sequence of symbols, and at least a portion of the symbol that belongs to the sequence of symbols contains a bit belonging to the protected portion and a redundant bit having a predetermined value, and
>
> **8[e]** wherein, in the communication quality judging step, the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value is identified among the redundant bits contained in the symbol that contains a bit belonging to the protected portion, and the communication quality of the transmission channel is judged based on the identified result.

104. As discussed below, it is my opinion that the combination of IS-54-B, Dent, Yeh, and Mårtensson discloses and/or renders obvious each limitation of claim 8, and renders claim 8 obvious as a whole.

1. 8[pre]: "A communication quality judging method, the method comprising the steps of"

105. For the purposes of my analysis I have assumed that the preamble of claim 8 is limiting on the claim.

106. IS-54-B is a dual-mode cellular standard which discloses that "the mobile performs signal quality measurements," including "[c]hannel quality measurements" of "Bit Error Rate (BER) information" on "[t]he current forward traffic channel [which] is used to transmit information from the base station to the mobile during a call." Ex. 1004 (IS-54-B), 102; *see also id*. i, 1, 3, 103-06, 134, 137-43, 167-68, 198-99, 248-49. Of course, such features were well-known and commonplace to a POSITA decades before the '891 patent.

107. It is well known to a POSITA that the mobile device contains a receiver for making channel quality measurements, including determining BER information. Ex. 1004 (IS-54-B), 102; *see also id*. i, 1, 3, 103-06, 134, 137-43, 167-68, 198-99, 248-49. Thus, IS-54-B discloses the claimed "communication quality judging method," as further reflected in the discussion below for the specific limitations of claim 8.

2. 8[a]: "obtaining a baseband signal representative of a sequence of multilevel symbols and judging the symbol represented by the baseband signal"

108. It is my opinion that IS-54-B discloses this limitation and that Dent also discloses this limitation. For example, IS-54-B discloses "demodulation signal

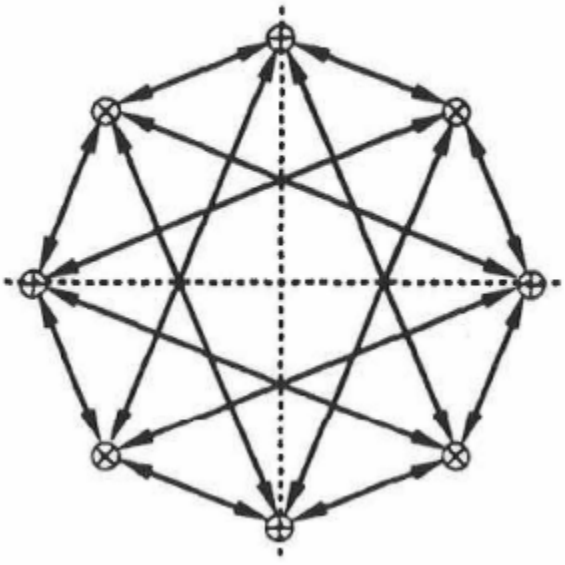
processing" (Ex. 1004 (IS-54-B), 73) and Dent discloses "a voice channel processor [that] numerically performs demodulation of the signal and error correction decoding and transcoding of digitized voice[.]" Ex. 1007 (Dent), 10:50-55; *see also* Ex. 1004 (IS-54-B), 7, 9-10, 7-25, 72; Ex. 1007 (Dent), 15:5- 16:27.

109. First, as an initial matter, a POSITA would have understood "*obtaining a baseband signal representative of a sequence of multilevel symbols*" to correspond to demodulation, which was well-known in the art by 2004. *See, e.g.*, Ex. 1001 ('891 patent), 9:5-12, 1:49-60; § VIII.A.1, *supra*. Second, a POSITA would have understood a "multilevel symbol" as any symbol representing more than one bit (e.g., two bits), which was likewise well-known in the art by 2004. § VIII.A.1, *supra*. Third, a POSITA would understand "*judging the symbol represented by the baseband signal*" to include a process of comparing ideal or expected instantaneous values of the baseband signal to those values received in the signal, which was well-known in the art by 2004. § VIII.A.1, *supra*. Thus, this limitation claims elements well-known in the art by 2004. *Id*.

110. IS-54-B discloses "differentially encoded quadrature phase shift keying" which "is amenable to a number of different **demodulation techniques**" and where each symbol carries two bits of information, which discloses or at least renders obvious "*obtaining a baseband signal representative of a sequence of multilevel symbols*" as recited. Ex. 1004 (IS-54-B), 7, 73; *see also id*. 9-11, 15, 17-

28. IS-54-B elaborates and further discloses a modulation scheme using "phase constellation" shown below in Figure 2-1 (reproduced below). Ex. 1004 (IS-54-B), 19-20. The constellation points represent the ideal phases of constant amplitude transmitted and received symbols. *See* § VIII.A.1, *supra*. The phase value of the received symbol can be compared to the ideal phase of the constellation point. If the detected symbol is shifted off one of those ideal constellation points, depending on the delta of the difference between the ideal and received phase, the symbol may be categorized as 00, 01, 10, or 11 ("*judging the symbol represented by the baseband signal"*).

Figure 2–1



111. A POSITA would recognize that Dent also discloses details of "*judging the symbol represented by the baseband signal*", and specifically,

discloses "baseband I and Q signals" ("*obtaining a baseband signal representative of a sequence of multilevel symbols*") that are "classified as lying nearest to one of the four values -3, -1, +1 or +3 arbitrary units, as indicated by a digital code 11, 10, 01 or 00" ("*judging the symbol represented by the baseband signal*"). Ex. 1007 (Dent), 15:32-42. A POSITA would have used IS-54-B, or combined the teachings of IS-54-B and Dent in the alternative, for the reasons set forth above in § VIII.C.1, *supra*.

112. Accordingly, IS-54-B, or the combined teachings of IS-54-B and Dent, consistent with a POSITA's knowledge, discloses and renders obvious limitation 8[a]: *obtaining a baseband signal representative of a sequence of multilevel symbols* (e.g., demodulating a signal) *and judging the symbol represented by the baseband signal* (e.g., measuring the difference between an ideal value and a received value).

3. 8[b] "judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged in the symbol judging step"

113. Mårtensson renders obvious this limitation.

114. A POSITA would recognize that, once the baseband signal is obtained by demodulation and its symbol judged for quality, as discussed above and as taught by IS-54-B and Dent, Mårtensson discloses judging communication quality based on the reliability of bits based on that symbol judgment.

115. In further detail, a POSITA would have recognized Mårtensson's judgment of the reliability of bits as reflective of the communication quality of the transmission channel. *See* §VIII.A.2, *supra*. For example, Mårtensson identifies problems with communication quality of a transmission channel and discloses that "signals (e.g., data, speech) transmitted over this [radio] channel may be strongly distorted due to fading, for example, so that the transmitted bursts give rise to a distorted speech frame." Ex. 1005 (Mårtensson), 5:3-10.

116. Like the teachings of IS-54-B and Dent, Mårtensson discloses that a receiver "converts a radio signal to a baseband signal" and "then sends this baseband signal to the equalizer [] where it is then demodulated." *Id*., 5:11-16. Mårtensson expands on these common teachings of IS-54-B and Dent of obtaining and demodulating a baseband signal and discloses thereafter obtaining soft information from the equalizer as "a measure of the reliability of each bit." *Id*., 5:18-19. As Mårtensson explains, the soft value associated with a bit is "a measure of the reliability of the bit received. If the bit is received as a 1, for example, the soft value gives a measure of the probability that the bit is actually a 1." *Id*., 3:49-53. Mårtensson discloses that using soft information as part of the decision as to the value of the original bit is advantageous, as such use has shown an improved signal-to-noise ratio performance in bit detection. *Id*., 2:8-16, 4:19-30, 7:21-27, FIG. 8; §§ VIII.A.2, VIII.B.4 *supra*. A POSITA would have recognized

Mårtensson's description of measuring the reliability of each bit to correspond to "*judging communication quality of a transmission channel over which the baseband signal has been transmitted*" because the reliability of the received bits is directly related to the communication quality of the channel. §§ VIII.A.2, VIII.B.4, *supra*. A POSITA would have combined these teachings of Mårtensson for the reasons set forth above in §§ VIII.C.3-4, *supra*.

117. Accordingly, Mårtensson renders obvious limitation 8[b]: "*judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged in the symbol judging step*" (e.g., Mårtensson discloses judging the reliability of obtained bits from a demodulated baseband signal as taught by IS-54-B).

4. 8[c] "changing data if the communication quality judged in the communication quality judging step does not satisfy a predetermined condition, to make a predetermined change to the data to be transmitted represented by the symbol used in the judgment"

118. It is my opinion that the combination of IS-54-B and Yeh render obvious this limitation.

119. IS-54-B discloses a "bad frame masking system" based on a "CRC comparison" which may detect "an error in the 12 most perceptually significant bits of the speech frame." Ex. 1004 (IS-54-B), 75. For example, IS-54-B discloses:

> The bad frame masking system is based on a 6 state machine. On every decode of a speech frame, the state machine can change state. State 0

> occurs most often and implies that the CRC comparison was successful. State 6 implies that there were at least 6 consecutive frames which failed the CRC check. The action at each of these states varies as well. States 1 and 2 are simple frame repeats. States 3, 4 and 5 repeat and attenuate the speech. Speech 6 completely mutes the speech.

Id., 74. IS-54-B explains that states 0-5 "indicate[] how many consecutive frames had CRC comparison failures. For example, state 5 indicates 5 consecutive frames (including the current frame) have failed the comparison." *Id*., 75.

120. IS-54-B further explains that the action that follows the comparison depends on the state of the machine ("make a predetermined change to the data to be transmitted"). *Id*., 74-75. In states 1 and 2 the data is "replaced with the corresponding values from the last frame that was in state 0," for states 3, 4 and 5 "repeat and attenuate the speech," and state 6 "totally mute[es] the output speech." *Id*., 74-75 ("*changing data*").

121. IS-54-B does not explicitly disclose the use of thresholds for purposes of determining whether to make a change, but this was a well-known technique in the wireless communication field (for example through the use of CRC checksum or hash function, to determine whether to perform error correction or Hamming code) and to a POSITA, and Yeh explicitly discloses comparing a value to a threshold to determine how to further process data ("*if the communication quality judged in the communication quality judging step does not satisfy a predetermined condition*"). Ex. 1006 (Yeh), Abstract. For example, Yeh discloses a "detection

method" which is "based on the Hamming distance between the two sets of received bits. If the Hamming distance is smaller than a threshold, the detection method declares ADVISE to be present" and proceeds one way. *Id*. "Otherwise, the method declares ADVISE to be absent" and proceeds another way. *Id*.; § VIII.A.4, *supra*. A POSITA would have combined these teachings of Yeh for the reasons set forth above in § VIII.C.2, *supra*.

122. Accordingly, the combination of IS-54-B and Yeh renders obvious limitation 8[c]: "*changing data*" (e.g., IS-54-B's replacing, attenuating, or muting data) "*if the communication quality judged in the communication quality judging step does not satisfy a predetermined condition*" (e.g., Yeh's comparison of the Hamming distance to a threshold to determine how to further proceed)*,* "*to make a predetermined change to the data to be transmitted represented by the symbol used in the judgment*" (e.g., IS-54-B's changing the data depending on the state of the state machine).

5. 8[d] "wherein at least a portion of a bit string is distinguished as a protected portion, the bit string constituting data to be transmitted represented by the sequence of symbols, and at least a portion of the symbol that belongs to the sequence of symbols contains a bit belonging to the protected portion and a redundant bit having a predetermined value"

123. Mårtensson discloses and renders obvious this limitation.

124. As an initial matter, protecting a portion of a bit string by using redundant bits was well-known in the art by 2004. My PhD dissertation from 1993

describes one such method that applies trellis codes to a modified GSM communication system. §§ VIII.A.2-3, *supra*. A bit is a binary digit with a value of either 0 or 1. *Id*. Protecting bits by dividing them into portions with various levels of protection was also well-known in the art by 2004. *Id*. Additionally, that a bit string constitutes data to be transmitted and represents a sequence of symbols was well-known by 2004. *Id.*

125. Consistent with this knowledge in the art, Mårtensson discloses a speech frame "divided into three blocks of bits, class 1*a*, class 1*b*, and class 2, according to their level of protection" ("*at least a portion of a bit string is distinguished as a protected portion*"). Ex. 1005 (Mårtensson), 1:18-21, 1:35-39. Mårtensson explains that class 1a bits "are most sensitive to transmission error and cause the most problematic consequences with regard to the intelligibility of the transmitted and decoded speech." *Id*., 5:58-61. For these bits, "error protection is performed with the aid of three parity bits 640 which are added to the 50 data bits as control bits." *Id*., 5:63-65. Mårtensson further explains that class 1b bits are protected by four "tail bits 650" and "are not equally as sensitive with regard to the intelligibility to transmission bit errors occurring as compared to the class 1*a* bits." *Id*., 5:66-6:3. Finally, the class 2 bits "are the bits least susceptible to error and are not protected at all-by additional bits, as in the case of class 1*a* and 1 *b*." *Id*., 6:7-9.

126. Mårtensson also discloses an "enhanced full rate (EFS) mode of transmission in GSM [where] there are used only 244 of the 260 bits available due to greater efficiency of the speech encoding method" which "leaves an additional 16 bits that can be used to protect the other 244 bits." *Id*., 6:18-22. Thus, Mårtensson explains that "8 bits 695 are used to protect a group of class 2 bits known as pulse5 bits 690." *Id*., 6:22-26. Those 8 bits "are used to protect the pulse5 bits 690 by repetition 695." *Id*., 6:28-29.

127. Figure 6 shows the three classes of bits disclosed with various levels of protection:

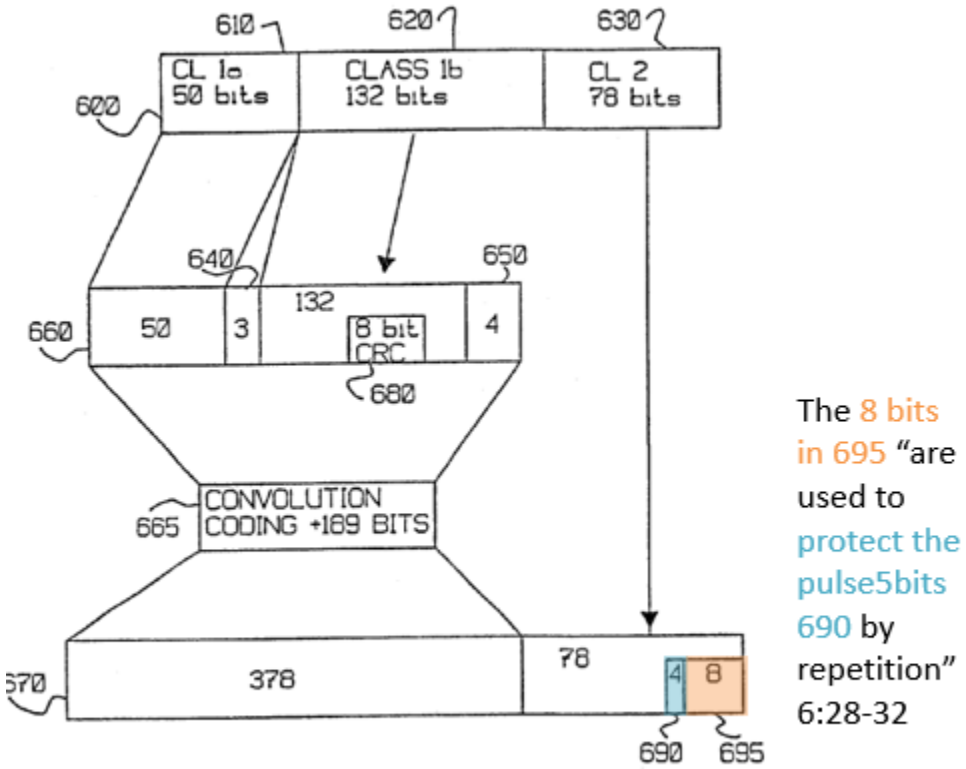


Fig. 6

Id. FIG. 6 (annotated).

128. A POSITA would recognize that Mårtensson further discloses that "bits are protected by repetition of their values" ("*a redundant bit having a predetermined value*") and that the bit values (and the corresponding protection-repetition bit) "are equal to 0" or "are equal to 1." Ex. 1005 (Mårtensson), 3:46-47; 3:66-4:9. For example, Mårtensson teaches that "the bits among those bits to be protected whose values are equal to 0 are chosen. These will be the bits from the original bit and its repetitions." *Id*. 3:67-4:2. Thus, Mårtensson discloses "*at least a portion of the symbol that belongs to the sequence of symbols contains a bit belonging to the protected portion and a redundant bit having a predetermined value*." A POSITA would have combined these teachings of Mårtensson for the reasons set forth above in §§ VIII.B.4, VIII.C.3-4, *supra*.

129. Accordingly, it is my opinion that Mårtensson discloses and renders obvious limitation 8[d]: "*wherein at least a portion of a bit string is distinguished as a protected portion, the bit string constituting data to be transmitted represented by the sequence of symbols, and at least a portion of the symbol that belongs to the sequence of symbols contains a bit belonging to the protected portion and a redundant bit having a predetermined value*" (e.g., Mårtensson discloses that "bits are protected by repetition of their values").

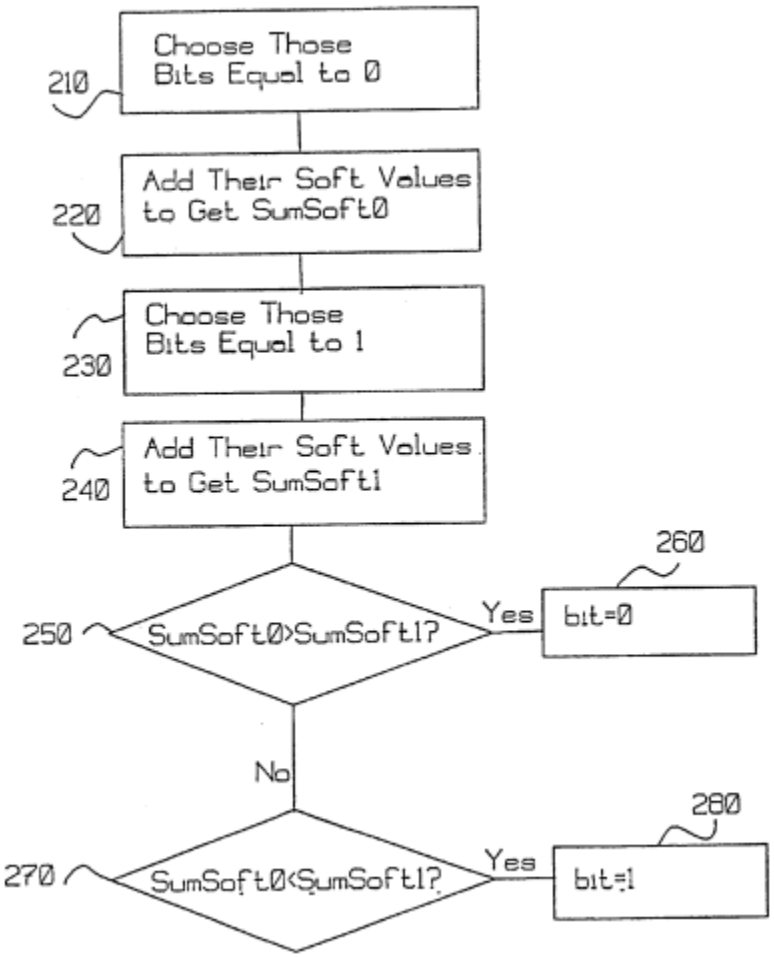
6. 8[e] "wherein, in the communication quality judging step, the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value is identified among the redundant bits contained in the symbol that contains a bit belonging to the protected portion, and the communication quality of the transmission channel is judged based on the identified result"

130. Mårtensson discloses and renders obvious this limitation.

131. For example, Mårtensson discloses "detection of the value of a bit received in a communication system." Ex. 1005 (Mårtensson), 3:43-45. Mårtensson discloses a method using a "pulse5 bit" that is "protected by repeating each pulse bit two times" *Id*., 1:38-39. Mårtensson further discloses a method using soft values for received bits which "are a measure of the reliability of the bit received. If the bit is received as a 1, for example, the soft value gives a measure of the probability that the bit is actually a 1." *Id*., 3:49-53.

132. As shown in Figure 2 below, Mårtensson discloses a method where "the bits among those bits to be protected whose values are equal to 0 are chosen. These will be the bits from the original bit and its repetitions." *Id*., 3:67-4:2. Then, "the soft values of these bits are added together" which results in "the sum of the soft values for all the bits equal to 0 among a given bit and its repetitions," called "SumSoft0." *Id*., 4:2-6. Next, "the bits from the original and its repetitions whose values are equal to 1" are chosen, "[t]hen the soft values of these bits are added together" which results in "the sum of the soft values for all the bits equal to 1

among a given bit and its repetitions," called "SumSoft1." *Id*., 4:7-13. Then, the values of SumSoft0 and SumSoft1 are compared. *Id*., 4:14-30.



Id. FIG. 2.

133. Mårtensson's disclosure of adding "the soft values for all bits equal to 0 among a given bit and its repetitions" to yield the SumSoft0 value includes choosing redundant bits equal to 0 and adding the soft values for those redundant bits equal to 0. *Id*., 4:4-6. Additionally, Mårtensson's disclosure of adding "the soft values for all bits equal to 1 among a given bit and its repetitions" to yield the SumSoft1 value includes choosing redundant bits equal to 1 and adding the soft

values for those redundant bits equal to 1. *Id*., 4:11-12. Thus, Mårtensson's disclosure discloses and renders obvious "*the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value is identified among the redundant bits contained in the symbol that contains a bit belonging to the protected portion*."

134. Mårtensson discloses comparing the values for SumSoft0 and SumSoft1 (which use soft values, "a measure of the reliability of the bit received") to make a decision as to the value of the original bit. Ex. 1005 (Mårtensson), 3:50-51, 4:19-30. Thus, Mårtensson discloses and renders obvious "*the communication quality of the transmission channel is judged based on the identified result*."

135. Additionally, Mårtensson further discloses that simulations show that the invention "improves the residual bit error for pulse5 bits (rber_ pulse5) performance between 3.4 and 4.6 dB." Ex. 1005 (Mårtensson), 7:23-26. Mårtensson further discloses that its simulations have "shown an improved C/I and SNR [signal-to-noise ration] performance of approximately 4.5 dB in the detection of these pulse5 bits." *Id*., 2:14-16. Thus, Mårtensson further discloses and renders obvious "*the communication quality of the transmission channel is judged based on the identified result*." A POSITA would have combined these teachings of Mårtensson for the reasons set forth above in §§ IV.B.4, IV.C.3-4 *supra*.

136. Accordingly, Mårtensson discloses and renders obvious limitation 8[e]: "*wherein, in the communication quality judging step, the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value is identified among the redundant bits contained in the symbol that contains a bit belonging to the protected portion*" (e.g., choosing the soft values of corresponding to redundant bits equal to 0 and equal to 1)*,* "*and the communication quality of the transmission channel is judged based on the identified result*" (e.g., comparing SumSoft0 and SumSoft1 to make a decision as to the transmitted bit which has been simulated and demonstrated to improve signal-to-noise ratio performance).

B. Independent Claim 1

1. 1[pre] "A communication quality judging device comprising"

137. For the purposes of my analysis I have assumed that the preamble of claim 1 is limiting on the claim.

138. IS-54-B discloses and renders obvious this limitation, because it teaches techniques to "ensure that a **mobile station** can obtain service in any cellular system manufactured according to this standard." Ex. 1004 (IS-54-B), 1. Thus, IS-54-B's mobile stations disclose or at least render obvious a "*communication quality judging device*" as recited.

2. 1[a] "a symbol judging means for obtaining a baseband signal representative of a sequence of multilevel symbols and judging the symbol represented by the baseband signal"

139. As detailed above in the analysis of limitation 8[a], IS-54-B, or the combined teachings of IS-54-B and Dent, disclose and render obvious "*obtaining a baseband signal representative of a sequence of multilevel symbols and judging the symbol represented by the baseband signal*." Thus, the function of this limitation is rendered obvious by the prior art.

140. Further, IS-54-B and Dent disclose and render obvious the corresponding structure, or equivalents thereof. For example, IS-54-B discloses a "demodulator" (*see* Ex. 1004 (IS-54-B), 19, 73) and Dent teaches components in FIGs. 13 and 15 that a POSITA would have recognized as equivalent to the structure of a processor in a receiver that judges an instantaneous value of the Nyquist point against threshold values and assigning a symbol to the section as identified in § VII.1, *supra*. *See* Ex. 1007 (Dent), 24:6-16, 27:30-62, FIGs. 9, 17, 18. For example, when the symbol rate equals the Nyquist rate, the instantaneous value of the Nyquist point is the received sample used for comparison against a threshold. This Nyquist point is determined by synchronization of the receiver timing to the transmitted symbols using an A/D converter with a narrow conversion time.

141. Accordingly, the combination renders obvious this limitation.

3. 1[b] "a communication quality judging means for judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged by the symbol judging means"

142. As detailed above in the analysis of limitation 8[b], the teachings of Mårtensson render obvious "judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged in the symbol judging step." Further, Mårtensson performs its judging by identifying a number of redundant bits having a predetermined value or the number of bits missing the predetermined value among the redundant bits contained in the symbol that contains a bit belonging to the protected portion. Thus, the function of this limitation is rendered obvious by the prior art.

143. Further, it is my opinion that Mårtensson renders obvious the corresponding structure, or equivalents thereof. For example, Mårtensson discloses "equalizer 530" which a POSITA would have recognized as equivalent to the corresponding structure of a processor that checks the value of bits and compares the number of bits having or missing a predetermined value to threshold values as identified in § VII.2, *supra*. Accordingly, the combination renders obvious this limitation.

4. 1[c] "a data changing means for, if the communication quality judged by the communication quality judging means does not satisfy a predetermined condition, making a predetermined change to the data to be transmitted represented by the symbol used in the judgment"

144. As detailed above in the analysis of limitation 8[c], the teachings of IS-54-B and Yeh render obvious "if the communication quality judged by the communication quality judging means does not satisfy a predetermined condition, making a predetermined change to the data to be transmitted represented by the symbol used in the judgment." Thus, the function of this limitation is rendered obvious by the prior art.

145. Further, it is my opinion that IS-54-B discloses and renders obvious the corresponding structure, or equivalents thereof. For example, IS-54-B discloses a "bad frame masking system … based on a 6 state machine" which a POSITA would have understood to be implemented by a processor or similar circuitry within a cellular or mobile device, or a processor for replacing data, muting data, substantially destroying data, and attenuating data as identified in § VII.3, *supra*.

146. Accordingly, the combination renders obvious this limitation.

5. 1[d] "wherein at least a portion of a bit string is distinguished as a protected portion, the bit string constituting data to be transmitted represented by the sequence of symbols, and at least a portion of the symbol that belongs to the sequence of symbols contains a bit belonging to the protected portion and a redundant bit having a predetermined value"

147. *See* 8[d], *supra*.

6. 1[e] "wherein the communication quality judging means identifies the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value among the redundant bits contained in the symbol that contains a bit belonging to the protected portion, and judges the communication quality of the transmission channel based on the identified result"

148. *See* 8[e], *supra*.

C. Dependent Claims 2-7

1. Claim 2 "The communication quality judging device according to claim 1, wherein the data changing means comprises means for externally obtaining a parameter that defines at least a portion of the condition."

149. It is my opinion that IS-54-B renders obvious this limitation, as it teaches a mobile station, which is capable of obtaining parameters that define the condition recited in claim 1, and thus renders obvious the function and structure of this limitation. IS-54-B at 1. For example, a mobile station as taught by IS-54-B would receive parameters that define the condition recited in claim 1 as part of a received baseband signal.

150. Alternatively, it is my opinion that IS-54-B renders obvious this limitation, as it teaches a mobile station with firmware implementing IS-54-B, which a POSITA would have understood as having means (e.g., a receiver) for obtaining parameters via compatible input devices for inputting parameters (e.g., a keypad or external input device), and thus renders obvious the function and structure of this limitation. *Id*. For example, BlackBerry mobile devices had

keypads and were in use at the time the application leading to the '891 patent was filed. As shown below, the Research in Motion BlackBerry 7230 had a keypad. Ex. 1014. The device also included a USB port. Ex. 1014. Both would allow a POSITA to input parameters.

Ex. 1014. Therefore, claim 2, which claims that "the data changing means comprises means for externally obtaining a parameter that defines at least a portion of the condition" would have been obvious to a POSITA.

2. Claim 3 "The communication quality judging device according to claim 1 or 2, wherein the predetermined change includes a process of substantially destroying the data to be transmitted represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition."

151. It is my opinion that IS-54-B renders obvious this limitation, as it teaches "a bad frame masking system [that] is based on a 6 state machine" that discloses "wherein the predetermined change includes a process of substantially destroying the data to be transmitted." Ex. 1004 (IS-54-B), 74-75. IS-54-B's bad frame masking process includes an attenuation process that eventually mutes the

speech. *Id*. Attenuation refers to the reduction of a signal power level. In states 3, 4, and 5 the parameter R(0) is decremented and attenuated until speech is eventually totally muted or comfort noise replaces the speech signal in state 6. *Id*. By inserting comfort noise in place of the speech signal in state 6 the data is "substantially destroyed." *Id*.

152. As discussed in in § IX.A.4., *supra*, during transmission, data can be corrupted by channel errors. Ex. 1004 (IS-54-B), 74. The system disclosed in IS-54-B checks for "an error in the 12 most perceptually significant bits of the speech frame" using a CRC comparison. *Id*. 74. Therefore, IS-54-B renders obvious "the data to be transmitted represented by the symbol used to judge" communication quality because IS-54-B discloses checking "the 12 most perceptually significant bits" for an error and the claimed symbols are comprised of bits.

153. As also discussed in § IX.A.4., *supra*, whether "the communication quality does not satisfy a predetermined condition" is rendered obvious by Yeh, when it discloses comparing a value to a threshold to determine how to further process data. Ex. 1006 (Yeh), Abstract. Yeh calculates the Hamming distance between two sets of received bits and proceeds differently depending on whether or not that distance is smaller than a threshold. *Id*.

154. Accordingly, IS-54-B renders obvious claim 3: ". . . *wherein the predetermined change includes a process of substantially destroying the data to be*

transmitted represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition" (inserting comfort noise in place of the speech signal).

3. Claim 4 "The communication quality judging device according to claim 1 or 2, wherein the predetermined change includes a process of replacing the data to be transmitted represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition, with previous data represented by a symbol previously obtained by the symbol judging means."

155. It is my opinion that IS-54-B renders obvious this limitation, as it teaches "wherein the predetermined change includes a process of replacing the data to be transmitted . . . with previous data represented by a symbol previously obtained by the symbol judging means" IS-54-B discloses that in state 1 when "[a] CRC error has been detected in the frame[, t]he parameter values for R(0) and the LPC bits are replaced with the corresponding values from the last frame that was in state 0" when no CRC error was detected. Ex. 1004 (IS-54-B), 75. Therefore, IS-54-B discloses replacing data in state 1 with data in state 0. The data "from the last frame that was in 0" is "previous data represented by a symbol previously obtained by the symbol judging means" because data in the current frame is being replaced with data from the last frame. In IS-54-B, each frame is separately processed using its communication quality judging device to obtain the bits corresponding to each frame. Thus, when the IS-54-B receiver replaces data in the current frame with

data from the previous frame, that data from the previous frame was obtained by the receiver using its communication quality judging device when that previous frame was received, which was also obtained by the symbol judging means because that component demodulates signals and identifies the symbols.

156. As discussed in in § IX.A.4., *supra*, during transmission, data can be corrupted by channel errors. Ex. 1004 (IS-54-B), 74. The system disclosed in IS-54-B checks for "an error in the 12 most perceptually significant bits of the speech frame" using a CRC comparison. *Id*. Therefore, IS-54-B renders obvious "the data to be transmitted represented by the symbol used to judge" communication quality because IS-54-B discloses checking "the 12 most perceptually significant bits" for an error and the claimed symbols are comprised of bits. *Id*.

157. As also discussed in § IX.A.4., *supra*, whether "the communication quality does not satisfy a predetermined condition" is rendered obvious by Yeh when it discloses comparing a value to a threshold to determine how to further process data. Ex. 1006 (Yeh), Abstract. Yeh calculates the Hamming distance between two sets of received bits and proceeds differently depending on whether or not that distance is smaller than a threshold. *Id*.

158. Accordingly, IS-54-B renders obvious claim 4: "*wherein the predetermined change includes a process of replacing the data to be transmitted represented by the symbol used to judge that the communication quality does not*

satisfy a predetermined condition, with previous data represented by a symbol previously obtained by the symbol judging means" (state 1 repeats the information from state 0 where no CRC error was detected).

4. Claim 5 "The communication quality judging device according to claim 4, wherein the predetermined change further includes a process of substantially destroying the data to be transmitted that follows last replaced data and that is represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition, when more than a predetermined number of replaced data continues."

159. It is my opinion that IS-54-B renders obvious this claim because IS-54-B discloses "wherein the predetermined change further includes a process of substantially destroying the data . . . when more than a predetermined number of replaced data continues."

160. IS-54-B explains that "[o]n every decode of a speech frame, the state machine can change state." Ex. 1004 (IS-54-B), 74. "State 6 implies that there were at least 6 consecutive frames which failed the CRC check" and thus "State 6 completely **mutes the speech**." *Id*.; § VIII.B.1. "Alternatively, comfort noise could be inserted in place of the speech signal" at state 6. *Id*., 75. As discussed in § IX.C.3, *supra*, in state 1 the data is replaced with the data from state 0. In state 2, the "same action is taken as in state 1" so data is again replaced. As discussed in § VIII.B.1, *supra*, the bad frame masking process gradually attenuates the speech. In states 3, 4, and 5 the parameter R(0) is decremented and attenuated until speech is

eventually totally muted or comfort noise replaces the speech signal in state 6. *Id*. By attenuating the speech in states 3-5 until it is muted or replaced in state 6 the data is "substantially destroyed." *Id*. Therefore, IS-54-B renders obvious "when more than a predetermined number of replaced data continues" because once the data is replaced in states 1 and 2 and there is an error such that the system enters state 3, the attenuation process begins which – if the CRC check continues to detect errors – results in muting should the system reach state 6.

161. As discussed in § IX.A.4, *supra*, during transmission, data can be corrupted by channel errors. *Id*., 74. The system disclosed in IS-54-B checks for "an error in the 12 most perceptually significant bits of the speech frame" using a CRC comparison. *Id*., 74. Therefore, IS-54-B renders obvious "the data to be transmitted represented by the symbol used to judge" communication quality because IS-54-B discloses checking "the 12 most perceptually significant bits" for an error and the claimed symbols are comprised of bits.

162. As also discussed in § IX.A.4., *supra*, whether "the communication quality does not satisfy a predetermined condition" is rendered obvious by Yeh which discloses comparing a value to a threshold to determine how to further process data. Ex. 1006 (Yeh), Abstract. Yeh calculates the Hamming distance between two sets of received bits and proceeds differently depending on whether or not that distance is smaller than a threshold. *Id*.

163. Accordingly, IS-54-B renders obvious claim 5: ". . . *wherein the predetermined change further includes a process of substantially destroying the data to be transmitted that follows last replaced data*" (IS-54-B's muting data if it reaches state 6) "*and that is represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition, when more than a predetermined number of replaced data continues*" (when IS-54-B's state count reaches 6).

5. Claim 6[pre] "The communication quality judging device according to claim 1 or 2, wherein the data to be transmitted is composed of data representative of strength of a variable, and"

164. It is my opinion that IS-54-B renders obvious this limitation.

165. IS-54-B discloses an energy value R(0) computed and encoded once per frame "reflecting the average signal energy in the input speech over a 20 msec. interval." Ex. 1004 (IS-54-B), 75-76; *see also id*., 33-34; § VIII.B.1, *supra*.

166. Accordingly, IS-54-B renders obvious "*wherein the data to be transmitted is composed of data representative of strength of a variable*."

6. Claim 6[a] "the predetermined change includes an attenuating process of changing the data to be transmitted represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition, to a data equivalent in which the variable represented by the data is attenuated."

167. It is my opinion that IS-54-B renders obvious this claim because IS-54-B discloses that "the predetermined change includes an attenuating process of

changing the data . . . to a data equivalent in which the variable represented by the data is attenuated."

168. As discussed in § IX.C.3, IS-54-B discloses that states 3, 4, and 5 "attenuate the speech." Ex. 1004 (IS-54-B), 74-75. The variable R(0), which reflects signal energy, is attenuated. *Id*. 74-76; *see also id*., 33-34; § VIII.B.1. For example, in state 3, "[a] dB attenuation is applied to the R(0) parameter, i.e., if R0 of the last state 0 frame is greater than 2, then R0 is decremented by 2 and repeated at this lower level." Ex. 1004 (IS-54-B), 75. Then, in state 4 "R(0) is again attenuated by 4 dB, so now the level is as much as 8 dB from the original value of the R(0)." *Id*. In state 5, "R(0) is attenuated an additional 4 dB." Therefore, IS-54-B discloses ""the predetermined change includes an attenuating process of changing the data . . . to a data equivalent in which the variable represented by the data is attenuated."

169. As discussed in in § IX.A.4., *supra*, during transmission, data can be corrupted by channel errors. *Id*., 74. The system disclosed in IS-54-B checks for "an error in the 12 most perceptually significant bits of the speech frame" using a CRC comparison. *Id*. Therefore, IS-54-B renders obvious "the data to be transmitted represented by the symbol used to judge" communication quality because IS-54-B discloses checking "the 12 most perceptually significant bits" for an error and the claimed symbols are comprised of bits.

170. As also discussed in § IX.A.4., *supra*, whether "the communication quality does not satisfy a predetermined condition" is rendered obvious by Yeh which discloses comparing a value to a threshold to determine how to further process data. Ex. 1006 (Yeh), Abstract. Yeh calculates the Hamming distance between two sets of received bits and proceeds differently depending on whether or not that distance is smaller than a threshold. *Id*.

171. Accordingly, IS-54-B, consistent with a POSITA's knowledge, renders obvious limitation 6[a]: "*the predetermined change includes an attenuating process of changing the data to be transmitted represented by the symbol used to judge that the communication quality does not satisfy a predetermined condition, to a data equivalent in which the variable represented by the data is attenuated*" (e.g., IS-54-B's attenuating process in states 3-5).

7. Claim 7 "The communication quality judging device according to claim 6, wherein, when first data, which is transmitted immediately before second data to be subjected to the attenuating process, has been subjected to the attenuating process, the attenuating process provided to the second data consists of a process of changing the second data to a data equivalent in which the variable represented by the second data is attenuated at an attenuation ratio larger than that for the variable represented by the first data."

172. It is my opinion that IS-54-B renders obvious this claim.

173. IS-54-B discloses an attenuation process that increases the attenuation ratio as the state count increases. Ex. 1004 (IS-54-B), 74-75; § VIII.B.1, *supra*. For

example, in state 3 "the value of R(0) is modified. A 4dB attenuation is applied to the R(0) parameter, i.e., if R0 of the last state 0 frame is great than 2, R0 is decremented by 2 and repeated at this lower level." Ex. 1004 (IS-54-B), 75. In state 4, "R(0) is again attenuated by 4 dB so now the level is as much as 8 dB from the original value of the R(0)." *Id*. In state 5, "R(0) is attenuated an additional 4 dB." *Id*.

174. Accordingly, IS-54-B, consistent with a POSITA's knowledge, renders obvious claim 7: "*wherein, when first data, which is transmitted immediately before second data to be subjected to the attenuating process*" (e.g., IS-54-B's attenuation in state 5)*,* "*has been subjected to the attenuating process,*" (e.g., IS-54-B's attenuation in state 4) "*the attenuating process provided to the second data consists of a process of changing the second data to a data equivalent in which the variable represented by the second data is attenuated at an attenuation ratio larger than that for the variable represented by the first data*" (e.g., IS-54-B's attenuation in state 5 is by "an additional 4 dB" from the attenuation in state 4).

D. Independent Claim 9

1. 9[pre] "A computer program causing a computer to execute the steps of:"

175. For the purposes of my analysis I have assumed that the preamble of claim 9 is limiting on the claim.

176. The combination renders obvious a "*computer program*" as recited. For example, a POSITA would have recognized that the mobile stations described throughout IS-54-B are computing devices controlled, at least in part, by software, which therefore renders obvious a "*computer program*" as recited. Computer programs are necessary for the mobile stations to operate.

177. The remaining limitations of claim 9 are identically recited in claim 8, and accordingly, claim 9 is rendered obvious for the same reasons as set forth for claim 8. *See* § IX.A *supra*.

X. A POSITA would have found claims 1-9 obvious in view of IS-54-B, Dent, and Su

A. Overview of the Prior Art

1. Su (Ex. 1008)

178. The reference that I refer to as "Su" is U.S. Patent 5,255,343. It was filed on Jun. 26, 1992, and issued Oct. 19, 1993. Ex. 1008. Huan-yu Su is the only named inventor. *Id*. On its face, it is assigned to Northern Telecom Limited. *Id*.

179. Su relates to an improvement in the "process for detection and masking of bad frames in a coded speech signal resulting from channel transmission errors." Su's invention is designed for compatibility with the IS-54-B digital cellular standard. Ex. 1008 (Su), 1:34-37, 2:41-45, FIGs. 2a, 2b, 2c. Su's invention teaches an additional error checking technique beyond a CRC check called a maximum likelihood (ML) check. *Id*. 4:66-5:27. As shown in Figs. 3a and

3b below, Su discloses that "the BER of the 65 Group B bits 53 is verified against the ML threshold. If the ML check is OK, indicating a minimal number of errors, the 65 Group B bits 53 are accepted without modification." *Id*., 5:56-60. But, "[w]hen the distance is higher then [*sic*] [the Hamming distance threshold of] 19, the bits 53 are rejected. When the ML check 54 is not OK, the" data may be changed according to the teachings of IS-54-B. *Id*., 5:61-6:6.

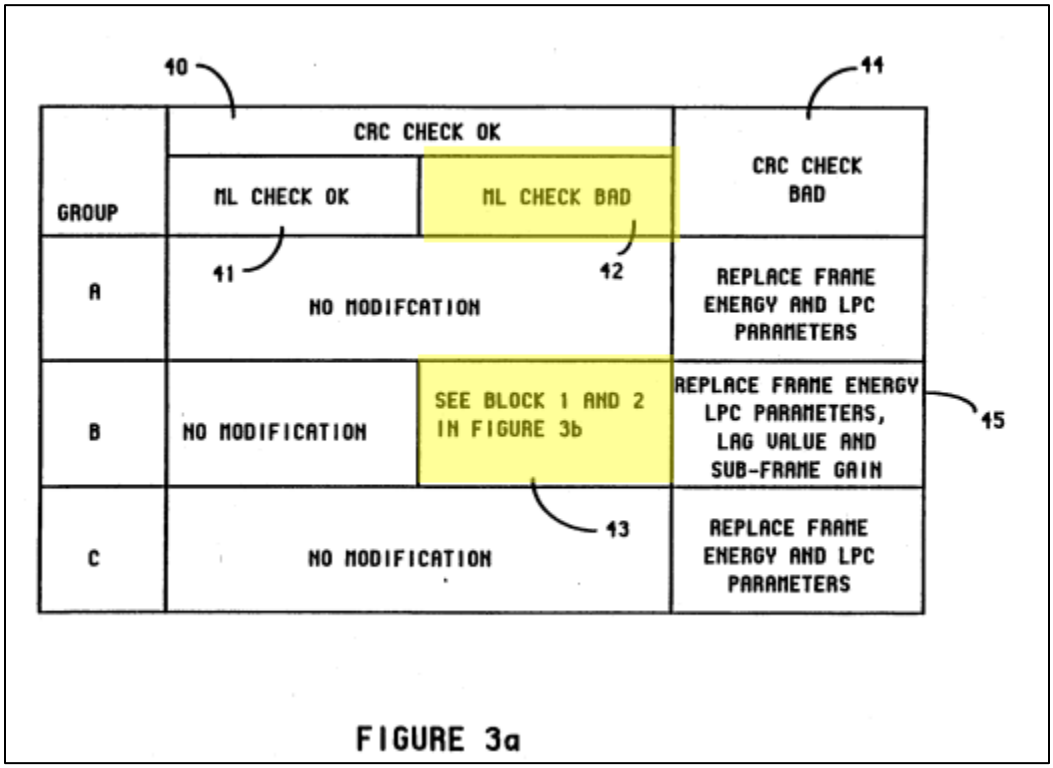
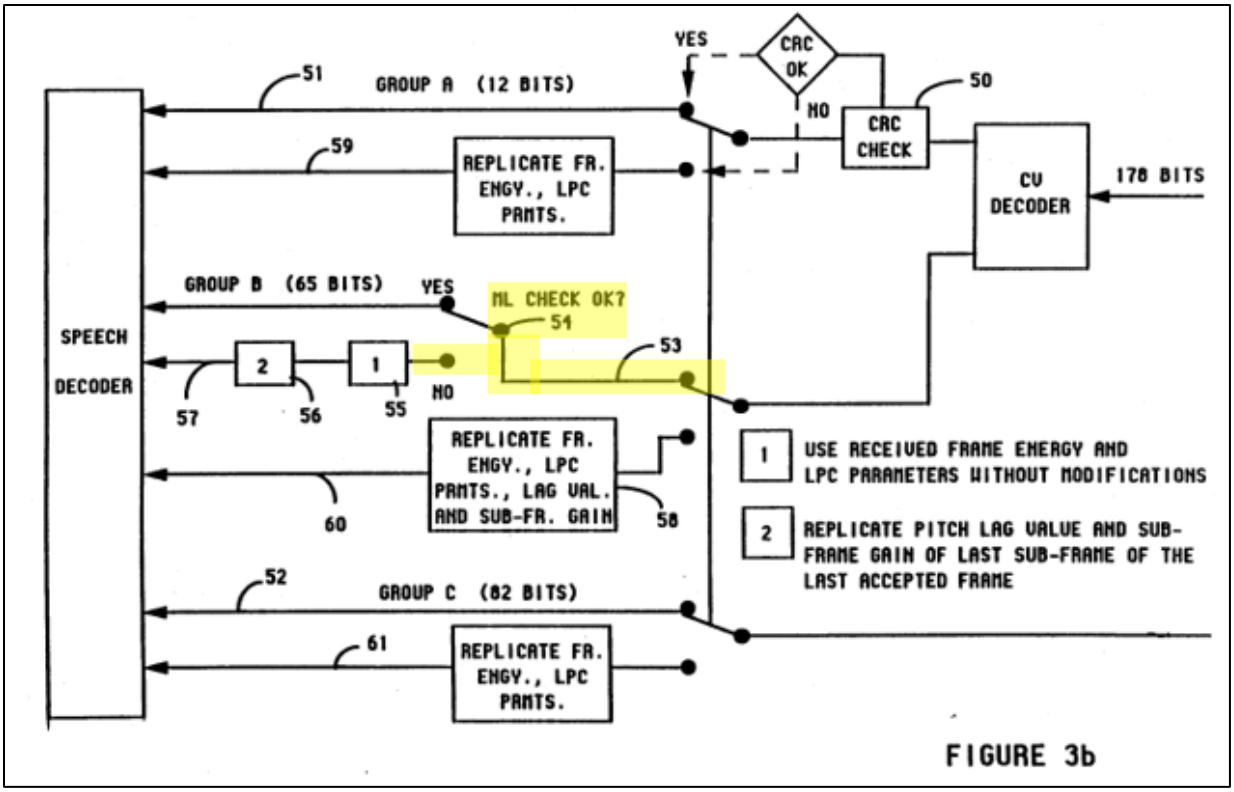


FIGURE 3a



Id. FIGS. 3a (annotated), 3b (annotated).

B. A POSITA would have combined IS-54-B and Su.

180. It is my opinion that IS-54-B and Su are analogous art to the ’891 patent. The ’891 patent is broadly related to “a device and method for judging communication quality in a communication system” (Ex. 1001 (’891 patent), 1:6-10) and Su teaches methods for better detecting errors in the transmission channel. *See, e.g.*, Ex. 1008 (Su), 1:7-10. Thus, Su is within the field of endeavor of the ’891 patent.

181. A POSITA considering Su would have been motivated to combine it with IS-54-B. Su’s disclosure is specifically intended to work with IS-54-B. Ex. 1008 (Su), 1:34-45, 2:41-44, 3:9-17, 3:29-4:65, 4:66-6:36, FIGs. 1, 2a, 2b, 2c, 3a,

3b, 3c. Su discloses that an "object of the present invention is to provide an improved error detection and bad frame masking technique which can be implemented with the requirements of the [IS-54-B] digital cellular standard." *Id*. 2:41-44; *see also id*. 1:34-45, 3:9-17, 3:29-4:65, 4:66-6:36, FIGs. 1, 2a, 2b, 2c, 3a, 3b, 3c.

182. Su discloses that "bad frame detection" and "bad frame masking" are "fundamental functions" in digital cellular mobile systems (*id*. 1:13-27), and explains that, "[i]n order to improve regenerated speech quality, the [IS-54-B] standard bad frame masking technique has been modified so that erroneous parameters are not used to regenerate speech." *Id*. 5:28-33; *see also id*. 1:34-45, 2:41-44, 3:9-17, 3:29-4:65, 4:66-5:27, 5:34-6:36, FIGs. 1, 2a, 2b, 2c, 3a, 3b, 3c.

183. Thus, Su proposes modifying the parameters used in IS-54B's bad frame masking process, so Su already proposes combining its invention with IS-54-B's bad frame masking process and provides an explicit motivation or suggestion to do so (i.e., so that erroneous parameters are not used to regenerate speech). *See id*. 5:28-33.

184. A POSITA would have had a reasonable expectation of success in combining Su and IS-54-B. Su is designed for compatibility with IS-54-B. A POSITA would have recognized the disclosures in Su referencing IS-54-B and examined IS-54-B. in its entirety. As discussed above, the outcome is predictable

because it combines the predictable features of each reference together using known methods intended to be combined together. *Id*. For example, implementing these teachings would have required nothing more than predictable hardware and software changes to a system implementing IS-54-B, which would have been within the level of skill in the art at the time, and to the extent additional hardware was needed, such components were known at the time as well.

185. The following discussion explains additional rationale for combining Su and IS-54-B to arrive at the claimed invention as relevant to individual limitations and claims.

1. Reasons to Incorporate Su's Teachings of Judging Communication Quality

186. Su discloses "a need for an improved bad frame detection and masking technique which will help in the avoidance of the explosion-like speech" and seeks to "provide an improved error detection and bad frame masking technique which provides smoother regenerated speech, improves intelligibility and the perceptual quality of speech." Ex. 1008 (Su), 2:24-2:32. Su also aims to "provide an improved error detection technique so that errors occurring in the Class 1 bits, other than the most significant bits, can be taken into account." *Id*., 2:33-36.

187. A POSITA contemplating Su would combine it with the IS-54-B system to improve the communication quality of IS-54-B's TDMA System. Su's

specification references its purpose is to improve upon the teachings of IS-54-B, so a POSITA would see the references to the standard throughout and examine the standard and seek to improve it by incorporating the teachings of Su.

188. The combination is obvious as a combination of prior art elements according to known methods to yield predictable results. As discussed above and below, the only difference between the claims and the prior art is the lack of actual combination of the recited elements in a single prior art reference. The combination uses known methods taught by each reference, including known protocols for transmitting and receiving data, known codecs for coding and decoding data, and known algorithms for protecting bits. §§ VIII.B.1, X.A.1, *supra*. IS-54-B and Su both perform bad frame detection and bad frame masking. The outcome is the predictable system combining the known functions of IS-54-B and Su.

189. The combination is also obvious as the use of a known technique (using Su's bad frame detection process) to improve similar devices (IS-54-B's bad frame masking process) in the same way. IS-54-B discloses a bad frame detection process that is comparable to Su's bad frame detection process, but Su's is an improvement to detect more errors and improve communication quality. *See* § VIII.A.2, VIII.B.1, X.A.1, *supra*. A POSITA would have applied these

improvements to IS-54-B's system in the same way for the reasons discussed above, and the results would have been predictable as shown above.

190. A POSITA would have had a reasonable expectation of success in combining IS-54-B and Su because both depend on IS-54-B as a base. As discussed above, the outcome is predictable because it combines the known features of each reference together using known methods. *Id*.

2. Reasons to Incorporate Su's Teachings of Using a Predetermined Condition

191. Su discloses "an additional error detection technique . . . based on a maximum likelihood (ML) check and is only used if the CRC check is successful." Ex. 1008 (Su), 4:66-5:27. Su's ML check is an improvement for an additional level of detection of errors to improve communication quality. While IS-54-B's CRC check allows the system to check for errors, Su's ML check allows a POSITA to use a threshold to further change data differently depending on how the number of bit errors compare to that threshold. Ex. 1004 (IS-54-B), 74-75; Ex. 1008 (Su), 4:66-6:36. This would allow a POSITA more flexibility to determine what predetermined change to make to the data according to how the judged communication quality falls in comparison to the threshold. A POSITA would have been motivated to combine these teachings of Su for the same reasons as set forth above.

3. Reasons to Incorporate Su's Teachings of a Protected Portion

192. Protecting portions of bit strings was well-known in the art § VIII.A.3, *supra*. A POSITA would have been familiar with providing portions of bit strings with various levels of protection in various ways, such as through convolutional coding, Reed-Solomon coding, or bit repetition. *See, e.g.,* Ex. 1008 (Su), 1:28-30, *id*. 3:32-34.

193. The protection teachings of IS-54-B and Su are substantively similar in that they both teach convolutional coding to protect bits. As IS-54-B explains, "[t]he first step in the error correction process is the separation of the 159 bit speech coder frame's information into class 1 and class 2 bits. The class 1 bits represent that portion of the speech data stream to which the convolutional coding is applied." Ex. 1004 (IS-54-B), 6. Channel coding includes "mechanisms for mitigation of channel errors. The first is to use a rate one-half convolutional code to protect the more vulnerable bits of the speech coder data stream . . . The third technique employs the use of a cyclic redundancy check over some of the most perceptually significant bits of the speech coder" which are later checked to see if they were received properly. *Id*. 59.

194. IS-54-B teaches concepts and algorithms well-known in the art at a high level and a POSITA would have known of other references describing in more detail the mechanisms for implementing those concepts, such as processing a

portion of a bit string as a protected portion. Su discloses that "[i]n both the IS-54 and GSM standards, maximum likelihood convolutional decoding (Viterbi decoding) is employed to recover the protected bits in Group A and Group B bits." Ex. 1008 (Su), 5:1-5. "Group A comprises the perceptually most significant bits protected by error detection as well as protection bits." *Id*., 3:32-34. Group B bits are covered by error correction which is "determined by the error protection techniques used" such as convolution coding. *Id*., 3:40-46, 1:28-33. A POSITA would have recognized that the Group A and Group B bits in class 1 of Su would fall within the class 1 bits of IS-54-B.

195. It would have been obvious to use the additional details in Su's disclosures to distinguish a portion of a bit string as a protected portion. Although a POSITA would understand IS-54-B to teach a protected portion, Su's teachings of Group A and Group B bits provides additional detail about protected portions. Incorporating Su into IS-54-B would have been nothing more than the use of a known technique (protecting Group A and Group B bits through convolutional coding) to improve a similar method (IS-54-B's convolutional coding) in the same way, which a POSITA would have a reasonable expectation of success in doing so.

196. Also, in further considering Su, a POSITA would have found it obvious to use Su's implementation of the Hamming distance metric in the

decoding process to identify the number of bits having a predetermined value or the number of redundant bits missing the predetermined value.

197. IS-54-B teaches that convolutionally encoded data can be decoded using "[a]ny known decoding technique for convolutional codes" such as the "Viterbi algorithm in conjunction with the use of soft channel information." Ex. 1004 (IS-54-B), 74. Such techniques were well known in the art and would have been obvious to a POSITA. The Hamming distance metric disclosed in Su would have provided details for a POSITA to approach the decoding of the protected portion of predetermined bits in a straightforward and simple manner to compare bits and check for errors. Given the relative simplicity and reduced complexity of applying the Hamming distance metric rather than Viterbi equalization, a POSITA would have preferred to use the Hamming distance metric disclosed in Su.

198. For example, Su discloses that "[w]hen a Viterbi algorithm is used with a hard channel information (hard decision, as in the IS-54 standard, the likelihood metric used is usually the hamming distance" and that the lower the Hamming distance, the lower the bit error rate. Ex. 1008 (Su), 5:61-67, 5:2-18. Therefore, a POSITA would have recognized that the Hamming distance implementation of Su for convolutional decoding could be implemented with convolutional decoding of IS-54-B with the added benefit of simplicity and lower complexity implementation.

199. Although a POSITA would understand IS-54-B to teach convolutional decoding for soft values of the bits, for additional detail on how to simplify decoding, a POSITA would have incorporated Su's teachings of the Hamming distance metric for maximum likelihood convolutional decoding using hard values for the bits as well. Doing so would have been nothing more than the use of a known technique (comparing bits and checking for errors through the Hamming process) to improve a similar method (IS-54-B's convolutional coding), and a POSITA would have had a reasonable expectation of success in doing so. § X.A.1, *supra*.

200. In the below discussion of individual claims I may also provide further rationale for combining IS-54-B and Su for specific features and limitations.

C. Independent Claim 8

201. For the reasons discussed below, it is my opinion that 1-9 of the '891 patent would have been obvious to a POSITA.

1. 8[pre] "A communication quality judging method, the method comprising the steps of"

202. *See* § IX.A.1, *supra*.

2. 8[a] "obtaining a baseband signal representative of a sequence of multilevel symbols and judging the symbol represented by the baseband signal"

203. *See* § IX.A.2, *supra*.

3. 8[b] "judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged in the symbol judging step"

204. Su discloses and renders obvious this limitation.

205. Su discloses an improvement "for detection and masking of bad frames in a coded speech signal." Ex. 1008 (Su), Abstract. Specifically, Su discloses an error detection uniquely "based on a maximum likelihood (ML) check and is only used if the CRC check is successful." *Id*., 4:67-5:2.

206. Su discloses that "maximum likelihood convolutional decoding (Viterbi decoding) is employed to recover the protected bits in Group A and Group B bits. Statistically, the metric assigned to the final surviving path by Viterbi decoding represents a measure of confidence in the recovered bits. The higher the metric, the lower the estimated bit error rate (BER) for these bits." *Id*., 5:2-11. A POSITA would have combined these teachings of Su for the reasons set forth above in § X.B.1, *supra*.

207. Accordingly, Su discloses and renders obvious limitation 8[b]: "*judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged in*

the symbol judging step" (e.g., performing a maximum likelihood check on a speech signal to check for bit errors).

4. 8[c] "changing data if the communication quality judged in the communication quality judging step does not satisfy a predetermined condition, to make a predetermined change to the data to be transmitted represented by the symbol used in the judgment"

208. The combined teachings of IS-54-B and Su render obvious this limitation. *See* § IX.A.4 concerning "changing data . . . to make a predetermined change to the data to be transmitted represented by the symbol used in the judgment."

209. Su teaches comparison against a threshold in describing a "metric to determine whether the group B bits are corrupted." Ex. 1008 (Su), 5:9-12. In particular, Su teaches that "[f]rames are rejected if the CRC check fails or the ML threshold is exceeded." *Id*., 5:11-14. The ML threshold thus corresponds to a "predetermined condition" as recited.

210. In more detail as shown in FIGs. 3a and 3b below, Su discloses that "the BER of the 65 Group B bits 53 is verified against the ML threshold. If the ML check is OK, indicating a minimal number of errors, the 65 Group B bits 53 are accepted without modification." Ex. 1008 (Su), 5:56-60. But, "[w]hen the distance is higher then [sic] [the Hamming distance threshold of] 19, the bits 53 are rejected. When the ML check 54 is not OK, the" data may be changed according to

the teachings of IS-54-B. Ex. 1008 (Su), 5:61-6:6. "By checking a finite ML threshold (e.g., 19), for a bad channel condition . . . the BER for accepted frame is reduced from 2% to 0.8%." *Id.*, 5:18-20; *see also* 5:66-67.

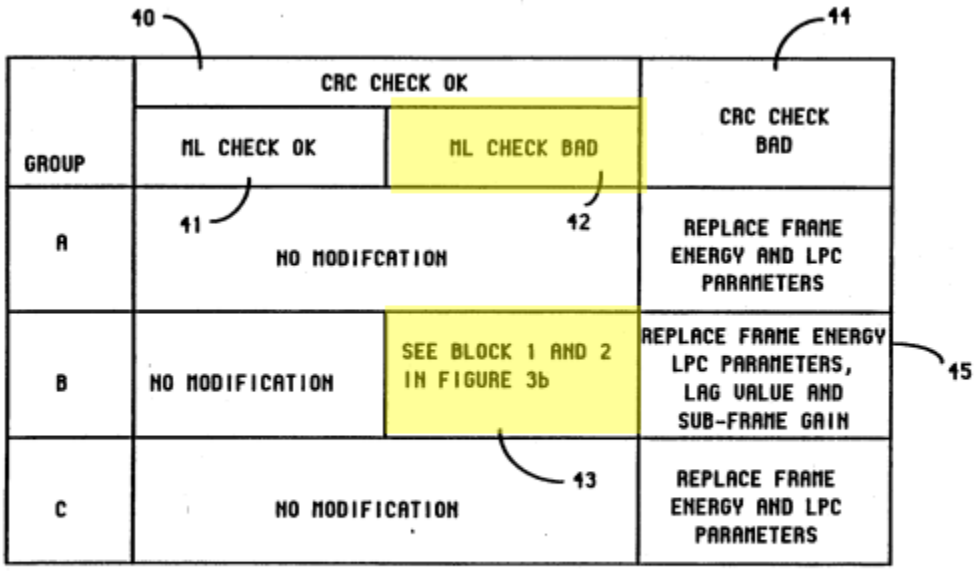


FIGURE 3a

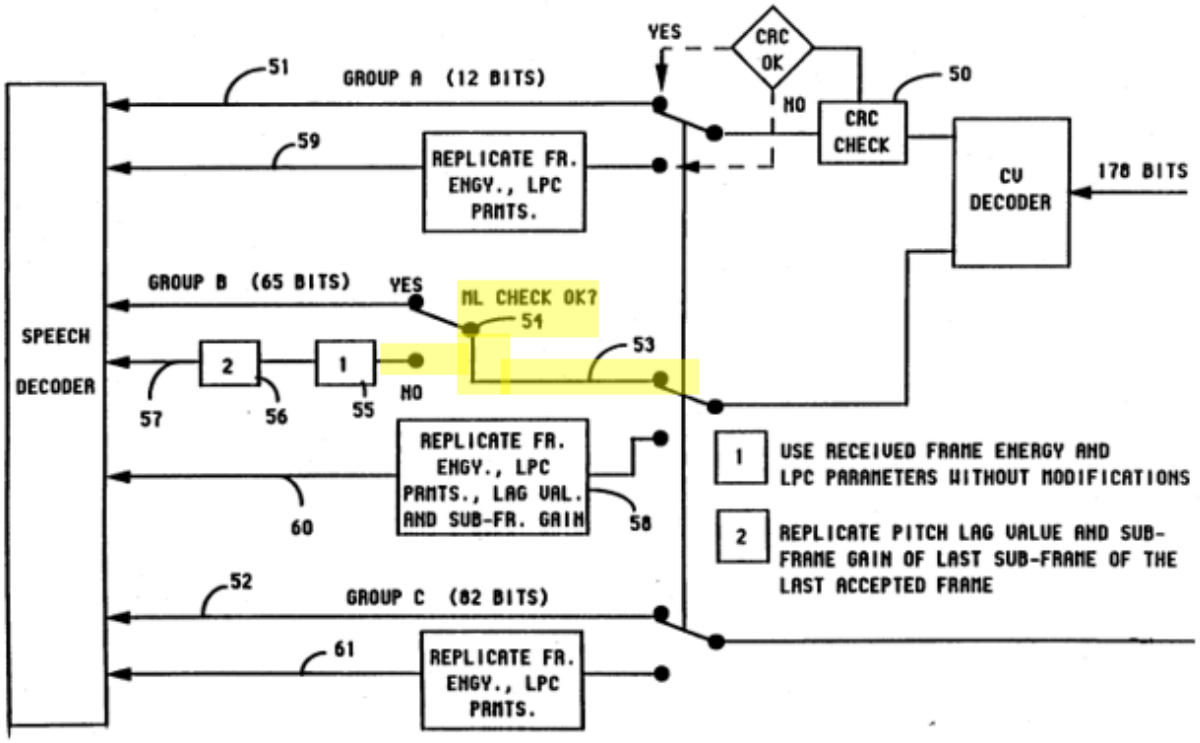


FIGURE 3b

Id. FIGs. 3a (annotated), 3b (annotated).

211. In light of the teachings of IS-54-B, this teaching of Su corresponds to "*if the communication quality judged in the communication quality judging step does not satisfy a predetermined condition*" because if the ML check (as determined by the ML threshold) indicates a minimal number of errors, data may not be changed as IS-54-B teaches; by contrast, if the ML check indicates more than the minimal number, data may be changed as IS-54-B teaches.

212. A POSITA would have combined these teachings of Su for the reasons set forth above in § X.B.II, *supra*.

213. Accordingly, the combined teachings of IS-54-B and Su disclose and render obvious limitation 8[d]: "*changing data … to make a predetermined change*

to the data to be transmitted represented by the symbol used in the judgment" (e.g., IS-54-B's replacing, attenuating, or muting data) "*if the communication quality judged in the communication quality judging step does not satisfy a predetermined condition,*" (e.g., Su's comparison against the ML threshold).

5. 8[d] "wherein at least a portion of a bit string is distinguished as a protected portion, the bit string constituting data to be transmitted represented by the sequence of symbols, and at least a portion of the symbol that belongs to the sequence of symbols contains a bit belonging to the protected portion and a redundant bit having a predetermined value"

214. It is my opinion that Su discloses and renders obvious this limitation.

215. As an initial matter, protecting a portion of a bit string by using redundant bits was well-known in the art by 2004. § VIII.A.3, *supra*. A bit is a binary digit with a value of either 0 or 1. *Id*. Protecting bits by dividing them into portions with various levels of protection was also well-known in the art by 2004. *Id*.

216. Indeed, these concepts were adopted and part of well-known standards before 2004. For example, Su discloses that "speech information bits in digital cellular systems (**TIA-IS-54 and GSM**) are organized into three groups[.]" Ex. 1008 (Su), 3:29-31. "Group A comprises the perceptually most significant bits protected by error detection as well as **protection bits**." *Id*., 3:32-34. "Group B comprises a larger group of perceptually significant bits covered by error correction only." *Id*., 3:40-41. "The error correction capability of the channel codec

is determined by the error protection techniques used, (such as, convolutional coding or Reed-Solomon coding)." *Id*., 1:28-30. "Group C comprises a group of perceptually less significant bits that are not protected at all." *Id*., 3:47-48. Su discloses that "[a]n error protection technique [] is [] applied on the class 1 bits" which "is based on convolutional coding" and class 1 consists of the Group A and Group B bits. *Id*., 4:4-22. Su further discloses that "[i]n both IS-54 and GSM standards, maximum likelihood convolutional decoding (Viterbi decoding) is employed to recover the protected bits in Group A and Group B bits." *Id*., 5:1-5.

217. Su discloses that "maximum likelihood convolution decoding (Viterbi decoding) is employed to recover the protected bits in Group A and Group B bits" ("*at least a portion of a bit string is distinguished as a protected portion*"). *Id*., 5:3-5. Su further explains that a "7 bit CRC (Cyclic Redundancy Checking) 13 is used for the purpose of error detection" on the Group A bits. *Id*., 4:10-13. Su also discloses that the Hamming distance metric is used as part of the decoding process and "[t]he higher the metric, the lower the estimated bit error rate (BER) for these bits." *Id*. 5:2-27; § VIII.A.2, *supra*.

218. Accordingly, Su discloses and renders obvious limitation 8[d]: "*wherein at least a portion of a bit string is distinguished as a protected portion, the bit string constituting data to be transmitted represented by the sequence of symbols, and at least a portion of the symbol that belongs to the sequence of*

symbols contains a bit belonging to the protected portion" (e.g., Su's Group A and Group B bits) "*and a redundant bit having a predetermined value*" (e.g., bits within Su's Group B).

6. 8[e] "wherein, in the communication quality judging step, the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value is identified among the redundant bits contained in the symbol that contains a bit belonging to the protected portion, and the communication quality of the transmission channel is judged based on the identified result"

219. Su renders this limitation obvious.

220. As an initial matter, comparing bits to calculate a Hamming distance was well-known in the art by 2004. § VIII.A.4, *supra*. A POSITA would have understood that calculating the Hamming distance entails comparing bits that form a valid Hamming codeword to the received bits, which may be an invalid Hamming codeword due to bit errors. The result of this comparison is a determination of the number of bits that differ between the two codewords, and their locations in the codeword. This error vector result can then be used to correct the errors in the received data bits as long as the number of bits in error does not exceed half the minimum Hamming distance between valid codewords in the Hamming code that is being used. For errors that exceed half the minimum Hamming distance but are less than the minimum Hamming distance, error correction cannot be performed on received Hamming codewords, but the number

of bit errors that were determined can still be compared against a threshold. Thus, identifying "*the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value is identified*" would have been known to a POSITA because the Hamming distance metric involves comparing bits. § VIII.A.4, *supra*.

221. As explained in the analysis of limitation 8[b], Su teaches judging the communication quality of the transmission channel. Further, Su discloses determining a threshold based on "a measure of confidence in the recovered bits" during the decoding process, which is then applied to determine whether Group B bits are corrupted. Ex. 1008 (Su), 5:5-12. Su discloses using a Hamming distance metric as the maximum likelihood metric. *Id*., 5:61-63; *see also id*., 3:66-4:27. Su discloses that "[f]rames are rejected if the CRC check fails or the ML threshold is exceeded" *Id*. 5:13-14. "[T]he BER of the [] Group B bits [] is verified against the ML threshold. If the ML check is OK, indicating a minimal number of errors, the Group B bits [] are accepted without modification" ("*the communication quality of the transmission channel is judged based on the identified result*"). *Id*., 5:57-60; § X.A.1 *supra*.

222. As explained in the analysis of limitation 8[d], bits with Su's Group A and Group B bits include "*redundant bits contained in the symbol that contains a bit belonging to the protected portion*.," § X.C.5, *supra*.

223. Accordingly, Su discloses and renders obvious limitation 8[e]: "*wherein, in the communication quality judging step, the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value*" (e.g., Su's Hamming distance metric) "*is identified among the redundant bits contained in the symbol that contains a bit belonging to the protected portion, and the communication quality of the transmission channel is judged based on the identified result*" (e.g., Su's comparing the bit error rate to a threshold to determine whether the bits should be accepted without modification).

D. Independent Claim 1

1. 1[pre] "A communication quality judging device comprising"

224. *See* § IX.B.1, *supra*.

2. 1[a] "a symbol judging means for obtaining a baseband signal representative of a sequence of multilevel symbols and judging the symbol represented by the baseband signal"

225. *See* § IX.B.2, *supra*.

3. 1[b] "a communication quality judging means for judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol judged by the symbol judging means"

226. As detailed above in the analysis of limitation 8[b], the teachings of Su render obvious "judging communication quality of a transmission channel over which the baseband signal has been transmitted, based on content of the symbol

judged in the symbol judging step." Thus, the function of this limitation is rendered obvious by the prior art.

227. Further, Su renders obvious the corresponding structure, or equivalents thereof. For example, Su discloses a "speech decoder" (Ex. 1008 (Su), 3:20-22) which a POSITA would have recognized as equivalent to the corresponding structure of a processor checking the value of bits and comparing the number of bits having or missing a predetermined value to threshold values as identified in § III.D.2., *supra*. *See also* Ex. 1008 (Su), FIG. 3b, 1:13-33, 2:47-40, 4:46-65, 5:61-6:5, 6:25-36, claims 1-2.

228. Accordingly, the combination renders obvious this limitation.

4. 1[c] "a data changing means for, if the communication quality judged by the communication quality judging means does not satisfy a predetermined condition, making a predetermined change to the data to be transmitted represented by the symbol used in the judgment"

229. As detailed above in the analysis of limitation 8[c], the teachings of IS-54-B and Su render obvious "if the communication quality judged by the communication quality judging means does not satisfy a predetermined condition, making a predetermined change to the data to be transmitted represented by the symbol used in the judgment." Thus, the function of this limitation is rendered obvious by the prior art.

230. Further, IS-54-B and Su render obvious the corresponding structure, or equivalents thereof. For example, IS-54-B discloses a "bad frame masking system … based on a 6 state machine" which a POSITA would have understood to be implemented by a processor or similar circuitry within a cellular device, or a processor for replacing data, muting data, substantially destroying data, and attenuating data as identified in § III.D.3, supra. Likewise, Su discloses a "speech decoder" (Ex. 1008 (Su), 3:20-22) which a POSITA would have recognized as equivalent to the corresponding structure for this limitation. *See also id*., FIG. 3b, 1:13-33, 2:47-40, 4:46-65, 5:61-6:5, 6:25-36, claims 1-2.

231. Accordingly, the combination renders obvious this limitation.

5. 1[d] "wherein at least a portion of a bit string is distinguished as a protected portion, the bit string constituting data to be transmitted represented by the sequence of symbols, and at least a portion of the symbol that belongs to the sequence of symbols contains a bit belonging to the protected portion and a redundant bit having a predetermined value"

232. *See* 8[d], *supra*.

6. 1[e] "wherein the communication quality judging means identifies the number of redundant bits having the predetermined value or the number of redundant bits missing the predetermined value among the redundant bits contained in the symbol that contains a bit belonging to the protected portion, and judges the communication quality of the transmission channel based on the identified result"

233. *See* 8[e], *supra*.

E. Dependent Claims 2-7

234. Dependent claims 2-7 are disclosed or rendered obvious by IS-54-B for the same reasons as detailed with respect to Ground 1. *See* §§ IX.C.1-7, *supra*.

F. Independent Claim 9

235. *See* §§ IX.D (preamble), IX.A (limitations), *supra*.

XI. CONCLUSION

236. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. Further, I am aware that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001. I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 12, 2025, in Portage, Indiana.

Dr. Harry Bims

APPENDIX A

Dr. Harry V. Bims
Protocomm Systems, LLC
2665 Marine Parkway, Suite 1140
Mountain View, CA 94043
harrybims@me.com
650-283-4174

PROFESSIONAL SUMMARY

Harry Bims, PhD, EE, provides expert witness support services for telecommunications-related intellectual property litigation. These services include deposition and court testimony, expert reports, and infringement research, for patent, copyright, and trade secret litigation matters. He has 30+ years of telecommunications industry experience, and holds twenty-two US patents in network architecture and chip design for wireless communications.

EMPLOYMENT HISTORY

12/2001 - 05/2004 **AirFlow Networks, Inc. ● Sunnyvale, California**

Position: *CEO/CTO & Founder*

As the sole founder of the company, created the original business plan, raised venture capital, and hired the core engineering team. Grew the company to 32 people and shipped products for revenue in the US and overseas. Fifteen patents on the core technology have issued. These patents, which relate to wireless network infrastructure based on the 802.11 specification, have been sold to Broadcom.

03/2001 - 12/2001 **Bay Partners LLC ● Cupertino, California**

Position: *Entrepreneur in Residence*

Reported to the partners of this VC firm as a technology expert on a range of wireless and networking subjects. Reviewed business plans and participated in due diligence activities related to several startups seeking funding. Developed a business plan for a startup that builds network infrastructure for 802.11 enterprise networks.

09/1999 - 03/2001 **Symmetry Communications Systems Inc ● San Jose, California**

Position: *Director, Software Architecture*

Reporting to the CEO, responsible for the software architecture of their core SGSN and GGSN products for the GPRS market. Formulated a software technology roadmap, showing the evolution from 2.5G to 3G SGSN and GGSN products. Management responsibility for Firmware, Hardware, Performance, and Systems Engineering Groups. Provided management support of early field trials of the system on a global basis.

07/1999 - 09/1999 **T-SPAN Systems Corporation ● Palo Alto, California**

Position: *Member of Technical Staff*

Designed a wireless home LAN protocol for the company. Also designed and built a PC-based platform to demonstrate their technology. Company is now publicly traded as Atheros Communications.

07/1992 - 12/1998 **Glenayre Technologies-Wireless Access Group ● San Jose, California**

Position: *Member of Technical Staff; Sr. Member of Technical Staff; Manager of NOC Systems*

Employee #6 at the company, which was acquired by Glenayre Technologies, Nov 1997. Designed and built a 4-channel ReFLEX50 pager demonstration in 1 week. Participated in early field trials and feasibility studies, culminating in a Pioneer's Preference license award from the FCC to SkyTel Corporation for Narrowband PCS development.

Invented, designed, and built from concept through full implementation, a patented two-way pager test system for the ReFLEX50 and ReFLEX25 protocols. This system was used throughout company operations for performance testing of the ReFLEX pager designs from Wireless Access, and Motorola. Over 16 systems were deployed around the country for manufacturing tests, engineering protocol tests, antenna tests, and pager repair tests.

The project required technical skills in PC hardware design, C++, object-oriented programming, signal processing techniques, NT device driver development, Win32 user interface development, real-time, multi-threaded control, and proficiency with wireless communications lab equipment. Three patents have been issued based on technical inventions in this capacity.

Co-developed a wireless application protocol for sending and receiving encrypted email messages over the paging channel. Led the project team that deployed a software encryption module based on this protocol for government agencies.

10/2012 – Present **BoughtStuff, Inc ● Palo Alto, California**

Position: *Founder*

The company has developed a mobile application for storage and delivery of product information to smartphones over wireless networks.

Bims Laboratories, Inc Work History

6/2009 – 7/2009 **Eastman Kodak Company ● Rochester, NY**

Position: *Technology Consultant*

Providing technology assessment on certain wireless communication patents.

10/2009 – 1/2017 **IEEE 802.16 Working Group**

Position: *Task Group Secretary, Task Group Vice-Chair, Task Group Chair, Working Group Vice-Chair & Secretary, IEEE 802.16 Expert*

Served in several leadership capacities within this group that is working on improvements to the IEEE 802.16 standard, otherwise known as WiMAX. The 802.16 Working Group entered hibernation on March 2018. From that time until the present, I am on the roster of Experts designated by the Chair to answer questions and provide clarification about the 802.16 standards.

2/2014 – Present **Access Network Protocol Development**

Position: *Technical Lead Developer*

Developing a C++17-based DES of SDRs for wired and wireless network protocols, that includes IMT-2020 channel models. Implementations of the IEEE 802 and LTE protocol families, plus PTP, PPoE, IPv6, digital cable, Bluetooth, DSL, frame relay and many other managed node models for smart grid and vertical IoT applications. Used for technical analysis of emerging wireless standards amendments.

Protocomm Systems, LLC Consulting History

04/1999–07/1999 **Gigabit Wireless, Inc. ● San Jose, California**

Position: *Technical Leader*

Technical leader for the Wireless MAC design group. Responsible for

comparative analysis of competing wireless MAC protocol standards. Responsible for the creation of a proprietary MAC protocol specification document, simulation of the protocol, and implementation in a prototype. Participated in early 802.16 protocol standards. This company was acquired by Intel Corporation.

3/2007 – 10/2009 **Apple, Inc. ● Cupertino, CA**

Position: *Technology Consultant*

Participating in IEEE 802.16 standards meetings as an affiliate of the client.

7/2003 – Present **Various expert witness engagements (see below)**

Position: *Technical Expert Witness*

Testified as a wireless technology expert in patent infringement cases. For a list of such cases, see below.

Technical Expert Witness Experience

10/2024 – Present **Fish & Richardson LLP (representing Apple)**

Case: Resonant Systems, Inc. d/b/a RevelHMI v. Apple Inc.

Civil Action No. 7:23-cv-00077-ADA

Location: UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF TEXAS, MIDLAND-ODESSA DIVISION

Testifying expert in this patent case involving haptic technology

For Plaintiff:

For Defendant: Fish & Richardson, LLP

Attorneys:

Status: Case ongoing

03/2024 – Present **Client: Fish & Richardson, LLP (representing General Motors Company, and General Motors LLC ("GM"), Tesla Inc., and American Honda Motor Co., Inc., and Honda Development & Manufacturing of America, LLC ("Honda")**

Client: DLA Piper LLP (representing Toyota Motor North America, Inc., Toyota Motor Sales, U.S.A., Inc., and Toyota Motor Engineering & Manufacturing North America, Inc., and Toyota Motor Credit Corporation ("Toyota")

Client: Venable LLP (representing FCA US LLC)

Client: Brooks Kushman LLP (representing Ford Motor Co.)

Client: Jenner & Block LLP (representing Nissan North America Inc. and Nissan Motor Acceptance Corporation A/K/A Nissan Motor Acceptance Company LLC ("Nissan")

Case: Neo Wireless, LLC v GM, Tesla, Honda, Toyota, FCA US LLC, Ford Motor Co., and Nissan, Civil Action No. 2:22-MD-03034-TGB (E.D. Mich)

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF MICHIGAN SOUTHERN DIVISION

Testifying expert in this District Court matter involving 5G communications.

Expert Report:

March 28, 2024 Opening Expert Report on Invalidity

April 25, 2024 Rebuttal Expert Report on Non-Infringement

May 23, 2024 Expert Deposition

Attorneys: For Plaintiff:

For Defendant: Fish & Richardson, LLP, DLA Piper LLP, Venable LLP, Broosk Kushman LLP, Jenner & Block LLP

Status: Case ongoing

3/2024 – Present **Client: Finnegan, Henderson, Farabow, Garrett, & Dunner, LLP (representing Motorola Mobility LLC)**

Case: Lenovo (UNITED STATES) Inc. and Motorola Mobility LLC (Petitioners) v. Headwater Research LLC. (Patent Owner)

IPR Petition relating to Headwater Research LLC v Motorola Mobility LLC and Lenovo (United States) Inc. Case No. 4:23-cv-04496-JST (N.D. Cal.)

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARDa

Testifying expert in these matters involving application-level prioritization across networks.

April 17, 2024 Expert Declaration ISO IPR Petition regarding US Patent 9,198,076

July 17, 2024 Expert Declaration ISO IPR Petition regarding US Patent 10,749,700

July 15, 2024 Expert Declaration ISO IPR Petition regarding US Patent 9,198,076

August 8, 2024 Expert Declaration regarding US Patent 9,198,076

Attorneys: For Patent Owner:

For Petitioner: Finnegan

Status: Case ongoing

2/2024 – Present **Client: Bookoff McAndrews LLP (representing Motorola Mobility, LLC)**

Case: Patent Litigation between Ericsson and Motorola/Lenovo in Colombia

Location Testifying expert in these matters involving 5G networking technology.

Expert Declaration:

March 4, 2024 (COLOMBIA) Non-Essentiality and Non-Infringement Technical Opinion regarding CO38083

March 20, 2024 (COLOMBIA) Invalidity Technical Opinion regarding CO38001

March 27, 2024 (COLOMBIA) Non-Infringement Technical Opinion regarding CO38001

March 27, 2024 (COLOMBIA) Non-Infringement Technical Opinion regarding CO36031

March 27, 2024 (COLOMBIA) Non-Infringement Technical Opinion regarding CO37362

April 16, 2024 (COLOMBIA) Non-Infringement and Non-Essentiality Technical Opinion regarding CO37550

April 19, 2024 (COLOMBIA) Non-Essentiality Technical Opinion regarding CO38002

July 19, 2024 (COLOMBIA) Invalidity Technical Opinion Regarding CO38457

Attorneys: For Plaintiff:

For Defendant: Bookoff McAndrews, LLP

Status: Case ongoing

2/2024 – Present **Client: Fish & Richardson, LLP (representing Lenovo (United States))**

Case: Certain Cellular Base Station Communication Equipment, Components Thereof, and Products Containing Same
U.S. Int'l Trade Commission Inv. No. 337-TA-1388

U.S. Int'l Trade Commission Inv. No. 337-TA-1397

Location: UNITED STATES INTERNATIONAL TRADE COMMISSION – Administrative Law Judge Hon. Bryan F. Moore

Testifying expert in this patent case involving 5G networking technology

August 7, 2024	Declaration Regarding Claim Construction
August 21, 2024	Rebuttal Declaration Regarding Claim Construction
September 10, 2024	Initial Expert Report Regarding Infringement and Domestic Industry
September 25, 2024	Rebuttal Expert Report Regarding Validity
October 4, 2024	Expert deposition testimony
December 9-10, 2024	Live testimony at 1397 trial.

Attorneys: For Plaintiff:

For Defendant: Fish & Richardson

Status: ITC case ongoing

2/2024 – Present **Greenberg Traurig LLP (representing Samsung)**

Case: Samsung Electronics Co., Ltd., (Petitioner) v. Asus Technology Licensing Inc. (Patent Owner), IPR2024-00614

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this patent case involving LTE networking technology

March 8, 2024: PTAB Declaration ISO IPR petition

August 12, 2024: PTAB Declaration ISO IPR petition – US Patent 10,785,759

Attorneys: For Patent Owner:

For Petitioner: Greenberg Traurig LLP

Status: Case ongoing

7/2022 – Present **Client: Fish & Richardson LLP (representing LG Electronics, Inc.)**

Case: LG Electronics, Inc. v Invention Investment Fund I, L.P., Invention Investment Fund II, LLC, Intellectual Ventures I, LLC, and Intellectual Ventures II, LLC., Civil Action No. N22C-11-145-SKR-CCLD

Location: SUPERIOR COURT FOR THE STATE OF DELAWARE

Testifying expert in these matters relating to a breach of a License Agreement

April 19, 2024: Opening Expert Report

October 10 – 15, 2024: Live trial testimony

Attorneys: For Plaintiff: Fish & Richardson LLP

For Defendant:

Status: Jury award

1/2024 – Present **Client: Kramer Levin Naftalis & Frankel, LLP (representing Acceleration Bay, LLC.)**

Case: Acceleration Bay, LLC v Amazon Web Services, Inc.

Civil Action No.: 22-904-RGA-SRF

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE – Hon. Richard G. Andrews

Testifying expert in this patent case involving internet data broadcasting.

Expert Declaration:

February 12, 2024: Expert Report Regarding Technology Tutorial of Asserted Patents

May 28, 2024 Live Deposition Testimony

September 23, 2024 Live trial testimony

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant: Fisch Sigler LLP

Status: Jury Award

12/2023 – Present **Kirkland & Ellis LLP (representing Motorola Mobility LLC & Lenovo)**

Case: Certain Mobile Phones, Components Thereof, and Products Containing the Same
U.S. Int'l Trade Commission Inv. No. 337-TA-1375

Certain Electronic Devices, including Mobile Phones, Tablets, Laptops, Components Thereof, and Products Containing the Same
U.S. Int'l Trade Commission Inv. No. 337-TA-1376

Telefonaktiebolaget LM Ericsson v Lenovo (United States), Inc.
Civil Action No. 5:23-cv-569 (E.D.N.C.)

Lenovo (United States) v Telefonaktiebolaget LM Ericsson
Civil Action No. 5:23-cv-570 (E.D.N.C.)

IPR Petition Lenovo (United States) Inc. (Petitioner) v Telefonaktiebolaget LM Ericsson (Patent Owner)

Location: UNITED STATES INTERNATIONAL TRADE COMMISSION
Administrative Law Judge Hon. MaryJoan McNamara

Testifying expert in this patent case involving 5G networking technology.

April 30, 2024 Expert Report on Invalidity

May 14, 2024 Rebuttal Expert Report Regarding Non-Infringement

May 31, 2024 Deposition Testimony

July 12-15, 2024 Live Testimony at Trial

Attorneys: For Plaintiff:

For Defendant: Kirkland & Ellis LLP

Status: Decision pending

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF NORTH CAROLINA

Attorneys: For Plaintiff:

For Defendant: Kirkland & Ellis LLP

Status: Case ongoing

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF NORTH CAROLINA

Testifying expert in this patent case involving establishing point-to-point

connections between mobile devices.

Attorneys: For Plaintiff: Kirkland & Ellis LLP

For Defendant:

Status: Case ongoing

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD
Case IPR2024-TBD

March 15, 2024: Declaration in support of Petition for IPR

Attorneys: For Petitioner: Kirkland & Ellis LLP

For Patent Owner:

Status: Case ongoing

12/2023 – Present **Fish & Richardson LLP (representing Reolink)**

Case: IPR Petition Shenzhen Reolink Technology Co., Ltd., Reolink Innovation Inc., Reolink Innovation Co., Ltd. (China) (Patent Owner) v Throughtek, Co., Ltd. (Patent Owner), Attorney Docket No. 52472-0005IP1

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

January 29, 2024: PTAB Declaration ISO IPR petition

Attorneys: For Patent Owner:

For Petitioner: Kirkland & Ellis LLP

Status: Case ongoing

7/2023 – Present **Client: Finnegan, Henderson, Farabow, Garrett, & Dunner, LLP (representing MediaTek)**

Case: U.S. Int'l Trade Commission Inv. No. 337-TA-1367

Certain Electronic Devices and Semiconductor Devices having Wireless Communication Capabilities and Components Thereof

Location: UNITED STATES INTERNATIONAL TRADE COMMISSION – Administrative Law Judge Hon. Bryan F. Moore

Testifying expert in this patent case involving IEEE 802.11 technology.

Expert Reports:

January 18, 2024 Rebuttal expert Report regarding Non-infringement

Videotaped Deposition:

February 15, 2024 Videotaped expert deposition

ITC Trial testimony:

March 24, 2024 Non-infringement witness statement

Attorneys: For Plaintiff:

For Defendant: Finnegan

Status: ITC case ongoing

8/2023 – Present **Kirkland & Ellis LLP (representing TP-Link Technologies Co Ltd.)**

Case: U.S. Int'l Trade Commission Inv. No. 337-TA-1361

In the Matter of Certain Wi-Fi Routers, Wi-Fi Devices, Mesh Wi-Fi Network Devices, and Hardware and Software Components Thereof (ICC Case No. 27699/PDP)

Location: UNITED STATES INTERNATIONAL TRADE COMMISSION – Administrative Law Judge Doris Johnson Hines

Testifying expert in these matters involving base station and wireless mesh technology.

November 9, 2023: Expert report concerning Invalidity

November 30, 2023: Expert rebuttal report on Non-Infringement and Technical Domestic Industry

January 22, 2023: Live testimony at ITC trial

Attorneys: For Plaintiff: LLP

For Defendant: Kirkland & Ellis LLP

Status: Trial verdict pending

5/2023 – Present **Client: Fish & Richardson LLP (representing Samsung Electronics, Co. Ltd.)**

Case: In the Matter of an Arbitration Pursuant to the Rules of the International Court of Arbitration of the International Chamber of Commerce (ICC Case No. 27699/PDP)

Location: INTERNATIONAL CHAMBER OF COMMERCE

Testifying expert in these matters involving international patent arbitration between Interdigital and Samsung.

January 8, 2024 Rebuttal expert report

June 18, 2024 Second expert report

Attorneys: For Plaintiff: Alston & Bird LLP

For Defendant: Fish & Richardson LLP

Status: Case ongoing

10/2022 – 2/2023 **Client: Finnegan, Henderson, Farabow, Garrett & Dunner LLP (representing Samsung Electronics, Co. Ltd.)**

Case: IPR Petition relating to Apex Beam Technologies, LLC v. Samsung Electronics, Co. Ltd., Civil Action No. 2:22-cv-00188)

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in these matters involving smart antenna technology.

February 27, 2023: Expert Declaration ISO petition for Inter Partes review

February 28, 2023: "Xia" Expert Declaration ISO petition for Inter Partes review

February 28, 2023: "Liu" Expert Declaration ISO petition for Inter Partes review

Attorneys: For Patent Owner:

For Petitioner: Finnegan, Henderson, Farabow, Garrett & Dunner LLP

Status: Case settled

7/2022 – Present **Client: Russ, August & Kabat LLP (representing Vivato, Inc.)**

Case: XR Communications, LLC d/b/a Vivato Technologies v D-Link Systems, Inc., Civil Action No. 8:17-cv-00596-DOC(JDE)

Location: UNITED STATES DISTRICT COURT FOR THE CENTRAL DISTRICT OF CALIFORNIA – Hon. David O. Carter

Testifying expert in these matters involving smart antenna technology.

Expert Declaration:

August 23, 2022: Rebuttal Expert Report on Validity

August 31, 2022: Deposition testimony

Attorneys: For Plaintiff: Russ, August & Kabat LLP

For Defendant:

Status: Case ongoing

6/2022 – 1/2024 **Client: Fish & Richardson LLP (representing Samsung Electronics, Co. Ltd.)**

Case: G+ Communications, LLC v Samsung Electronics Co. Ltd. et. al, Civil Action No. 2:22-cv-78

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS – Hon. Rodney Gilstrap

Testifying expert in these matters involving smart antenna technology.

March 13, 2023: Expert Declaration ISO Samsung Defendants' Claim Construction Proposals

June 28, 2023: Opening Expert Report on Invalidity

December 18, 2023: PTAB Declaration ISO IPR Petition

Attorneys: For Plaintiff: Russ, August & Kabat LLP

For Defendant: Fish & Richardson

Status: Jury trial verdict

5/2022 – 6/2023 **Client: Kilpatrick Townsend LLP (representing Apple, Inc.)**

Case: IPR Petition relating to Apple, Inc. v. Mullen Industries LLC, Civil Action No. 6:22-cv-00145

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in these matters involving remote notification devices.

August 8, 2022: Expert Declaration

May 23, 2023: Expert Deposition

Attorneys: For Patent Owner: Mintz, Levin, Cohn, Ferris, Glovsky, and Popeo, P.C.

For Petitioner: Kilpatrick Townsend LLP

Status: Case settled

3/2022 – 9/2023 **Client: Kirkland & Ellis LLP (representing Samsung Electronics Co. Ltd.)**

Case: California Institute of Technology v Samsung Electronics Co. Ltd., Civil Action No. 2:21-cv-00446

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS – Hon. Rodney Gilstrap

Testifying expert in these matters involving LDPC codes.

November 22, 2022: Declaration regarding claim construction

December 20, 2022: Rebuttal Declaration regarding claim construction

May 22, 2023: Rebuttal expert report on non-infringement

May 31, 2023: Deposition testimony

Attorneys: For Petitioner: Kirkland & Ellis LLP

For Plaintiff: Mintz, Levin, Cohn, Ferris, Glovsky, and Popeo, P.C.

Status: Case settled

2/2022 – 12/2022 **Client: Fish & Richardson LLP (representing Apple, Inc.)**

Case: Litigation between Ericsson and Apple in Belgium, Brazil, Germany, Netherlands, and Colombia, and US matters:

Ericsson Inc. et. al. v. Apple Inc., Civil Action No. 6:22-cv-00061-ADA

Ericsson Inc., et. al, v. Apple Inc., Civil Action No. 2:21-cv-00376

Apple Inc. v. Telefonaktiebolaget LM Ericsson, et. al., Civil Action No. 2:21-cv-00460

In the Matter of Certain Mobile Phones Tablet Computers, Smart Watches, Smart Speakers, and Digital Media Players, and Products Containing Same.

U.S. Int'l Trade Commission Inv. No. 337-TA-3596

Location: UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF TEXAS WACO DIVISION – Hon. Alan D. Albright

UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS

UNITED STATES INTERNATIONAL TRADE COMMISSION

Testifying expert in these matters involving 5G networking technology.

Expert Declaration:

May 18, 2022 COLOMBIA: Invalidity and Non-Infringement Technical Opinion

regarding certain Colombia patents

April 27, 2022 COLOMBIA: Invalidity and Non-Infringement Technical Opinion regarding certain Colombia patents #1

April 27, 2022 COLOMBIA: Invalidity and Non-Infringement Technical Opinion regarding certain Colombia patents #2

March 28, 2022 COLOMBIA: Invalidity and Non-Infringement Technical Opinion regarding certain Colombia patents

March 9, 2022 BRAZIL: Invalidity Technical Opinion regarding Brazil patents

May 26, 2022 BRAZIL: Response to Ericsson Statement regarding Brazil patents

August 25, 2022 BRAZIL: Live testimony before the Brazil Patent and Trademark Office regarding invalidity

November 15, 2022 (COLOMBIA) Invalidity and Non-Infringement Technical Opinion regarding CO37550

Attorneys: For Plaintiff:

For Defendant: Fish & Richardson, LLP

Status: Case settled

1/2022 – 3/2023 **Client: Finnegan LLP (representing Toyota Motor Corp., et. al.)**

Case: Intellectual Ventures I LLC, et. al. v. Toyota Motor Corp., et. al., Civil Action No. 2:21-cv-389

Toyota Motor Corp. (Petitioner) v. Intellectual Ventures II, LLC (Patent Owner) Case No. IPR2022-01355

Location: UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF TEXAS MARSHALL DIVISION –

UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this District Court and PTAB matter involving IEEE 802.11 wireless networking.

Expert Declaration:

January 13, 2023: Marshall Division Declaration on Invalidity

August 25, 2022: PTAB Declaration ISO Petition for IPR

April 8, 2024: PTAB Declaration ISO Petition for IPR2022-00973

Attorneys: For Plaintiff:

For Defendant/Petitioner: Finnegan, LLP

Status: Case settled

9/2021 – Present **Client: Schulte, Roth & Zabel LLP (representing TrackThings LLC)**

Case: TrackThings LLC v. NETGEAR, Inc. Civil Action No. 22-981-RGA-JLH

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE – Testifying expert in this District Court matter involving wireless network reconfiguration.

July 9, 2024 Expert Rebuttal report regarding Validity of US Patent Nos. 9,642,017, 9,332,442, and 10,107,893

August 15, 2024 Reply Expert Report regarding infringement

July 9, 2024 Rebuttal Expert Report regarding Validity

October 17, 2024 Deposition testimony

Attorneys: For Plaintiff: Schulte, Roth, and Zabel

For Defendant: Quinn Emanuel

Status: Case ongoing

9/2021 – Present **Client: Stroock LLP/Schulte, Roth & Zabel (representing TrackThings LLC)**

Case: TrackThings LLC v. Amazon.com, Inc. and Amazon.com Services LLC, and eero LLC., Civil Action No. 6:21-cv-00720; Civil Action No. 6:23-cv-00133-ADA

Location: UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF TEXAS WACO DIVISION – Hon. Alan D. Albright

Testifying expert in this District Court matter involving wireless network reconfiguration.

March 17, 2023: Expert declaration ISO claim construction responses

February 24, 2023 Rebuttal Expert report regarding Validity

January 25, 2024 Expert report on Infringement

February 9, 2024 Expert report regarding Infringement

March 8, 2024 Rebuttal Expert report regarding Validity

March 29, 2024 Live deposition testimony

Attorneys: For Plaintiff: Schulte, Roth, and Zabel

For Defendant: Quinn Emanuel

Status: Case ongoing

12/2020 – Present **Client: BlankRome (representing Samsung Electronics Co., Ltd)**

Case: TOT Power Control, S.L. v. Samsung Elecs. Co., Ltd and Samsung Elecs. Am. Inc., Civil Action No. 1:21-cv-01305-MN

IPR Petition relating to TOT Power Control, S.L. v. Samsung Elecs. Co., Ltd and Samsung Elecs. Am. Inc., Civil Action No. 1:21-cv-01305-MN

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

– Hon. Maryellen Noreika

UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this district court and IPR proceeding involving power control methods in wireless systems.

September 12,2022 Expert Declaration regarding IPR for 865 patent

August 23, 2024 Expert Report on Invalidity

October 1, 2024 Expert report on Non-infringement

October 22, 2024 Reply Expert Report on Invalidity

November 8, 2024 Live deposition testimony

Attorneys: For Plaintiff: DLA Piper

For Defendants: Blank Rome

For Patent Owner: Hausfeld, LLP

For Petitioner: Blank Rome

Status: Case ongoing

5/2024 – Present **Client: BlankRome (representing Samsung Electronics Co., Ltd)**

Case: Secure Wi-Fi LLC v. Samsung Elecs. Co., Ltd and Samsung Elecs. Am. Inc., Civil Action No. 2:24-cv-00047

IPR Petition relating to TOT Power Control, S.L. v. Samsung Elecs. Co., Ltd and Samsung Elecs. Am. Inc., Civil Action No. 1:21-cv-01305-MN

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS

Testifying expert in this IPR proceeding involving randomizing MAC addresses in Wi-Fi networks.

September 3, 2024	Expert Declaration regarding IPR for 384 patent
September 3, 2024	Expert Declaration regarding IPR for 005 patent
September 3, 2024	Expert Declaration regarding IPR for 552 patent

Attorneys: For Petitioner: Blank Rome, LLP

Status: Case ongoing

10/2021 – 5/2022 **Client: Finnegan, Henderson, Farabow, Garrett & Dunner, LLP (representing MediaTek Inc.)**

Case: NXP USA, Inc. v. MediaTek Inc., et. al., Civil Action No. 2:21-cv-000318-JRG – Hon. Rodney Gilstrap

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS MARSHALL DIVISION

Testifying expert in this District Court matter involving 802.11n, 802.11ac, and 802.11ax chipsets.

Expert Report:

February 3, 2022	Declaration ISO Defendant's Claim Construction Brief

Attorneys: For Plaintiff: Duane Morris, LLP

For Defendant: Finnegan, LLP

Status: Case settled

09/2021 – 9/2024 **Client: Fish & Richardson, LLP (representing Samsung Electronics Co., Ltd., et. al.)**

Case: Smart Mobile Technologies, LLC v. Samsung Electronics Co., Ltd., et. al., Civil

Action No. 6:21-cv-00701-ADA. Hon. Alan D. Albright

Location: UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF TEXAS WACO DIVISION

Testifying expert in this District Court matter involving wireless voice and data transfer.

Expert Report:

June 8, 2022 Declaration ISO Defendant's Claim Construction Brief

Attorneys: For Plaintiff: Hagens Berman Sobol Shapiro, LLP

For Defendant: Fish & Richardson, LLP

Status: Case closed

05/2021 – 6/2021 **Client: Sidley Austin (representing HP Inc. and Microsoft Corporation)**

Case: SynKloud Technologies, LLC v. HP Inc., Civil Action No. 1:19-cv-01360-RGA and Microsoft Corporation v. SynKloud Technologies, LLC, Civil Action No. 1:20-cv-00007-RGA

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

Testifying expert in this District Court matter involving wireless cloud storage.

Expert Report:

June 25, 2021 Declaration ISO Microsoft and HP's Claim Construction Brief

Attorneys: For Plaintiff:

For Defendant: Sidley Austin

Status: Case settled

05/2021 – 5/2022 **Client: DLA Piper (representing Motorola Mobility LLC)**

Case: U.S. Int'l Trade Commission Inv. No. 337-TA-1253

Certain LTE-Compliant Cellular Communication Devices

Motorola v. Evolved Wireless LLC.

Location: UNITED STATES INTERNATIONAL TRADE COMMISSION – Administrative Law Judge Cameron R. Elliot

Testifying expert in this ITC matter involving LTE cellular device handover.

Expert Report:

November 16, 2021 Expert Report on NonInfringement and Lack of Technical Domestic Industry

Expert Testimony:

December 15, 2021 Deposition testimony

Attorneys: For Plaintiff: Nelson Bumgardner Albritton P.C.; Adduci, Mastriani & Schaumberg, LLP

For Defendant: DLA Piper

Status: Case settled

04/2021 – 6/2022 **Client: Desmarais LLP (representing Google LLC and FitBit Inc.)**

Case: Cellspin Soft, Inc. v. Fitbit, Inc., No. 4-17-cv-05928-YGR

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA

Hon. Yvonne Gonzalez Rogers

Testifying expert in this patent case involving the distribution of real-time health data.

Expert Testimony:

October 29, 2021 Expert Report on NonInfringement

Attorneys: For Plaintiff: Garteiser Honea PLLC and Corcoran IP Law PLLC

For Defendant: Desmarais LLP

Status: Case settled. Summary Judgment for Non-Infringement.

3/2021 – 9/2021 **Client: Fish & Richardson (representing Samsung)**

Case: U.S. Int'l Trade Commission Inv. No. 337-TA-1248

Certain Cellular Communications Infrastructure Systems, Components Thereof, and Products Containing Same

U.S. Int'l Trade Commission Inv. No. 337-TA-DN-3525

Certain Cellular Communications Infrastructure Systems, Components Thereof, and Products Containing Same

Location: UNITED STATES INTERNATIONAL TRADE COMMISSION

Testifying expert in this ITC matter regarding 3GPP technology.

Attorneys: For Plaintiff: Winston & Strawn, LLP

For Defendant: Fish & Richardson, LLP

Status: Case terminated in its entirety based on an Initial Determination.

2/2021 – 11/2021 **Client: Fish & Richardson (representing Quectel)**

Client: Axinn, Veltrop & Harkrider LLP (representing Thales DIS AIS USA, LLC)

Client: Pearl Cohen LLP (representing Telit)

Case: U.S. Int'l Trade Commission Inv. No. 337-TA-1240

Certain UMTS and LTE Cellular Communication Modules and Products Containing the Same

Koninklijke Philips N.V. v Quectel Wireless Solutions Co. Ltd., Thales DIS AIS Deutschland GmbH, Thales S.A., Telit Wireless Solutions, Inc., Telit Communications PLC, CalAmp Corp, Xirgo Technologies, LLC, Laird Connectivity, Inc., Thales DIS AIS USA LLC

Case No. 1:20-cv-1713 (D. Del)

Location: UNITED STATES INTERNATIONAL TRADE COMMISSION – Administrative Law Judge Hon. David P. Shaw

Testifying expert on 3GPP mobile device operation.

Expert Testimony:

July 21, 2021	Expert Report on Invalidity
August 6, 2021	Deposition Testimony
October 12, 2021	Live Testimony before ALJ David P. Shaw

Attorneys: For Plaintiff: Mayer Brown LLP

For Defendants: Fish & Richardson; Axinn, Veltrop & Harkrider LLP

Status: Case closed

11/2020– Present **Client: Orrick, Herrington & Sutcliffe LLP (representing PayPal Holdings,**

Inc.)

Case: IOENGINE LLC v PayPal Holdings, Inc.

Civil Action No. 1:18-cv-00452-WCB

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

Hon. William C. Bryson

Testifying expert in this patent case involving peripheral device communication to remote servers.

Expert Testimony:

November 19, 2021 Expert Report on Invalidity

January 7, 2022 Expert Report on Non-Infringement

January 20-21, 2022 Deposition Testimony on Invalidity and Non-Infringement

Status: Case ongoing

11/2020 – Present **Client: DLA Piper (representing Apple, Inc.)**

Case: Maxell v. Apple Inc. In the Matter of Certain Mobile Electronic Devices and Laptop Computers

U.S. Int'l Trade Commission Inv. No. 337-TA-1215

Location: UNITED STATES INTERNATIONAL TRADE COMMISSION – Administrative Law Judge Hon. Dee Lord

Testifying expert on 3GPP mobile device operation.

Expert Testimony:

February 25, 2021: Opening Expert Report Regarding Invalidity

March 11, 2021: Rebuttal Expert Report regarding NonInfringement and Lack of Technical Domestic Industry

March 24, 2021: Videotaped deposition

Attorneys: For Plaintiff: Mayer Brown LLP

For Defendant: DLA Piper LLP

Status: Case settled

11/2020– 11/2020 **Client: Folio Law Group PLLC (representing Dali Wireless)**

Case: Dali Wireless, Inc. v. John Mezzalingua Associates, LLC d/b/a JMA Wireless

and Teko Telecom SRL (an Italian Corporation)

Civil Action No. 19-2367-RGA

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

Testifying expert in this patent case involving distributed antenna system networks.

Expert Testimony:

November 6, 2020: Declaration Regarding Interpretation of Asserted Claims

Status: Case closed

8/2020– 8/2022 **Client: Folio Law Group PLLC (representing Dali Wireless)**

Case: Dali Wireless, Inc. v. Corning Optical Communications, LLC,

Civil Action No. 3:20-cv-06469-EMC

Location: UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF TEXAS – Hon. Edward M. Chen

Testifying expert in this patent case involving distributed antenna system networks.

Expert Testimony:

February 12, 2021: Declaration Regarding Interpretation of Asserted Claims

June 29, 2022: Expert Report on Infringement

August 22, 2022: Deposition Testimony

October 11, 2022: Supplemental Expert Report on Infringement

Status: Case closed

3/2020– 8/2021 **Client: Folio Law Group PLLC (representing Dali Wireless)**

Case: Dali Wireless, Inc. v. CommScope Technologies, LLC and CommScope Holding Company, Inc..

Civil Action No. 1:19-cv-00952-MN

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE – Hon. Maryellen Noreika

Testifying expert in this patent case involving distributed antenna system networks.

Expert Testimony:

June 23, 2021: Expert report on infringement.

August 17, 2021: CORRECTED Reply Expert report on infringement of ’338 Patent

Status: Case closed

03/2020 – 8/2022 **Client: Sidley Austin LLP (representing Lenovo and Motorola)**

Case: InterDigital Technology Corporation, IPR Licensing, Inc., InterDigital Communications, Inc., InterDigital Holdings, Inc., and InterDigital, Inc. v. Lenovo Holding Company, Inc., Lenovo (United States) Inc., and Motorola Mobility LLC

Civil Action No. 19-1590-LPS

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

Hon. Leonard P. Stark

Testifying expert in this patent case involving 3G and 4G cellular standards.

Expert Testimony:

April 16, 2022 Expert report on Invalidity of ’665 and ’954 patents

June 16, 2022 Expert Report on Invalidity of 8,675,612 and 9,456,449 patents

June 16, 2022 Rebuttal Expert Report on Invalidity of 8,085,665 and 8,427,954 patents

July 17, 2022 Rebuttal expert report regarding non-infringement of ’612 and ’449 patents

July 18, 2022 Rebuttal expert report on non-infringement of ’665 and ’954 patents

August 8, 2022 Rebuttal Expert Report on Invalidity of ’612 and ’449 patents

August 31, 2022 Videotaped expert Deposition

Status: Case closed

3/2020– 5/2022 **Client: Finnegan, Henderson, Farabow, Garrett & Dunner LLC (representing Google)**

Case: IPR Petition Google LLC, v. Sonos, Inc., Case No. IPR2021-01563

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this IPR proceeding involving wireless home speaker systems.

Expert Testimony:

September 27, 2021: Declaration ISO petition for Inter Partes Review

May 10, 2022: Supplemental declaration ISO petition for Inter Partes Review

June 29, 2022: Videotaped deposition testimony

Status: Case closed

08/2019 – 6/2021 **Client: Fish & Richardson (representing Finjan, Inc.)**

Case: Finjan, Inc. v. Cisco, Inc.

Civil Action No. 5:17-cv-00072-BLF-SVK

Location: UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF CALIFORNIA SAN DIEGO DIVISION – Hon. Susan Van Keulen

As a testifying expert, provided a technology tutorial in this patent case involving internet security technology.

Expert Testimony:

August 14, 2019 Tutorial expert report on network security technology.

September 4, 2019 Deposition Testimony

Attorneys: For Plaintiff: Fish & Richardson

For Defendant:

Status: Case settled

8/2019 – 5/2020 **Client: Fish & Richardson (representing LG Electronics, Inc.)**

Case: Bell Northern Research, LLC v. LG Electronics, Inc., et. al.

USDC-SDCA Civil Action No. 18-cv-2864-CAB-BLM

Location: UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF CALIFORNIA – Hon. Cathy Ann Bencivengo, Magistrate Judge: Hon. Barbara L. Major

Testifying expert on wired/wireless communication in gaming systems.

Expert Testimony:

November 20, 2019 Declaration ISO motion for summary judgment

Attorneys: For Plaintiff: Skiermont Derby LLP

For Defendant: Fish & Richardson

Status: Case closed

7/2019 – 05/2021 **Client: O'Melveny & Myers LLP (representing Apple Inc.)**

Case: Maxell, Ltd. v. Apple Inc.,

Case No. 5:19-cv-00036-RWS.

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS TEXARKANA DIVISION – Hon. Robert W. Schroeder III

Testifying expert on 3G cellular telephone technology.

Expert Testimony:

May 7, 2020: Opening Expert Report Regarding Invalidity

June 4, 2020: Rebuttal Expert Report on Non-Infringement

Deposition Testimony: June 24, 2020

Attorneys: For Plaintiff: Mayer Brown LLP

For Defendant: O'Melveny & Myers LLP

Status: Case settled.

4/2019 – Present **Client: Perkins Coie (representing Nintendo of America, Inc.)**

Case: Genuine Enabling Technology LLC v. Nintendo Company Ltd., and Nintendo of America, Inc., W.D. Wash.,

Civil Action No. 2:19-cv-00351-RSM

Location: UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF WASHINGTON – Hon. Ricardo S. Martinez

Testifying expert on wired/wireless communication in gaming systems.

Expert Declarations:

October 23, 2019 Declaration ISO claim constructions

November 26, 2019 Sur-reply declaration ISO claim constructions

January 23, 2020 Declaration ISO motion for summary judgment

April 20, 2020 Opening Expert Report Regarding Invalidity

Expert Depositions:

December 19, 2019

Claim Construction Hearing Testimony:

February 24, 2020 Tutorial testimony on the technology of the Asserted Patents

Attorneys: For Plaintiff: Bayard, P.A.

For Defendant: Perkins Coie

Status: Case ongoing

12/2019 – 12/2019 **Client: Erise IP (representing Apple Inc.), Haynes and Boone, LLP (representing Ericsson Inc)**

Case: Ericsson Inc. (Petitioner) v. Uniloc 2017, LLC (Patent Owner)

Apple Inc. (Petitioner) v. Uniloc 2017, LLC (Patent Owner) Case No. IPR2020-00224

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this IPR proceeding involving ARQ data exchange on LTE networks.

Expert Declarations:

December 16, 2019 Declaration ISO Petition for Inter Partes Review of U. S. Patent No. 7,075,917

Attorneys: For Petitioner: Erise IP; Haynes and Boone, LLP

For Patent Owner:

Status: Case closed

6/2019 – 7/2020 **Client: Fish & Richardson (representing Microsoft Corporation)**

Case: Microsoft Corp. (Petitioner) v. Uniloc 2017, LLC (Patent Owner)

Uniloc 2017, LLC v. Microsoft Corp.

USDC Central District of California, Case Nos. 8:18-cv-2053, 8:18-cv-2054, 8:18-cv-2224; 8:19-cv-0428, 8:19-cv-0477, 8:19-cv-0196

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this IPR proceeding involving 3GPP transport formats and channels.

Expert Declarations:

August 6, 2019 Declaration in support of claim construction

Attorneys: For Plaintiff: Feinberg Day LLP

For Defendant: Fish & Richardson

Status: Case settled

2/2019 – 5/2020 **Client: Klarquist Sparkman, LLP (representing Microsoft Corporation)**

Case: Uniloc 2017, LLC v. Microsoft Corp.

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this IPR proceeding involving ARQ data exchange on LTE networks.

Expert Declarations:

April 14, 2019 Declaration ISO Petition for Inter Partes Review of U. S. Patent No. 7,075,917

Attorneys: For Plaintiff:

For Defendant: Klarquist LLP

Status: Case settled

10/2018 – 6/2021 **Client: Kramer Levin Naftalis & Frankel, LLP (representing Finjan, Inc.)**

Case: Finjan, Inc. v. Eset, Inc.

Civil Action No. 3:17-cv-00183-CAB-BGS

Location: UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF CALIFORNIA SAN DIEGO DIVISION – Hon. Cathy Ann Bencivengo

As a testifying expert, provided a technology tutorial in this patent case involving internet security technology.

Expert Declaration:

October 5, 2018 Tutorial expert report on network security technology.

March 11, 2020 Jury trial testimony.

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant:

Status: Jury Trial Mistrial due to COVID-19.

Case closed.

9/2018 – 6/2021 **Client: Kramer Levin Naftalis & Frankel, LLP (representing Finjan, Inc.)**

Case: Finjan, Inc. v. Juniper, Inc.

Civil Action No. 15-cv-03295-BLF-SVK

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA SAN JOSE DIVISION – Hon. Beth L. Freeman

As a testifying expert, provided a technology tutorial in this patent case involving internet security technology.

Expert Declaration:

September, 11, 2018 Tutorial expert report on network security technology.

Videotaped Deposition:

November 7, 2018

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant:

Status: Case closed

9/2017 – 9/2018 **Client: (Covington & Burling representing Huawei Device USA, Inc.)**

Case: Optis Wireless Technology, LLC, et. al. v. Huawei Technologies Co. Ltd, et. al.

Civil Action No. 2:17-cv-123-JRG-RSP

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS MARSHALL DIVISION – Hon. Roy S. Payne

Testifying expert regarding 3G and LTE technology.

Expert Declarations and Reports:

November 3, 2017: Declaration regarding Claim Construction.

March 26, 2018: Initial Expert Report Regarding Invalidity

April 23, 2018: Rebuttal Expert Report on Non-Infringement

April 27, 2018: Rebuttal Expert Report on Secondary Considerations

Videotaped Deposition: May 10, 2018

May 14, 2018: Declaration in support of Motion for Partial Summary Judgment

Jury Trial Testimony: August 22, 2018 and August 23, 2018

Attorneys: For Plaintiff: McKool Smith

For Defendant: Covington & Burling

Status: Jury award

6/2017 – 4/2018 **Client: Kramer Levin Naftalis & Frankel, LLP (representing Finjan, Inc.)**

Case: Finjan, Inc. v. Symantec, Inc.

Civil Action No. 4:14-cv-02998-HSG

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA OAKLAND DIVISION

As a testifying expert, provided a technology tutorial in this patent case involving internet security technology.

Expert Declaration:

July 27, 2017 Tutorial expert report on security technology.

Videotaped Deposition:

August 29, 2017

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant: Quinn Emmanuel

Status: Case settled

5/2017 – 3/2018 **Client: Barnes & Thornburg, LLP (representing Ooma, Inc.)**

Case: Ooma, Inc. (Petitioner) v. Deep Green Wireless, LLC (Patent Owner)

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

As a testifying expert, provided a technology tutorial in this patent case involving voice and data communications over wireless networks.

Expert Declaration:

June 8, 2017 Expert report on prior art wireless network technology.

Videotaped Deposition:

February 15, 2018

Attorneys: For Petitioner: Barnes & Thornburg LLP

For Defendant: Mischcon De Reya New York, LLP

Status: Case closed

3/2017 – 6/2019 **Client: Fish & Richardson (representing Apple, Inc.) / Gibson, Dunn & Crutcher LLP (representing Compal Electronics, et. al.)**

Case: Apple Inc. v. Qualcomm Inc.

Qualcomm Inc. v. Compal Electronics, Inc., et. al.

Civil Action No. 3:17-cv-00108 / Civil Action No. 3:17-cv-01010

Location: UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF CALIFORNIA – Hon. Gonzalo P. Curiel, Magistrate Judge: Hon. Mitchell D. Dembin

Testifying expert regarding LTE technology.

Expert Declaration:

December 11, 2017: Declaration regarding Claim Construction.

Expert Report:

June 29, 2018: Opening Expert Report regarding invalidity

August 3, 2018: Expert Report on infringement

October 2, 2018: Rebuttal Expert Report on Invalidity

Videotaped Deposition:

October 25, 2018

None

Attorneys: For Apple: Fish & Richardson

For Qualcomm: Quinn Emanuel Urquhart & Sullivan LLP / Cravath, Swaine & Moore LLP

For Compal Electronics, Inc., et. al: Gibson, Dunn & Crutcher LLP

Status: Case settled.

3/2017 – 1/2018 **Client: Kramer Levin Naftalis & Frankel, LLP (representing Finjan, Inc.)**

Case: Finjan, Inc. v. Blue Coat Systems, LLC

Civil Action No. 15-cv-03295-BLF-SVK

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA SAN JOSE DIVISION – Hon. Beth L. Freeman

As a testifying expert, provided an opening technology tutorial at trial in this patent case involving internet security technology.

Expert Declaration:

March 29, 2017 Tutorial expert report on security technology.

Videotaped Deposition:

May 2, 2017

October 31 – November 2, 2017: Jury Trial Testimony

January 8-10, 2018: Jury Trial Testimony (retrial after mistrial):

Live Testimony on Network Security Technology Tutorial

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant: Morrison & Forrester & Quinn Emmanuel

Status: Jury award

1/2017 – 7/2017 **Client: Foster Pepper LLP (representing Dali Wireless)**

Case: Dali Wireless, Inc. (Petitioner) v. CommScope Technologies, LLC (Patent Owner)

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this patent case involving RF transport networks.

Expert Reports:

4-26-17 Declaration ISO petition for IPR

6-30-17 Declaration ISO Opening claim construction brief

Videotaped Deposition:

July 24, 2017

Status: Case closed

1/2017 – 6/2019 **Client: Dorsey & Whitney LLP (representing Dali Wireless)**

Case: CommScope Technologies, LLC (Plaintiff/Counterclaim Defendant) v. Dali Wireless, Inc. (Defendant/Counterclaim Plaintiff)

Civil Action No.: 3:16-cv-477

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF TEXAS DALLAS DIVISION

– Hon. Barbara M. G. Lynn

Testifying expert in this patent case involving RF transport networks.

Expert Reports:

8-24-18 Expert Report regarding Invalidity of CommScope patents

8-24-18 Expert Report regarding Infringement of Dali Wireless patents

11-5-18 Expert Report regarding Validity of Dali Wireless patents

11-5-18 Expert Report regarding Non-Infringement of CommScope patents

1-9-19 Declaration ISO opposition to MSJ

1-18-19 Declaration ISO partial MSJ on Non-infringement and Invalidity

5-2-19 Declaration ISO Motion for Sanctions

Videotaped Deposition:

November 20, 2018

Live Testimony at Jury Trial:

June 10-13, 2019

Attorneys: For Plaintiff: Dorsey & Whitney, LLC

For Defendant: Carlson Caspers, P.A.

Status: Jury award.

11/2016 – 4/2019 **Client: Boies, Schiller & Flexner LLP (representing Apple Inc.)**

Case: Evolved Wireless, LLC v. Apple, Inc.

Civil Action No.: 1:15-cv-00542-SLR

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE – Hon. Sue L. Robinson

Testifying expert in this patent case involving LTE wireless networks.

Expert Reports:

11-06-17 Declaration ISO Summary Judgment of Validity

10-05-17 Declaration ISO Summary Judgment of Non-Infringment

10-03-17 Supplemental Expert Report on Non-Infringement

07-24-17 Supplemental Expert Report on Secondary Considerations of Non-Obviousness

6-26-17 Expert Report on Non-Infringement

5-22-17 Expert Report on Invalidity

Videotaped Deposition:

August 11, 2017

Live Testimony at Jury Trial:

March 29 - April 1, 2019

Attorneys: For Plaintiff: Boies, Schiller & Flexner LLP

For Defendant: Robins Kaplan LLP

Status: Jury verdict of non-infringement.

7/2016 – 4/2018 **Client: Jackson Walker LLP (representing D&M Holdings, Inc., *et. al.*)**

Case: Sonos, Inc., v. D&M Holdings, d/b/a The D+M Group, D&M Holdings U.S. Inc., and Denon Electronics (USA), LLC

Civil Action No.: 16-0141-RGA

D&M Holdings Inc., d/b/a The D+M Group, D&M Holdings U.S. Inc. v. Sonos, Inc.

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE – Hon. Richard G. Andrews

Testifying expert in this patent case involving wireless speaker networks.

Expert Testimony:

9-11-17 Expert Report on Infringement

6-29-22 Remote Videotaped Deposition

Attorneys: For Plaintiff: Jackson Walker LLP

For Defendant: Potter Anderson & Corroon LLP

Status: Case settled

7/2016 – 1/2018 **Client: Kramer Levin Naftalis & Frankel, LLP (representing Finjan, Inc.)**

Case: Palo Alto Networks, Inc. (Petitioner) v. Finjan, Inc. (Patent Owner)

Case IPR2015-02001, Case IPR2016-00157. US Patent No. 8,225,408 B2

Case IPR2015-01974

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this patent case involving wireless speaker networks.

Expert Declaration:

8-9-16 Expert Declaration, Patent 7,647,633

8-9-16 Expert Declaration, Patent 8,225,408

8-30-16 Supplemental Expert Declaration, 7,647,633

Status: Case settled

5/2016 – 7/2018 **Client: (Winston & Strawn LLP representing Atlantic Broadband Group, LLC, et. al.)**

Case: ChanBond LLC v. Atlantic Broadband Group, LLC, et. al.

Civil Action No: 15-842-RGA, 15-843-RGA, 15-844-RGA, , 15-845-RGA, , 15-846-RGA, , 15-847-RGA, , 15-848-RGA, , 15-849-RGA, , 15-850-RGA, , 15-851-RGA, , 15-852-RGA, , 15-853-RGA, , 15-854-RGA

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE – Hon. Richard G. Andrews

Testifying expert regarding digital cable technology.

Expert Report:

10-24-17 Expert Report on Invalidity

Videotaped Deposition:

None

Attorneys: For Plaintiff: Bayard, P.A.

For Defendant: Winston & Strawn LLP

Status: Case settled

5/2016 – 11/2019 **Client: (Torys LLP representing Telus, Bell, and Rogers)**

Case: Wi-LAN Inc. v Telus Communications Company, Rogers Communications Canada Inc., and Bell Mobility Inc.

Court File No. T-301-16; Court File No. T-303-16; Court File No. T-304-16

Location: CANADIAN FEDERAL COURT – Hon. Mandy Aylen

Testifying expert regarding LTE technology.

Expert Report:

June 14, 2019 Expert Report regarding invalidity

Videotaped Deposition:

None

Attorneys: For Plaintiff: Torys LLP

For Defendant:

Status: Case settled

12/2015 – 4/2016 **Client: Kramer Levin Naftalis & Frankel, LLP (representing Acceleration Bay, LLC.)**

Case: Activision Blizzard, Inc., Electronic Arts Inc., Take-Two Interactive Software, Inc., 2K Sports, Inc., Rockstar Games, Inc., and Bungie, Inc., Petitioner v. Acceleration Bay, LLC, Patent Owner.

Case IPR2015-01951, Case IPR2015-01953, Case IPR2015-01964, Case IPR2015-01970, Case IPR2015-01996, Case IPR2016-00724, Case IPR2016-00747

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this IPR patent case involving internet data broadcasting.

Expert Declaration:

January 4, 2017 Supplemental Declaration ISO Patent Owner's Response -- Case IPR2016-00724

January 4, 2017 Supplemental Declaration ISO Patent Owner's Response -- Case IPR2016-00747

December 7, 2016 Declaration ISO Patent Owner's Response – Case IPR2016-00724; Secondary Considerations of Non-Obviousness

December 7, 2016 Declaration ISO Patent Owner's Response – Case IPR2016-00747; Secondary Considerations of Non-Obviousness

July 17, 2016 Declaration ISO Patent Owner's Response – Patent 6,714,966; Secondary Considerations of Non-Obviousness

July 17, 2016 Declaration ISO Patent Owner's Response – Patent 6,829,634; Secondary Considerations of Non-Obviousness

July 17, 2016 Declaration ISO Patent Owner's Response – Patent 6,701,344; Secondary Considerations of Non-Obviousness

Videotaped Deposition:

February 7, 2017 and February 8, 2017

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant: Winston & Strawn

Status: Cased closed

4/2016 – Present **Client: Kramer Levin Naftalis & Frankel, LLP (representing Acceleration Bay, LLC.)**

Case: Acceleration Bay, LLC v Activision Blizzard, Inc., Electronic Arts Inc., Take-Two Interactive Software, Inc.

Civil Action No.: 14-453 (RGA), 16-454 (RGA), 16-455 (RGA)

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE – Hon. Richard G. Andrews

Testifying expert in this patent case involving internet data broadcasting.

Expert Declaration:

September 24, 2017: Expert Report Regarding Technology Benefits of the Asserted Patents

Videotaped Deposition: January 4, 2018

July 17, 2018: Reply Report Regarding Technology Benefits of the Asserted Patents

April 29 – May 3, 2024 Live Tutorial Testimony at Trial about benefits of Asserted Patents

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant: DLA Piper

Status: Jury Award

12/2015 – 9/2016 **Client: Kramer Levin Naftalis & Frankel, LLP (representing Finjan, Inc.)**

Case: Finjan, Inc. v. Sophos, Inc.

Civil Action No. 3:14-cv-01197-WHO

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA SAN FRANCISCO DIVISION – Hon. William H. Orrick

As a testifying expert, provided a technology tutorial in this patent case involving internet security technology.

Expert Declaration:

December 21, 2015 Tutorial expert report on network security technology.

Videotaped Deposition:

February 22, 2016

September 5 – 9, 2016 Jury Trial:

Live Testimony at Jury Trial regarding tutorial on network security

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant: DLA Piper

Status: Jury Trial

9/2015 – 2/2016 **Client: Brinks Gilson & Lione (representing LifeWatch Services, Inc., and Card Guard Scientific Survival, Ltd.)**

Case: Card Guard Scientific Survival Ltd.

Reexam Control No. 12/706,541

Location: UNITED STATES PATENT AND TRADEMARK OFFICE

Provided testimony in this Patent Office re-examination appeal.

Expert Declaration:

November 13, 2015 Declaration under 37 C.F.R §1.132.

February 13, 2016 Declaration ISO petition for IPR.

Attorneys: For Plaintiff: Brinks Gilson & Lione

Status: Re-examination appeal decision invalidated the patent.

9/2015 – 1/2017 **Client: Kramer Levin Naftalis & Frankel, LLP (representing Finjan, Inc.)**

Case: Finjan, Inc. v. Proofpoint, Inc. and Armorize Technologies, Inc.

Civil Action No. 13:cv-03999-BLF

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA SAN JOSE DIVISION – Hon. Howard R. Lloyd, Hon. Haywood S. Gilliam, Jr.

As a testifying expert, provided an opening technology tutorial report in this patent case involving internet security technology.

Expert Declaration:

October 7, 2015 Tutorial expert report on network security technology.

Videotaped Deposition:

November 6, 2015

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant: Quinn Emanuel

Status: Case settled

8/2015 – 12/2015 **Client: Brinks Gilson LLP (representing ZTE Corporation and ZTE (USA), Inc.)**

Case: Inter-System Handover of a Mobile Terminal Operable with a First and a Second Radio Access Network

ZTE v. Vringo Infrastructure, Inc.

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this IPR proceeding involving 3GPP cellular technology.

Expert Declarations:

08-28-15 Declaration ISO Petition for Inter Partes Review of U. S. Patent No. 7,126,940

09-04-15 Declaration ISO Petition for Inter Partes Review of U. S. Patent No. 7,242,943

09-04-15 Declaration ISO Petition for Inter Partes Review of U. S. Patent No. 7,558,283

09-04-15 Declaration ISO Petition for Inter Partes Review of U. S. Patent No. 8,812,000

09-04-15 Declaration ISO Petition for Inter Partes Review of U. S. Patent No. 7,724,720

10-12-15 Declaration ISO Petition for Inter Partes Review of U. S. Patent No. 7,242,933

Videotaped Deposition:

None

Attorneys: For Plaintiff:

For Defendant: Brinks Gilson, LLP

Status: Case settled.

11/2014 – Present **Client: Fish & Richardson (representing Regents of the University of Minnesota)**

Case: Regents of the University of Minnesota v. AT&T Mobility, LLC, Sprint Solutions, Inc., T-Mobile USA, Inc., Cellco Partnership d/b/a Verizon Wireless

Civil Action No. 14-cv-4666

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF MINNESOTA – Hon. Tony N. Leung

Testifying expert on 3GPP error correction coding, precoding, and modulation.

February 10, 2023 Expert Report regarding Objective Indicia relating to Validity

May 12, 2023: Expert Deposition

April 14, 2023: Rebuttal Expert Report regarding Validity

September 25, 2024 Supplemental Rebuttal Expert Report regarding Validity

Attorneys: For Plaintiff: Fish & Richardson

For Defendant:

Status: Case ongoing

10/2014 – 2/2015 **Client: Alston & Bird (representing Microsoft Corporation)**

Case: Microsoft Corporation. v. IPR Licensing, Inc.

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this IPR proceeding involving cellular technology.

Expert Declarations:

October 16, 2014 Supplemental Declaration ISO Petition for Inter Partes Review of U. S. Patent No. 8,380,244

September 25, 2024 Supplemental Rebuttal Expert Report regarding Validity

Attorneys: For Plaintiff: Fish & Richardson LLP

For Defendant:

Status: Case settled

9/2014 – 4/2015 **Client: Reed & Scardino, LLP (representing Mobile Telecommunications Technologies, LLC)**

Case: Mobile Telecommunications Technologies LLC v. Amazon.com, Inc.

Civil Action No. 2:13-CV-883-JRG-RSP

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS MARSHALL DIVISION – Hon. Roy S. Payne

Testifying expert in this patent case involving package delivery notification

systems and reliable delivery of wireless messages.

Expert Reports:

4-06-15 Second Supplemental Expert Report on Infringement

2-10-15 Expert Report on Infringement

2-24-15 Supplemental Expert Report on Infringement

Videotaped Deposition:

2-25-15

Declaration:

3-20-15 Declaration ISO Response to Opposition Motion

Attorneys: For Plaintiff: Reed & Scardino LLP

For Defendant: Greenberg Traurig LLP

Status: Case settled

5/2014 – 7/2015 **Client: Kramer Levin Naftalis & Frankel, LLP (representing Finjan, Inc.)**

Case: Finjan, Inc. v. Blue Coat Systems, Inc.

Civil Action No. 3:13-cv-03999-BLF

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA SAN JOSE DIVISION – Hon. Beth L. Freeman

As a testifying expert, provided an opening technology tutorial at trial in this patent case involving internet security technology.

Expert Declaration:

January 12, 2015 Tutorial expert report on security technology.

Videotaped Deposition:

March 18, 2015

Live Jury Trial Testimony: July 20, 2015.

Live Bench Trial on Laches Testimony: September 8, 2015

Attorneys: For Plaintiff: Kramer Levin, Naftalis, & Frankel LLP

For Defendant: Wilson Sonsini

Status: Jury award.

4/2014 – 12/2014 **Client: Reed & Scardino, LLP (representing Mobile Telecommunications**

Technologies, LLC)

Case: Mobile Telecommunications Technologies LLC v. United Parcel Service, Inc.

Civil Action No. 1:12-cv-03222-AT

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF GEORGIA ATLANTA DIVISION – Hon. Amy Totenberg

Testifying expert in this patent case involving package delivery notification systems.

Expert Reports:

7-3-14 Opening Expert Report regarding Infringement

8-11-14 Rebuttal Expert Report regarding Infringement

Videotaped Depositions:

10-7-14

Declaration:

11-24-14 Declaration ISO Response to MSJ

Attorneys: For Plaintiff: Reed & Scardino LLP

For Defendant: Alston & Bird LLP

Status: Case settled.

12/2013 – 9/2015 **Client: Brinks Gilson & Lione LLP (representing ZTE Corp, and ZTE (USA), Inc.)**

Case: ZTE Corporation and ZTE (USA) Inc. v. InterDigital Technology Corporation

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this IPR proceeding involving cellular technology.

Expert Declarations:

3-21-14 Declaration in support of the Petition for Inter Partes Review of U. S. Patent No. 8,380,244

Attorneys: For Plaintiff: Brinks Gilson & Lione

For Defendant: Latham & Watkins, LLP

Status: IPR Hearing before PTAB: All disputed claims are unpatentable.

12/2013 – 4/2014 **Client: Kramer Levin Naftalis & Frankel LLP (representing Sirius XM Radio Inc.)**

Case: Catch a Wave Technologies, Inc. v. Sirius XM Radio Inc.

Case No. 3:12-cv-05791-WHA

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA SAN FRANCISCO DIVISION – Hon. William Alsup

Testifying expert in this patent case involving satellite radio systems.

Expert Reports:

2-14-2014 Expert Report regarding non-infringement

Attorneys: For Plaintiff: Freitas Tseng & Kaufman LLP

For Defendant: Kramer Levin LLP

Status: Case settled

2/2013 – 7/2016 **Client: Reed & Scardino, LLP (representing Mobile Telecommunications Technologies, LLC)**

Case: Mobile Telecommunications Technologies LLC v. BlackBerry Corporation.

Civil Action No. 3:12-cv-1652-M

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF TEXAS DALLAS DIVISION – Hon. Barbara M. G. Lynn

Testifying expert in this patent case involving package delivery notification systems.

Expert Reports:

9-3-15 Expert Report on Infringement

Videotaped Depositions:

November 18, 2015

Live Testimony at Jury Trial: July 13, 2016.

Attorneys: For Plaintiff: Baker Botts, LLP

For Defendant: Reed & Scardino LLP

Status: Jury verdict of non-infringement.

9/2013 – 1/2014 **Client: Reed & Scardino, LLP (representing Mobile Telecommunications**

Technologies, LLC)

Case: Mobile Telecommunications Technologies, LLC v Clearwire Corporation

Civil Action No. 2:12-CV-308

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS MARSHALL DIVISION – Hon. Roy S. Payne

Testifying expert in this patent case involving wireless networking signals.

Expert Reports:

11-11-13 Rebuttal report regarding validity

Videotaped Depositions:

12-5-13

Declarations:

1-23-14 Declaration before the Patent Trial and Appeal Board in Case IPR2013-00306

Attorneys: For Plaintiff: Reed & Scardino LLP

For Defendant: Shook, Hardy & Bacon, LLP

Status: Case settled

10/2013 – 5/2015 **Client: Foley & Lardner, LLP (representing Motorola Mobility, LLC)**

Case: University of Florida Research Foundation Inc., and Rapid Mobile Technologies, Inc. v Motorola Mobility, LLC.

Case No. 13-cv-61120-KMM-EGT

Location: UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF FLORIDA FORT LAUDERDALE DIVISION – Hon. K. Michael Moore, Magistrate Judge: Hon. Edwin G. Torres

Testifying expert in this patent case involving mobile device testing systems.

Expert Reports:

None.

Declarations:

11-21-13 Declaration ISO Motorola's Responsive Claim Construction Brief

Attorneys: For Plaintiff: Meltzer & Meksraitis

For Defendant: Foley & Lardner LLP

Status: Case settled

7/2013 – 6/2015 **Client: WilmerHale (representing Broadcom)**

Case: Inter Partes Review of US Patent 6,424,625; 6,772,215; and 6,466,568 owned by Ericsson

Docket No. 0111168-0240

Location: UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE PATENT TRIAL AND APPEAL BOARD

Testifying expert in this Inter Partes Review regarding ARQ mechanisms.

Expert Declarations:

9-19-13 Declaration regarding US Patent 6,772,215

9-19-13 Declaration regarding US Patent 6,466,568

9-29-13 Declaration regarding US Patent 6,424,625

Videotaped Deposition:

5-29-14, and 5-30-14

Attorneys: For Plaintiff: Meltzer & Mathis

For Defendant: Wilmer Cutler Pickering Hale and Dorr LLP

Status: IPR Petition granted. All claims invalidated

4/2013 – 4/2015 **Client: Kilpatrick Townsend & Stockton LLP (representing Google Inc. and Motorola Mobility LLC)**

Case: Fujifilm Corporation v. Motorola Mobility LLC

Case No. 3:12-cv-03587 WHO

Location: UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA SAN FRANCISCO DIVISION – Hon. Richard Seeborg

Testifying expert in this patent case involving smartphone technology and video codecs.

Expert Declarations:

4-23-14 Declaration ISO Motion for Protective Order

12-9-14 Declaration ISO MSJ

Expert Reports:

10-3-14 Opening Expert Report Regarding Invalidity

10-31-14 Rebuttal Expert Report on non-infringement

10-31-14 Appendix A to Rebuttal Report of Dr. Alan Bovik

Videotaped Deposition:

11-19-14, and 11-20-14

Trial Testimony:

April 28, 2015 Non-infringement and invalidity of ’970 Patent

Attorneys: For Plaintiff: Morgan, Lewis & Bockius LLP

For Defendant: Kilpatrick Townsend & Stockton LLP

Status: Jury verdict: ’970 Patent claims not infringed and invalid.

2/2013 – 10/2013 **Client: Seyfarth Shaw LLP (representing Motorola Mobility LLC)**

Case: University of Florida Research Foundation, Inc. and Rapid Mobile Technologies, Inc. v. Motorola Mobility LLC

Civil Action No. 13-cv-61120-KMM-EGT

Location: UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF FLORIDA – Hon. K. Michael Moore, Magistrate Judge: Hon. Edwin G. Torres

Testifying expert in this employment law case involving mobile device testing systems.

Expert Reports:

3-1-13 Expert Report regarding Non-Infringement

4-1-13 Declaration in Opposition to Plaintiff’s MSJ

Attorneys: For Plaintiff: Meltzer & Mathis

For Defendant: Seyfarth Shaw LLP

Status: Case settled

5/2012 – 4/2013 **Client: Paul Hastings LLP (representing Apple, Inc.)**

Case: SmartPhone Technologies, LLC v Research in Motion Corporation, et. al.

Case No. 6:10-cv-00074

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF

TEXAS TYLER DIVISION – Hon. John D. Love

Testifying expert in this patent case involving 3GPP technology.

Expert Reports:

12-31-12 Appendix A to Rebuttal Expert Report of Dr. David Wilson

3-13-13 Appendix A to Supplemental Expert Report of Dr. David Wilson

Attorneys: For Plaintiff: Mintz Levin Cohn Ferris Glovsky and Popeo PC

For Defendant: Paul Hastings LLP

Status: Case settled

8/2012 – 9/2013 **Client: Reed & Scardino, LLP (representing EON Corp. IP Holdings, LLC)**

Case: EON Corp. IP Holdings, LLC v. SKYGUARD, LLC et. al.

Case No. 6:11-cv-00015-LED

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS TYLER DIVISION – Hon. John D. Love

Testifying expert in this patent case involving RF technology for WiFi networking.

Expert Reports:

2-15-13 Expert Report regarding Infringement

Videotaped Deposition:

4-09-13

Attorneys: For Plaintiff: Reed & Scardino, LLP

For Defendant: K&L GATES LLP

Status: Case settled

5/2012 – 6/2014 **Client: Reed & Scardino LLP (representing Eon Corp. IP Holdings)**

Case: Eon Corp. IP Holdings, LLC v. Landis+Gyr, Inc., et. al.

Case No. 6:09-cv-00317-LED-JDL

Location: UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TEXAS TYLER DIVISION – Hon. John D. Love

Testifying expert in this patent case involving two-way wireless networks, before Judge Love.

Expert Report:

7-8-13 Expert Report regarding Infringement by Silver Spring Networks, Inc.

7-8-13 Expert Report regarding Infringement by Itron, Inc.

Videotaped Deposition: September 12, 2013

Live Testimony at Jury Trial: June 2, 2014 – June 6-2014

Attorneys: For Plaintiff: Reed & Scardino LLP

For Defendant: Dentons, LLP

Status: Jury award. All patents found valid and infringed.

3/2012 – 3/2014 **Client: Perkins Coie (representing Intel Corporation)**

Case: Stragent LLC, et. al. v. Intel Corp.,

Case No. 6:11-cv-421-LED (E.D. Tex.)

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS TYLER DIVISION – Hon. Timothy Dyk, Hon. John D. Love

Testifying expert in this patent case involving the use of error detection technology in computer networking, before Judge Dyk.

Expert Reports:

08-23-13 Expert Report regarding Invalidity

09-23-13 Expert Report regarding Non-Infringement

Videotaped Deposition:

10-08-13, and 10-09-13

Jury trial testimony:

3-13-2014 Live trial testimony on non-infringement and invalidity before Judge Timothy Dyk

Attorneys: For Plaintiff: Nelson, Bumgardner & Casto

For Defendant: Perkins Coie

Status: Jury verdict for non-infringement and invalidity

2/2012 – 09/2015 **Client: Dewey & LeBoeuf LLP (representing Harris Corporation)**

Case: Harris Corporation v. Ruckus Wireless, Inc.

Case No. 6:11-cv-00618-CEM-CRS

Location: UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF FLORIDA ORLANDO DIVISION – Hon. Charlene Edwards Honeywell

Testifying expert in this patent case involving RF technology for WiFi networking.

Expert Reports:

3-5-12 Expert Report regarding Infringement

3-6-12 Supplemental Expert Report regarding Infringement

4-6-12 Expert Report regarding Validity

Declarations:

5-30-12 Declaration ISO Claim Construction

6-18-12 Declaration ISO Markman Motion

1-23-15 Declaration ISO Responsive Markman Brief

3-6-15 Supplemental Expert Report regarding Infringement

4-3-15 Rebuttal Expert Report regarding Validity

Videotaped Deposition:

4-30-12

Attorneys: For Plaintiff: Dewey & LeBeouf LLP

For Defendant: Lewis and Roca LLP

Status: Case settled

2/2012 – 2/2013 **Client: Common-Interest-Group (representing Nokia, Huawei, ZTE)**

Case: InterDigital Communications LLC, et. al. v. Huawei Tech Co., LTD., et. al.

Certain Wireless Devices With 3G Capabilities and Components Thereof

U.S. Int'l Trade Commission Inv. No. 337-TA-800

Location: UNITED STATES INTERNATIONAL TRADE COMMISSION – Administrative Law Judge Hon. David P. Shaw and Administrative Law Judge Hon. Theodore R. Essex

Testifying expert in this patent case involving 3G wireless, WiFi, and WCDMA technology.

Expert Reports:

11-30-12 Expert Report regarding Non-infringement

7-31-12 Expert Report regarding Invalidity

11-19-10 Rebuttal Expert Report regarding Validity

12-6-10 Supplemental Expert Report regarding Infringement

Videotaped Deposition:

12-14-12, 12-15-12

ITC Trial testimony:

2-6 through 2-15/13 Non-infringement and Invalidity witness statements, live testimony

Attorneys: For Plaintiff: Latham & Watkins, LLP

For Defendant: Alston & Bird, Covington & Burling, Brinks Hofer

Status: ITC hearing verdict: All patents not infringed and invalid

9/2010 – 4/2011 **Client: Reed & Scardino LLP (representing Eon Corp. IP Holdings)**

Case: Eon Corp. IP Holdings, LLC v. Sensus USA, Inc., et. al.

Case No. 6:09-cv-00116-LED-JDL

Location: UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TEXAS TYLER DIVISION – Hon. John D. Love

Testifying expert in this patent case involving two-way wireless networks

Expert Report:

10-22-10 Expert Report regarding Infringement (Sensus USA, Inc)

11-7-10 Expert Report regarding Infringement (Bell Industries)

11-19-10 Rebuttal Expert Report regarding Validity

12-6-10 Supplemental Expert Report regarding Infringement

Declaration:

12-28-10, 1-18-11

Videotaped Deposition:

12-8-10, 2-3-11

Attorneys: For Plaintiff: Reed & Scardino LLP

For Defendant: Jones Day

Status: Case settled

10/2009 – 2/2010 **Client: White & Case LLP (representing Marvell)**

Case: Marvell Semiconductor, Inc., et. al. v. Commonwealth Scientific Industrial Research Organisation

Case No. 6:07-CV-204 (LED)

Location: UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TEXAS TYLER DIVISION – Hon. Leonard Davis

Testifying expert in this patent case involving wireless LAN protocols.

Expert Report:

11-24-09 Rebuttal Expert Report

Videotaped Deposition:

01-07-10

Attorneys: For Plaintiff: White & Case LLP

For Defendant: Townsend and Townsend and Crew LLP

Status: Case settled

9/2009 – 2/2010 **Client: Perkins Coie Brown & Bain PA (representing Intel)**

Case: Saxon Innovations, LLC v. Apple, Inc., et. al.

Case No. 6:08-cv-00265-LED

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS TYLER DIVISION – Hon. John D. Love

Testifying expert in this patent case involving wireless technology.

Declarations:

12-04-09 Declaration Regarding Claim Construction

Videotaped Deposition:

01-19-10

Attorneys: For Plaintiff: Susman Godfrey LLP

For Defendant: Perkins Coie Brown & Bain LLP

Status: Case settled

8/2008 – 10/2009 **Client: Reed & Scardino LLP (representing Eon Corp. IP Holdings)**

Case: Eon Corp. IP Holdings, LLC v. Verizon Clinton Center Drive Corp., et. al.

Case No. 6:08-cv-00385

Location: UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS TYLER DIVISION – Hon. John D. Love

Testifying expert in this patent case involving two-way wireless networks

Expert Report:

06-22-10 Expert Report
08-16-10 Supplemental Expert Report

Videotaped Depositions:
08-18-10, 08-26-10

Attorneys: For Plaintiff: Reed & Scardino LLP

For Defendant: Simpson Thacher & Bartlett LLP

Status: Case settled

4/2008 – 3/2009 **Client: McDermott, Will & Emery LLP (representing GE Licensing)**

Case: CIF Licensing, LLC d/b/a GE Licensing v. Agere Systems, Inc.

Case No. 07-170 (JJF)

Location: UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE – Hon. Joseph. J. Farnan, Jr.

Testifying expert in this patent case involving modem technology.

Expert Report:

09-05-08 Rebuttal Expert Report

Non-videotaped Depositions:
9-24-08, 9-26-08

Jury trial testimony:

2-04-09

Attorneys: For Plaintiff: McDermott, Will & Emery LLP

For Defendant: Townsend and Townsend and Crew LLP

Status: Jury award. 2 patents infringed and valid, remaining 2 patents non-infringed

2/2008 – 5/2010, 2/2011 – 4/2011 **Client: Simpson Thacher & Bartlett LLP (representing Cisco Systems, Inc.)**

Case: Commil USA, LLC v. Cisco Systems, Inc., et. al.

Case No. 2:07-CV-341-DF-CE

Location: UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TEXAS MARSHALL DIVISION – Hon. Charles Everingham IV

Testifying expert on invalidity regarding short range communication protocols.

Opening Expert Report

12-23-09

Videotaped Depositions:

02-09-10

Attorneys: For Plaintiff: Sayles Werbner

For Defendant: Simpson Thacher & Bartlett LLP

Status: Jury award for original trial and retrial: patents found valid and infringed.

6/2007 – 4/2009 **Client: Common Interest Group of Co-Defendants**
11/2010 – 4/2012 **Client: Common Interest Group of Co-Defendants**

Case: Commonwealth Scientific and Industrial Research Organisation v. Toshiba America Information Systems, Inc., et. al.

Case No. 6:06-cv-00550-LED

Case No. 6:09-CV-0399 (LED)

Location: UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TEXAS TYLER DIVISION – Hon. Leonard Davis

Testifying expert in this patent case involving wireless LAN technology.

Declarations:

06-05-08 Regarding claim construction

12-17-08 Supporting opposition to summary judgment

04-05-09 Supporting motion for reconsideration

02-24-12 Supporting opposition to summary judgment

Expert Reports:

10-08-08 Rebuttal Expert Reports- Re: TI Chips, Re: Marvell Chips, Re: Airgo Chips, Re: Broadcom Chips, Re: Conexant Chips, Re: Ralink Chips, Re: Atheros Chips

01-27-12 Rebuttal Expert Reports- Re: TI Chips, Re: Broadcom Chips, Re: Ralink Chips, Re: Atheros Chips

Videotaped Depositions:
11-1-08, 11-2-08, 02-14-12

Attorneys: For Plaintiff: Townsend & Townsend LLP

For Defendant: Keker & Van Nest, LLP

Status: Jury trial: patents found valid and infringed.

10/2006 – 8/2009 **Client: Keker & Van Nest (representing Comcast Corporation)**

Case: Rembrandt Technologies, Inc. v. Comcast Corporation

Case No. 2-05-CV-000443 (TJW)

Location: UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TEXAS MARSHALL DIVISION – Hon. T. John Ward

Testifying expert in this patent case involving physical layer and data link layer communication protocols for cable networks.

Declaration:

01-10-07 Support of Claim Construction Brief

Videotaped Deposition:

12-22-06 Regarding claim construction opinions

Attorneys: For Plaintiff: McKool Smith

For Defendant: Keker & Van Nest

Status: Case settled

3/2007 – 5/2007 **Client: Niro, Scavone, Haller and Niro (representing MLR, LLC)**

Case: MLR, LLC v. Kyocera Wireless Corporation and Novatel Wireless, Inc.

Case No. 05-CV-0935 B (AJB)

Location: UNITED STATES DISTRICT COURT SOUTHERN DISTRICT OF CALIFORNIA

Testifying expert in this patent case involving cellular phone technology.

Expert Report:

04-20-07 Expert Report regarding infringement

Attorneys: For Plaintiff: Niro, Scavone, Haller, and Niro

For Defendant: Hogan & Hartson, LLP

Status: Case settled

6/2006 – 10/2006 **Client: Thompson & Knight (representing Ericsson, Inc.)**

Case: Fenner Investments, Ltd., v. Juniper Networks, Inc. et. al.
Case No. 2:05–CV–05 JDL

Location: UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TEXAS MARSHALL DIVISION

Testifying expert in this patent case involving wireless communications services.

Expert report regarding infringement and invalidity

5-23-06 Rebuttal expert report regarding infringement and invalidity

Attorneys: For Plaintiff: Fulbright & Jaworski

For Defendant Ericsson: Thompson & Knight

Status: Case settled

12/2003 – 5/2006 **Client: Howrey LLP/ Winston & Strawn LLP (representing McKesson Information Solutions, Inc.)**

Case: McKesson Information Solutions, Inc. vs. Bridge Medical, Inc.
Case No. CIV S-02-2669 FCD KJM

Location: UNITED STATES DISTRICT COURT EASTERN DISTRICT OF CALIFORNIA – Hon. Peter A. Nowinski

Testifying expert in this patent case involving a patient on a patient identification and verification system that incorporates wireless technology.

Inequitable Conduct Trial live testimony:
5-04-06

Markman Hearing live testimony:
6-29/30-05

Videotaped Depositions:
2-14-04, 6-3-05

Declarations:
12-1-03 Dec. in support of MISI's Opening/Opposition re Claim Construction
12-24-04 Dec. in support of MISI's Motion for Preliminary Injunction
3-1-04 Dec. in support of Claim Construction
6-29-04 Dec. re meaning of "Communication"
7/15/05 Dec. in support of MISI's Opposition to Bridge's Motion for Summary Judgment

Attorneys: For Defendant: Morrison & Foerster

For Plaintiff: Howrey Simon, Winston & Strawn, Morgan Lewis

Status: Bench trial on inequitable conduct: Verdict found inequitable conduct.

07/2003–02/2006 **Client: Heller Ehrman LLP (representing Texas Instruments, Inc.)**

Case: Texas Instruments, Inc. and Stanford University vs. GlobespanVirata, Inc.

Provided discovery of evidence used at trial, concerning the structure and operation of Globespan's ADSL products, and supported litigators in depositions of Globespan engineers.

Attorneys: For Plaintiff: Heller Ehrman

For Defendant: Covington & Burling, LLP

Status: Jury award.

Patents

Patent Number	**Date Issued**	**Title**
11,748,764	September 5, 2023	Light-based Data Entry for Personal Inventory and Product Support System
10,332,121	June 25, 2019	Light-based Data Entry for Personal Inventory and Product Support System
9,978,037	May 22, 2018	Personal inventory and product support system
8,995,996	March 31, 2015	Methods and apparatus for performance optimization of heterogeneous wireless system communities
8,935,580	January 13, 2015	Multimedia-aware quality-of-service and error correction provisioning
8,468,426	June 18, 2013	Multimedia-aware quality-of-service and error correction provisioning
8,189,538	May 29, 2012	Reconfiguration of a communication system
8,144,640	March 27, 2012	Location tracking in a wireless communication system using power levels of packets received by repeaters
8,064,380	November 22, 2011	Reconfiguration of a communication system
8,027,637	September 27, 2011	Single frequency wireless communication system
7,957,741	June 7, 2011	Token-based receiver diversity
7,876,704	January 25, 2011	Tunneling protocols for wireless communications

7,689,210	March 30, 2010	Plug-n-playable wireless communication system
7,672,274	March 2, 2010	Mobility support via routing
7,668,542	February 23, 2010	Token-based receiver diversity
7,515,557	Apr 7, 2009	Reconfiguration of a communication system
7,236,470	Jun 26, 2007	Tracking multiple interface connections by mobile stations
7,149,196	Dec 12, 2006	Location tracking in a wireless communication system using power levels of packets received by repeater
6,965,769	Nov 15, 2005	Testing Center
6,862,448	Mar 1, 2005	Token-based receiver diversity
6,788,658	Sep 7, 2004	Wireless communication system architecture having split MAC layer
6,760,318	Jul 6, 2004	Receiver diversity in a communication system
6,557,134	Apr 29, 2003	ARQ method for wireless communication
6,259,911	Jul 10, 2001	Network operations center hardware and software design

Education

Year	**College/University**	**Degree**
1993	Stanford University	PhD, Electrical Engineering Thesis: "Trellis Coding for Multi-Level, Partial-Response Continuous Phase Modulation with Precoding"
1988	Stanford University	MS, Electrical Engineering
1985	Rensselaer Polytechnic Institute	BS, Computer and Systems Engineering

Publications

Goldhamer, M., Grandblaise, D., Bims, H., Feng, S., Piggin, P., Sydor, J., and Wu, X. "Coexistence between 802.16 Systems Operating in Shared Bands", *Radio Resource Management in WiMAX,* John Wiley & Sons, 2009.

Bims, Harry. "Surveying the Wireless LANdscape. Or Why Large Wi-Fi Networks Require Good Planning." Xchange. [Online] Available http://www.xchangemag.com/articles/391supsys1.html, September 1, 2003.

Bims, Harry. "Building Voice-Ready Wireless LANs" Wireless Week. [Online] Available http://www.wirelessweek.com/article/CA319429.html?spacedesc=Departments, September 1, 2003.

Bims, Harry. "Enabling Voice over WLANs". White Paper. [Online] Available. **http://airflownetworks.com/solutions/pdf/vowlan_wp.pdf.** September 2003.

Bims, Harry. "Securing Enterprise WLANs". White Paper. [Online] Available. http://web.archive.org/web/20040303212529/airflownetworks.com/solutions/pdf/securing_wlans_wp.pdf. August 2003.

Bims, H. and Cioffi. J. "Trellis Coding for Full-Response CPM", *Third Generation Wireless Information Networks*, Kluwer Academic Publishers, 1992.

Bims, H. and Cioffi. J. "Trellis Coding for Full-Response CPM", *WINLAB WORKSHOP*, East Brunswick, NJ. October 18-19, 1990.

Bims, H. and Cioffi, J. "Trellis Coding for Partial-Response CPM", *1991 International Symposium on Information Theory*, Budapest, Hungary. June 24-28, 1991.

Bims, H. and Cioffi, J. "Trellis Coding with M-ary MSK Constraints", *GLOBECOM '89*, Dallas TX. Nov. 1989.

Professional Associations and Achievements

- Jan 2009 – Present Vice-Chair and Board of Directors, Menlo Park Chamber of Commerce
- Nov 2007 – Sep 2010 Vice-Chair and Secretary, IEEE 802.16h License Exempt Group
- Feb 2002 – Jan 2011 Member, City of Menlo Park Planning Commission (2006 Chairperson, 2005 Vice-Chairperson)
- Feb 2012 – Present Senior Member, IEEE
- Jan 2000 – Dec 2000 Chair, IEEE Engineering Management Society – Silicon Valley Chapter
- Jun 1985 - Jun 1991 AT&T Bell Laboratories Cooperative Research Fellow