

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

V AMERICAN HONDA MOTOR CO., INC.,
Petitioner,

v.

NEO WIRELESS LLC,
Patent Owner.

Case IPR2023-00794
Patent 10,833,908

EXHIBIT 2001
DECLARATION OF WILLIAM P. ALBERTH, JR.

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I. INTRODUCTION

1. My name is William P. Alberth Jr. I am an expert in mobile telecommunications and wireless technology. As further detailed below and exhibited in my attached Curriculum Vitae, I have over 25 years of experience in the design, development, implementation, and manufacturing of mobile telephones, smartphones, and other electronic equipment in addition to being an inventor on over 100 patents, including those related to telecommunications and wireless communications.

2. I have been retained as an expert witness to provide my independent opinion in regard to the matters at issue in *inter partes* review of U.S. Patent No. 10,833,908 (“the ’908 patent”) in IPR2023-00794. I have been retained by Neo Wireless LLC (“Neo”), the Patent Owner in the above proceedings. The Petitioner is American Honda Motor Co., Inc. (“HONDA”). I was previously retained by Neo to opine on this same patent and same claims in IPR2022-00277, in which I understand the proposed grounds of review were not instituted for a trial because the tribunal determined that the record of that proceeding did not indicate even a reasonable likelihood that the challenger of the ’908 patent in that case could succeed at trial in proving unpatentability of any of the claims.

3. For my work on this case, I am being compensated for my time at my typical consulting rate of \$200 per hour. I am also being reimbursed for expenses

that I incur during the course of this work. My compensation does not depend on the substance of my opinions or the outcome of any issues in this case.

4. My analysis of the materials produced in this matter is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date. I reserve the right to amend or supplement my opinions based on additional documents or evidence I am presented, including without limitation any arguments or expert declarations advanced by HONDA in this case.

II. QUALIFICATIONS

5. I believe that I am qualified to be an expert witness in this matter as I possess the requisite knowledge, skill, experience, training and education relating to the subject matter covered by the asserted patents.

6. In summary, I have over 25 years of experience in the design, development, implementation, and manufacturing of mobile telephones, smartphones, and other electronic equipment. The majority of my career was spent at Motorola where my final role was serving as the Chief Technology Officer for Motorola Mobile Devices. I held that position from 2007 until August 2012, and in that role, I led the development of differentiating technology that was integrated into Motorola's commercial mobile telephone products.

7. During the early stages of my career with Motorola (between 1987 and 2006, covering the Priority Date of the '908 patent), I was employed as an engineer, working on developing cutting-edge chipsets to enable cellular devices, and in the development of many products that changed the way people communicated, including the development of the Motorola MicroTAC, StarTAC and RAZR mobile telephones. I worked on or directed work on evaluating transmitter technologies and architectures to mitigate the effects of PAPR (Peak to Average Power Ratio) on the current drain of the devices. Some of the techniques evaluated include for example: pre-distortion; envelope following; EER (Envelope Elimination and Restoration); and adaptive biasing.

8. My educational background includes a B.S. in Electrical Engineering from the University of Illinois Urbana-Champaign (1985), and a M.S. in Electrical Engineering from Illinois Institute of Technology (1992).

9. I am inventor or co-inventor on over 100 patents issued or pending, including patents related to my work on transmitter architectures involved for wireless communications.

10. In forming my opinions here, I am relying on my education and experience, including my over 25 years of experience in a variety of technologies and industries related to various wireless communications systems.

11. Additional information concerning my background, qualifications, publications, conferences, honors, and awards are described in my Curriculum Vitae, a copy of which is attached with this Report as Appendix A.

III. LEGAL STANDARDS

12. I am not a lawyer, and I do not intend to offer any opinions as to the interpretation of the law. However, I have a general understanding of claim construction based on my experience with patents, my work as an expert in other cases, and my conversations with counsel. When considering the '908 patent and stating my opinions, I rely on the following legal standards as described to me by the attorneys for Neo.

13. I understand that a patent claim is unpatentable if the claimed invention would have been obvious to a person of ordinary skill in the art at the time of the purported invention.

14. I understand that an obviousness analysis involves comparing a claim to the prior art to determine whether the claimed invention would have been obvious to a person of ordinary skill in the art at the time of the invention in view of the prior art and in light of the general knowledge in the art as a whole. I also understand that obviousness is ultimately a legal conclusion based on underlying facts of four general types, all of which must be considered: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences

between the claimed invention and the prior art; and (4) any objective indicia of non-obviousness, including any praise of the invention.

15. I also understand that obviousness may be established under certain circumstances by combining or modifying the teachings of the prior art. Specific teachings, suggestions, or motivations to combine any first prior art reference with a second prior art reference can be explicit or implicit, but must have existed before the date of purported invention. I understand that prior art references themselves may be one source of a specific teaching or suggestion to combine features of the prior art, but that such suggestions or motivations to combine art may come from the knowledge that a person of ordinary skill in the art would have had.

16. I understand that a reference may be relied upon for all that it teaches, including uses beyond its primary purpose, but also including teachings that lead away from the invention. I understand that a reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, although the mere disclosure of alternative designs does not teach away.

17. I further understand that whether there is a reasonable expectation of success in combining references in a particular way is also relevant to the analysis. I understand that it is improper to use hindsight to combine references or elements

of references to reconstruct the invention using the claims as a guide. My analysis of the prior art is made from the perspective of a person of ordinary skill in the art at the time of the invention.

18. I am not offering any legal opinions in this declaration nor am I qualified to do so. I only consider such legal standards in framing my opinions and conclusions as well as placing assertions made by Petitioner in the Petition into the proper context. Additionally, from a subject matter perspective, I understand that the petitioner always has the burden of persuasion regarding a challenge of patentability of an invention under an inter partes review.

19. My opinions in this declaration are based on the understandings of a person of ordinary skill in the art, which I understand is sometimes referred to as an “ordinary artisan” or by the acronym “POSITA” as of the date of the invention, which I understand is here assumed to be the filing date (January 29, 2004) of US Provisional Application Serial No. 60/540,032, to which the ’908 claims the benefit of an earlier filing date. My opinion would not change if the date of invention were found to be the filing date of the earliest non-provisional application in the benefit chain (January 27, 2005). I understand that the person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. By “relevant,” I mean relevant to the challenged claims of the ’908 patent.

IV. LEVEL OF ORDINARY SKILL IN THE ART

20. I understand that factual indicators of the level of ordinary skill in the art include the various prior art approaches employed, the types of problems encountered in the art, the rapidity with which innovations are made, the sophistication of the technology involved, and the educational background of those actively working in the field. I understand that, in assessing the level of skill of a person of ordinary skill in the art, one should consider the type of problems encountered in the art, the prior solutions to those problems found in the prior art references, the rapidity with which innovations are made, the sophistication of the technology, the level of education of active workers in the field, and my own experience working with those of skill in the art at the time of the invention.

21. In this case, Dr. Cimini has asserted in his declaration the following standard for a person of ordinary skill in the art as of the time of the '908 patent:

In my opinion, a person of ordinary skill in the art of the '908 patent as of January 29, 2004, would have a B.S. degree in electrical engineering, computer engineering, or computer science, or an equivalent field, as well as at least 3-5 years of academic or industry experience in mobile wireless communications, or comparable industry experience. A greater amount of education, e.g., a doctorate in electrical engineering, computer engineering, computer science, or an equivalent field would also qualify as a POSA for the '908 patent in lieu of a B.S. degree. Experience could take the place of some

formal training, as domain knowledge may be learned on the job. This description is approximate, and a higher level of education or skill might make up for less experience and vice versa.

Ex. 1003 [Cimini-Decl.] ¶ 40. I understand that the Petition proposes an even higher level of ordinary skill that requires “a bachelor’s degree in electrical engineering, computer engineering, computer science, or an equivalent field, or an advanced degree in those fields, as well as at least 3-5 years of academic or industry experience in mobile wireless communications, or comparable industry experience.” Pet., 11. By contrast, Dr. Valenti in the prior petition against the ’908 patent proposed a lower level of skill in the art:

A person of ordinary skill in the art (POSITA) relating to, and at the time of, the Priority Date would have been someone with at least a Bachelor’s degree in an academic area emphasizing electrical engineering or a similar discipline, and at least two years of experience in the field working with, teaching, or researching wireless communication networks. Superior education could compensate for a deficiency in work experience, and vice-versa.”

Ex. 2009 [Valenti-Decl.] ¶23.

22. I disagree with the levels of ordinary skill proposed by Dr. Cimini and in the Petition in that both levels of skill are too high. The level of skill proposed by Dr. Valenti is much closer to the actual level of ordinary skill in the art at the time of invention. In 2004 many of the professionals working in the wireless

communications space had only a couple years of experience after having graduated with an undergraduate degree in electrical engineering or a similar discipline. Mobile communications was a fast-growing field that necessarily attracted many newcomers to the field. Certainly it was uncommon for working professionals in the field to have doctorate degrees and such advanced education would be typical of someone with more than ordinary skill in the art. For example, Dr. Stefan Kaiser, the author of the Kaiser reference (Ex. 1007), at the time he wrote this paper had a PhD and five years of experience. Under the Petition's standard he would be just one of "ordinary" skill. Dr. Jerry Gibson, who was editor in chief of the Gibson reference (Ex. 1008) was the chairman of the electrical engineering department at Southern Methodist University. Both Drs. Kaiser and Gibson clearly had more than ordinary skill in the art. A POSITA in 2004 was typically involved in deploying and configuring wireless communication equipment to increase the reach of commercial wireless networks, increase their capacity to handle more users, and also allow for the deployment of new applications requiring more bandwidth. A POSITA would not have been required to design a wireless system from the ground up. This is because many important parameters and design choices had already been made by standards setting committees in order to ensure interoperability of equipment. Thus, a POSITA would have had enough knowledge of the technology to understand and deploy

equipment adhering to these technical specifications but would have a very limited ability to change the fundamental specifications of the network. Nevertheless, my opinions would not change even if I accepted the standard for a person of ordinary skill in the art proposed by Dr. Cimini or the Petition.

23. Based on my experience and qualifications, I am a person of ordinary skill in the art and was a person of ordinary skill in the art at the relevant date. The opinions I render in this declaration are from the perspective of POSITA.

V. PRIOR OPINIONS

24. In the IPR2022-00277 litigation I submitted a declaration concerning the '908 patent, which I incorporate into this declaration to ensure that it is part of the record in this proceeding. The following excerpts are from paragraphs 25-33 of my declaration from IPR2022-00277. The citations to the Petition and exhibits in this section are to those in IPR2022-00277

A. Opinions Related To The '908 Patent

25. The POSITA reading the '908 patent would have understood that the '908 patent gives reasons for adding “guard periods.” First, it is used to prevent interference between an overlaid spread signal and an underling multi-carrier signal. *See* Ex. 1001 ['908 patent] 8:7-11. Secondly, it is used to “account for initial time alignment uncertainty” in the random access signal.” *Id.*, 8:60-62. Initial time misalignment uncertainty is present in the initial random access signal

because “propagation delay is unknown before communication starts” between the mobile station and the base station. Ex. 1006 [*TR*] 197. As ordinarily understood, during the “guard period” no energy is transmitted. This is consistent with how the ’908 uses the word “guard.” See Ex. 1001 [’908 patent] 3:56-57 (describing “guard bands” as subcarriers “which have no energy”). Furthermore, a “guard period” that did transmit energy would not reduce interference between an overlaid spread signal and an underlying multi-carrier signal like a no-energy guard period would. Since the first reason that the ’908 gives for its “guard periods” is reducing this interference, it is reasonable to understand that its “guard periods” require no energy to be transmitted. In my opinion, the POSITA reading the ’908 patent would have had that understanding of its disclosure.

B. Opinions Related To *Ma* and *TR*

1. *TR*’s Post-Guard Time

26. *TR* teaches that each of the OFDM symbols has a guard time both at its beginning and at its end. See Ex. 1006 [*TR*] 199, 208. *Ma* teaches that its RACH is “mapped to OFDM symbols in a defined RACH slot” and that “[a] RACH slot is defined as a set of OFDM symbol durations in time.” Ex. 1005 [*Ma*] ¶ 207. Dr. Valenti suggests that “a POSITA would have been motivated to include ‘an additional guard interval at the back of the OFDM symbol’ as proposed by *TR* in *Ma*’s random access signal transmitted on the RACH that include one or more

OFDM symbols.” Ex. 1003 [Valenti Decl.] ¶ 93. In addition, he opined that, “the ‘additional guard interval at the back of the [last] OFDM symbol’ in Ma’s random access signal constitutes a guard period following the random access signal.” *Id.* In my opinion, I cannot agree with Dr. Valenti’s opinions in this regard because they fail to sufficiently take account of the facts below.

27. During the post-guard time in *TR* the transmitter remains energized even though the signal is not modulated. This is shown in Figure 17 of *TR* below:

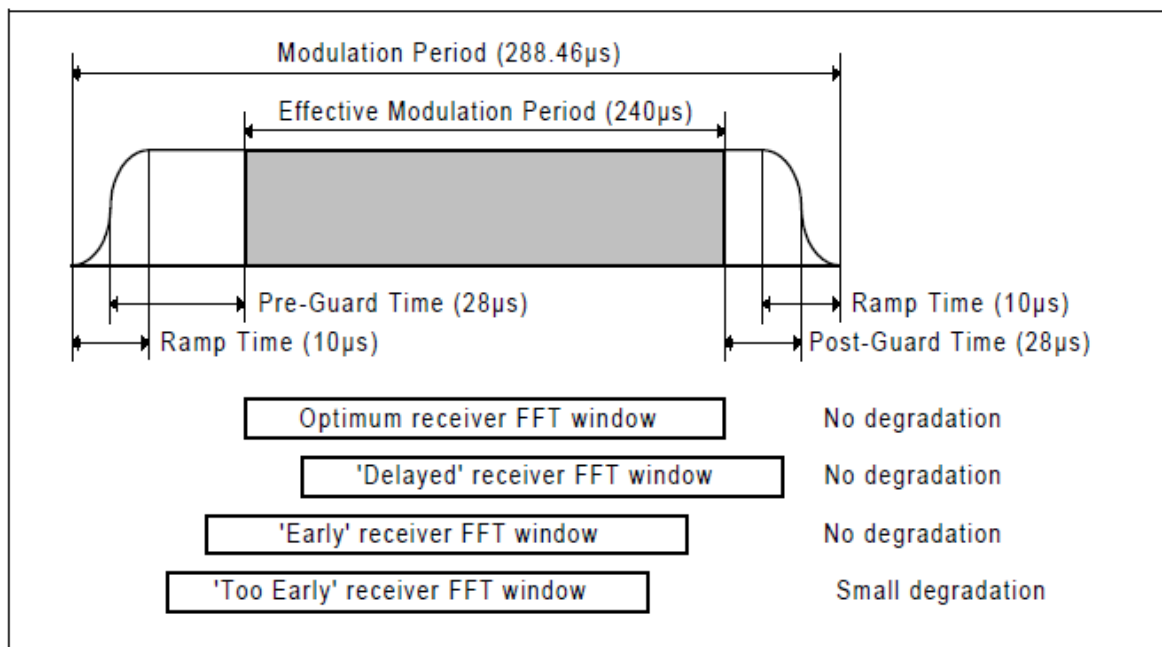


Figure 17: OFMDA burst and synchronisation requirements

Indeed, during the 28µs Post-Guard Time Dr. Valenti identifies as the “guard period” the energy remains at the same level as during transmission of the OFDM symbol. There is a reduction in energy during the 10µs Ramp Time after the Post-

Guard Time but the energy soon increases again during the Ramp Time for the next OFDM symbol. Because the POSITA would have understood no energy to be transmitted during the claimed “guard periods” (as I explain in paragraph 25 above), the additional guard interval at the back of the last OFDM symbol in Ma’s random access signal, in which energy is transmitted as I just explained above, does not constitute a guard period following the random access signal, as claimed.

28. *Ma*’s RACH channel is “mapped to OFDM symbols” in the sense that each RACH slot is defined in time by the number and length of the OFDM symbols. Since the RACH slot is four OFDM symbols long, that is the timeslot that can be used for transmission and those four OFDM symbols are the RACH signal. Any post-guard time inside an OFDM symbol, such as that in *TR*, would be considered part of the RACH signal rather than a separate “guard period” because that post-guard time is included in the RACH signal. For this additional reason, I disagree with Dr. Valenti’s opinion that the addition of a post-guard time at the back of the last OFDM symbol would constitute a guard period following the random access signal.

2. *TR*’s Additional Timeslot

29. *TR* states: “Two continuous time slots are prepared for the RACH burst, because propagation delay is unknown before communication starts between MS and BS.” Ex. 1006 [*TR*] 197. The ’908 patent and *TR* are addressing the same

problem when one mentions “initial time alignment uncertainty,” Ex. 1001 [’908 patent] 8:61-63, and the other mentions that “propagation delay is unknown before communications starts between MS and BS.” Dr. Valenti suggests that “In view of the ‘unknown propagation delay’ particular to the random access signal as pointed out by TR, a POSITA would have been inspired to likewise add the additional safeguard following *Ma*’s random access signal in the time domain to provide more buffer to ensure correct reception of the random access signal.” Ex. 1003 [Valenti Decl.] ¶ 95.

30. In my opinion, TR addresses two related problems with its additional RACH timeslot. First, it prevents interference between a late RACH signal and any signal scheduled for the timeslot immediately after the RACH. *Ma* uses MC-OFDMA for its Mode-1 communications. Ex. 1005 [Ma] ¶¶ 148-149. As such, *Ma*’s RACH signatures are orthogonal to the data due to the spreading. *Id.*, ¶¶ 206, 216. Even if the RACH signature from one user were mistimed it already overlaps and is orthogonal to the data so the base station can still distinguish between the RACH and the data. Given *Ma*’s use of Walsh spreading for both its RACH and its Mode-1 signaling, there is no need to add an additional timeslot to its RACH slot to further reduce interference between RACH and Mode-1. In addition, *Ma*’s RACH signatures are orthogonal to one another so, even if the RACH signature from one user were mistimed and overlapped with the RACH

signature of another user, the base station can still distinguish between the two signatures. *See id.*, ¶¶ 208, 211, 213. Overall, adding an extra timeslot to *Ma*'s RACH as taught in *TR* would not reduce any interference problems that might exist in *Ma*.

31. Secondly, *TR*'s additional timeslot also allows the access point a longer window to detect the RACH signal. This is important in *TR* because *TR* uses the RACH to synchronize the timing offset for each remote unit. Ex. 1006 [*TR*] 207 ("In the uplink the rough timing offset is detected by the base station by measuring the arrival time of the RACH burst."). In contrast, the use of orthogonal RACH signatures allows *Ma* to have a long RACH detection window "for initial timing and synchronization" without requiring an additional empty timeslot. Ex. 1005 [*Ma*] ¶ 219, 220 - 232. This process is described as follows in *Ma* in the paragraphs of *Ma* just cited: First, the received signal is saved. Then the data signal, which is orthogonal to the RACH, is recovered. The recovered data signal is remodulated and subtracted from the original received signal. The result is a signal that contains only the RACH but we still do not know when the RACH was initially received. This signal can be called the RACH only signal. The base station then attempts to correlate the RACH only signal is correlated with each of the set of RACH signatures that the mobile station could have used for its RACH signal. When correlating the RACH only signal with possible RACH signatures,

the signatures will be shifted in time by, for example, multiplying the signal by a phase vector. A peak will occur when the RACH only signal is correlated with a matching RACH signal shifted by the correct amount to accommodate the initial alignment uncertainty. The shift (phase vector) associated with this peak indicates the timing offset for the mobile station and can be used for synchronization. By using this procedure, *Ma* is able to use to RACH for initial timing and synchronization, even if the RACH signal is very late, without utilizing an additional timeslot, and without any guard periods.

32. The number of users able to join the network at any particular time is limited by the number of available RACH slots. *TR* teaches that the RACH should be assigned two timeslots. Ex. 1006 [*TR*] 197. Applying this concept to *Ma*'s RACH would require adding at least one extra symbol to each of *Ma*'s 4 symbol-long RACH signals, creating a 5 symbol-long RACH where there would be no RACH signal transmitted during the allocated to the fifth symbol. Since the overall bandwidth is fixed, this results in a 25% reduction in the number of RACH slots.

C. Opinions Related To *Walton*

33. *Walton* states that, "An access point may also be referred to as a base station or some other terminology." Ex. 1013 [*Walton*] ¶ 40. It also states that, "A user terminal may also be referred to as a mobile station, a remote station, an

access terminal, a user equipment (UE) a wireless device, or some other terminology.” *Id.*, ¶ 41. Finally, it states, “The MAC ID field identifies the specific user terminal for which the information element is intended. Each user terminal registers with the access point at the start of a communication session and is assigned a unique MAC ID by the access point. This MAD [sic] ID is used to identify the user terminal during the session.” *Id.*, ¶ 122. Based on my understanding of these paragraphs of *Walton* as well as the rest of *Walton*’s specification, the claimed “mobile station” should be read on *Walton*’s user terminal rather than its access point and the claimed “base station” should be read on *Walton*’s access point rather than its user terminal. Under this read, *Walton*’s MAC ID would be “associated with” *Walton*’s user terminal, not *Walton*’s access point. Thus, under this read, in my opinion the MAC ID is not a “sequence associated with the base station” as required by the claims of the ’908 patent. This is so at least because knowing the MAC ID does not allow for identification of the access point (the “base station” under this read). Also, in *Walton* adding a guard interval to the RACH sent by the user terminal prevents it from interfering with the BCH, which is sent by the access point (the “base station” under this read). *See id.*, ¶ 647 (“The RACH segment includes a guard interval, which is provided to prevent the uplink transmission from the user terminals from interfering with the next BCH segment, which is a possibility for user terminals that do not compensate

for their round trip delay.’’), Table 3 (‘‘BCH Used by the access point to transmit pilot and system parameters to the user. ...RACH | Used by the user terminals to gain access to the system and send short messages to the access point.’’)

VI. OPINIONS WITH RESPECT TO ISSUES IN THIS PROCEEDING

A. The ’908 Patent

34. The ’908 patent specification describes a ‘‘*frame format*’’ where a ‘‘*timeslot*’’ is an intermediate unit of time between the larger ‘‘*frame*’’ and the smaller unit of time called a ‘‘*OFDM symbol*.’’ Ex. 1001 [’908 patent] 4:8-10, 4:20-22, Figs. 3, 5. Dr. Cimini states that ‘‘the ’908 patent’s specification does not use or define the term ‘frame format.’’’ Ex. 1003 [Cimini Decl.] ¶ 101. It is true that the specification uses the terms ‘‘frame structure’’ and ‘‘slot structure’’ rather than ‘‘*frame format*.’’ See Ex. 1001 [’908 patent] 4:8-10, 4:20-22. However, a POSITA would certainly interpret the claimed ‘‘*frame format*’’ in light of the specification’s description of the ‘‘frame structure’’ and ‘‘slot structure,’’ as well as Figures 3 and 5. Those sections focus on the structure or ‘‘*frame format*’’ within a single frame. Conversely, I cannot find a discussion anywhere in the ’908 specification of a format that encompasses multiple frames. Based at least on the sections of the ’908 specification I cite above, a POSITA would understand that the claimed ‘‘*frame format*’’ describes the internal structure of a single frame. It does not appear that Dr. Cimini considered these sections as he did not cite them

when explaining his understanding of “*frame format*.” See Ex. 1003 [Cimini-Decl.] ¶101. Thus, the claimed “frame format” requires two units of time larger than the “OFDM symbol,” with the claimed “timeslot” being smaller than the claimed “frame.”

B. Frank

35. Frank chooses to include data on the same RACH used for the random access request. *See e.g.*, Ex. 1009 [Frank] Preamble, 6:6-10, 8:19-22, Fig. 4. Frank describes several alleged benefits to adding its “guard time interval” between sending the preamble and the data on its RACH. “A guard interval (T_G) is preferably inserted between the preamble and data portion of the frame, which enables data detection to occur during an idle period.” *Id.* Preamble. “A guard interval is preferably inserted in the preamble portion of the frame, which enables some data detection to occur before the actual data detection process is started. Consequently, the buffering of data can be minimized.” *Id.*, 6:6-10. “A guard interval is preferably inserted between the preamble and data portion of the frame, which enables detection of the preamble before the data arrives (requiring less buffering).” *Id.*, 8:19-22. None of the reasons Frank gives for adding its “guard interval” would provide any advantage to that system if not for the fact that Frank’s random access channel follows its preamble with data. The advantage of adding data to the RACH is that the data is immediately available to the base

station as soon as the random access request is received from the mobile station. However, there are many drawbacks to this approach. This is because putting data on the RACH uses up bandwidth in that channel that could otherwise be used to connect with other mobile stations. This reduces the number of users that can connect to the system at any one time, which can be a very serious problem during busy hours. A POSITA would have been aware that the capacity of the random access system is critical to system performance especially during the busy hour (when the system is used the most, often times traffic rush hour) and on holidays and during natural disasters (when everyone tries to call friends/family/authorities). This ability to handle a large volume of callers initiating connection simultaneously became, if anything, even more important over time. Frank not only puts data on the RACH, it does so before receiving any acknowledgment from the base station. *Id.*, 9:16-19. Thus, each unsuccessful access attempt takes up bandwidth and produces interference that prevents other mobile stations from connecting. This would have made it less able to handle large call volumes than even other solutions available in 1999. Frank provides no evidence that they have actually solved any of the problems it identifies as it gives no simulations showing capacity of the RACH or the method in real world situations. Without said simulations this method would never gain traction in the standards community. Gibson teaches a dedicated RACH, which was known at the time.

36. Frank's primary motivation for incorporating a guard interval between its preamble and its data is to allow the base station sufficient time to process the preamble before the data arrives. "Yet another important technical advantage of the present invention is that all necessary post-processing, such as for example, signature decoding, can be accomplished during a guard period." Ex. 1009 [Frank] 6:20-22. "A guard interval is preferably inserted between the preamble and data portion of the frame, which enables detection of the preamble before the data arrives (requiring less buffering)." *Id.*, 8:19-22. "Additionally, in accordance with the preferred embodiment, during the guard time interval, T_G , the signature detection processing can be performed at the base station receiver (e.g., by using a fast Walsh-Hadamard transformation), and the base station can determine more quickly whether a random access request has been made." *Id.*, 9:24-27. "In accordance with the present invention, the use of a guard time interval, T_G , between the random access request preamble and data portion enables the system to accomplish all of the above-described post-processing during this idle period." *Id.*, 13:11-13.

37. Frank's primary motivation for incorporating a guard interval between its preamble and its data is to allow the base station sufficient time to process the preamble before the data arrives. *See* Ex. 1009 [Frank] 6:20-22, 8:19-22, 9:24-27, 13:11-13. This may have been a concern in some limited circumstances in May of

1998 when Frank was first written. However, by 2004, the priority date of the '908 patent, this was no longer a concern. Moore's law, which observes that the density of transistors in an integrated circuit doubles every two years, accurately described the advance in computing power between 1998 and 2004. *See* https://en.wikipedia.org/wiki/Moore%27s_law. In 1998 the typical base station might have, for example, had the equivalent of a Pentium 2 processor with 7.5 million transistors. By 2004 an Intel Itanium 2 processor could have more than 220 million transistors. Clock frequency improved as well with processing in 1998 running at around 600Mhz versus in excess of 2Ghz by 2004.

<http://www.cs.columbia.edu/~sedwards/classes/2012/3827-spring/advanced-arch-2011.pdf>

38. Processing power as anticipated by Frank in base stations was simply not a concern at the time of invention because faster processors were readily available due to the advancement of semiconductor technology and Moore's law. Thus, even if a POSITA would be willing to accept the significant drawbacks of putting data on the RACH, there would be no reason to include Frank's "guard time interval." A POSITA could simply have used a faster processor that could complete the detection and decoding of the preamble fast enough so the base station would be ready for the data arriving immediately thereafter. Transmission resources, which is defined as time or bandwidth that can be used to transmit

signals, is a limited commodity in a mobile communications system. Systems are generally designed to maximize the efficient use of transmission resources. Frank proposes a .25ms long guard interval for a 10ms long preamble. Ex. 1009 [Frank] 10:3-5. This effectively means that the RACH takes up about 2.5% more transmission resources than necessary. This is a significant amount and a POSITA in 2004 would have chosen to use a faster processor rather than incurred this transmission resource penalty.

39. Frank was published on November 25, 1999. Ex. 1009 [Frank]. The priority date of the '908 patent is January 29, 2004. Ex. 1001 ['908 patent]. Several 3GPP2 documents were developed after Frank but before the invention date. Ex. 2008 [3GPP2] 1 ("Date: October 25, 2002"). Like Frank, 3GPP2 standards described a CDMA system. *Id.*, 53 ("This standard was prepared by Technical Specification Group C of the Third Generation Partnership Project 2 (3GPP2). This standard is evolved from and is a companion to the cdma2000 standards."). Also like Frank, it transmitted data on its RACH. *Id.*, 463 ("The output power of the Pilot Channel during the preamble portion of an access probe is higher than it is during the data portion of the probe by an amount such that the total output power of the preamble and data portions of the access probe are the same as shown in Figure 9.2.1.3.2-1."). However, it did not include a "guard time

interval” but rather sent the data immediately after the preamble. *Id.* This is seen most clearly in Figure 9.2.1.3.2-1 shown below:

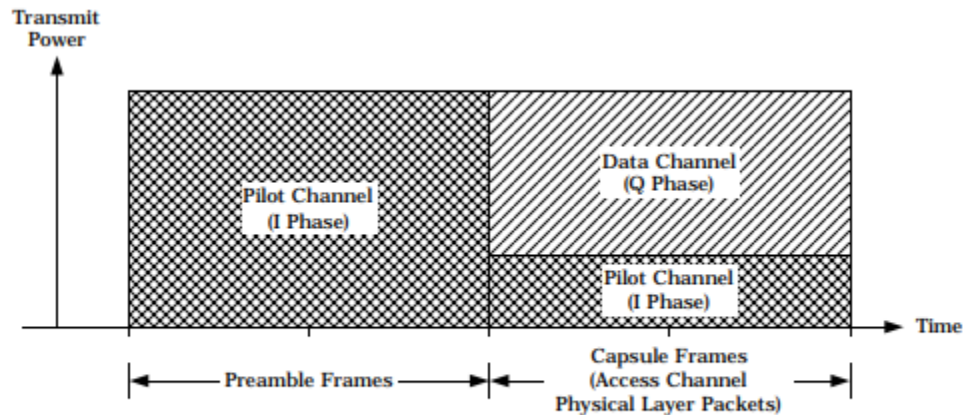


Figure 9.2.1.3.2-1. Example of an Access Probe

Id. The designers of 3GPP2 likely did not include the guard interval because they realized that the alleged problems identified by Frank were already solved with simple processing power. This supports my belief that by 2002, at the latest, it would no longer have been obvious to include a “guard time” even in situations where data is transmitted on the RACH.

C. Gibson

40. Gibson is very clear that only the random access signal, not data, should be transmitted on the random access channel. Regarding Figure 17.3 reproduced below, Gibson says “[t]he successful procedure for establishing a call that originates from the mobile station is outlined.” Ex. 1008 [Gibson] 319.

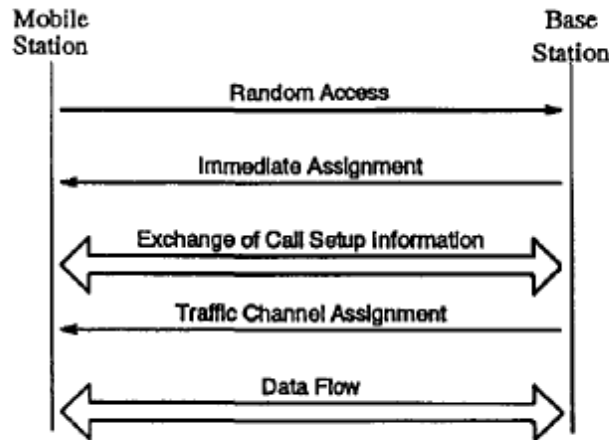


FIGURE 17.3 Mobile-originating call establishment.

Id., 320. Gibson describes the first step for establishing a call is that “[t]he mobile initiates the procedure by transmitting a request on the random-access channel.”

Id., 319. Gibson does not describe transmitting any data with this request and indeed elsewhere Gibson states that, “[s]pecifically, the random access channel (RACH) is only used by the MSs in the uplink direction if they request, for example, a bidirectional SDCCH to be mapped onto an RF channel to register with the network and set up a call.” *Id.*, 497. Gibson then teaches that, “[o]nce the base station has received the mobile’s request, it responds with an immediate assignment message that directs the mobile to tune to a dedicated control channel for the ensuing call setup.” *Id.*, 319. It is on this “dedicated control channel” that any data needed for setting up the call would be transmitted between the mobile station to the base station. *See id.* Lastly, Gibson teaches that, “[u]pon completion of the call setup negotiation, a traffic channel, i.e., a frequency in FDMA systems or a time slot in TDMA systems, is assigned by the base station and all future

communication takes place on that channel.” *Id.* This procedure is also illustrated in Figure 17.3, which Gibson states is, “[t]he successful procedure for establishing a call that originates from the mobile station.” *Id.*

D. Kaiser

41. There is no explicit teaching in Kaiser that the “frame” it describes is divided into “*timeslots*” as required by the claims. The fact that the duration of the symbols in Kaiser is in the same order of magnitude as that in the ’908 patent does not mean that Kaiser teaches or suggest the claimed “*timeslots*.” It is perfectly possible to have OFDM symbols in the 100 μ s range without using the claimed “*timeslots*.”

42. Timeslots can be added to a frame structure as an intermediate unit of time between the larger frame and the smaller OFDM symbol in order to facilitate multiple access. When a single frame is shared among multiple users, groups of OFDM symbols within the frame need to be assigned to each user. One way to do this, while reducing overhead, is to divide the frame into timeslots that are smaller than the frame but longer than a single OFDM symbol. Using timeslots in this way can reduce overhead.

E. The Kaiser-Gibson-Kaiser Combination

43. Dr. Cimini lists several reasons why it would be obvious to combine Kaiser and Gibson with Frank. Ex. 1003 [Cimini-Decl.] ¶83. Some of these

reasons, related to the supposed advantages of Frank, have been addressed above. For those reasons, and for the reasons I further detail below, I do not believe it would have been obvious to combine Frank with Kaiser-Gibson.

44. Dr. Cimini asserts that “Frank teaches that its random-access technique, particularly using the preamble and guard period, confers numerous important technical advantages, such as ‘that each portion of the random access request has to fulfill only one function and can thus be optimally designed for that respective task.’” Ex. 1003 [Cimini-Decl.] ¶83 *citing* Ex. 1009 [Frank] 6:14-16. However, this comparison appears to be made to systems that have both a preamble and data in a unitary random access request. Gibson already separates its random access signal from the data on a “dedicated control channel.” Ex. 1008 [Gibson] 319. Gibson could design its random access signal and the data for call setup to optimally fulfil their designed functions just as well or better than Frank could do so.

45. Frank discusses in detail its use of RAKE receivers or RAKE fingers to decode its RACH. *See e.g.*, Ex. 1009 [Franks] 4:22-30, 6:20-24, 9:27-32, 12:12-30. This is apparently the basis for Dr. Cimini’s claim that Frank “simplifies ‘the hardware design for random access request detection.’” Ex. 1003 [Cimini-Decl.] ¶83 *citing* Ex. 1009 [Franks] 6:20-24. A RAKE receiver is one hardware option for compensating for multipath interference in CDMA systems where symbols are

very short and the transmission rate is very high. Frank asserts that its random access design is advantageous because it uses the RAKE receiver used to decode channel traffic to decode the RACH. *Id.*, 6:20-24. Kaiser, which uses longer OFDM symbols, does not use a RAKE receiver but rather a MLSE (maximum-likelihood sequence estimation) to decode the data of a single user. *See e.g.*, Ex. 1007 [Kaiser] 1 (“For joint detection of the data of a single user a low complex maximum-likelihood sequence estimation (MLSE) is applied.”), 2 (“Joint detection with MLSE is applied for the superimposed data of a user.”). Thus, applying Frank’s teaching of using a RAKE receiver to decode the random access signal would require more hardware, not less. I see no evidence that the combination of Frank with Kaiser-Gibson “simplifies the hardware design for random access request detection” as Dr. Cimini claims.

46. Dr. Cimini repeats Frank’s claim of “‘reduc[ing] the MS’s transmitted power.’” Ex. 1003 [Cimini-Decl.] ¶83 *citing* Ex. 1009 [Frank] 9:19-23. The power the mobile station uses to transmit the random access request itself is not dependent on Frank’s frame structure but rather on the signal strength needed for the base station to detect the request. Frank claims a “slight[.]” power savings because there is an interruption between the preamble and data portion of the random access request. Ex. 1009 [Frank] 9:19-23. The interruption in transmission between the preamble and data may provide some tiny power savings

relative to sending a null signal between the preamble and data portion of the Frank's random access request. However, as I discuss above, Gibson does not send data as part of the random access request. Moreover, Gibson's mobile station waits for the base station to respond to its access request with an "immediate assignment" of a "dedicated control channel for the ensuing call setup" before transmitting any data. Ex. 1008 [Gibson] 319. Thus, Gibson does not need to incorporate Frank in order to cease transmission between the random access request and sending the data needed to complete the call. If the data signal were sent immediately after the preamble the power requirement would be the same as Frank and possibly slightly less (the logic circuitry would not need to be active during the guard period) than the proposed solution. So, while Frank may save a tiny amount of power by not transmitting during the guard period, the same savings can be realized by just sending the data immediately after the preamble. Also, any savings in power comes at the expense of transmission resources. As I explain above, transmission resources are valuable and a "slight" power savings would not be worth the waste of transmission resources. A POSITA would not be motivated to combine Frank with Kaiser-Gibson by a desire to reduce the mobile station's transmit power.

47. Dr. Cimini asserts that "random access request can be aligned exactly to that of an existing system's frame slot scheme." *See* Ex. 1003 [Cimini-Decl.]

¶83 *citing* Ex. 1009 [Frank] 9:19-23. Gibson's RACH is already broadly aligned with the existing frame slot to the extent it implements the well-known slotted ALOHA protocol. Frank's attempt to force random access requests to happen at frame boundaries unnecessarily reduces the opportunities for a handset to submit a random access request. This reduces the ability of the network to handle high volume call situations such as busy hours, holidays, and disasters. Dr. Cimini also says that combining Frank is advantageous because "the base station can determine more quickly whether a random access request has been made." Ex. 1003 [Cimini-Decl.] ¶83 *citing* Ex. 1009, 9:24-27. However, since Gibson's RACH is a designated portion of the frequency band, Gibson already can rapidly discern whether a random access request has been made.

48. The Kaiser-Gibson-Frank combination would be much more complicated to implement than simply "the combination of well-known, prior art elements ... according to their established functions, yielding predictable results" as asserted by Dr. Cimini. Ex. 1003 [Cimini Decl.] ¶ 88. This is clear just by comparing the specifications of Kaiser with Frank. Kaiser's OFDM symbols are 128 μ s long. Ex. 1007 [Kaiser] 103. This is approximately 500x the duration of Frank's CDMA chips. Ex. 1009 [Frank] 10:3-4 (calculating from the inverse of a 4.096 Mc/s symbol rate). This also means that Kaiser's symbol rate is slower than Frank's by nearly three orders of magnitude. The bandwidth of a carrier is

proportional to the chips/symbol rate. Thus, Frank's carrier bandwidth is 500x wider than Kaiser's subcarrier bandwidth. Even taking Kaiser's 256 subcarriers together forming a 2 MHz transmission bandwidth, Frank's single 5MHz carrier is 2.5x wider than Kaiser's. Furthermore, even the hardware requirements for Kaiser and Frank are different. Whereas Frank uses rake receivers, Kaiser uses a MLSE. *Compare* Ex. 1007 [Kaiser] 101 *with* Ex. 1009 [Frank] 6:29-32.

49. Furthermore, the length of Frank's random access signal along with its frame structure, which is composed of multiple timeslots, is incompatible with Kaiser. Each of Kaiser's frames has 31 128 μ s long symbols, which means they have a duration of only 0.3968ms. *See* Ex. 1007 [Kaiser] 103. By contrast, Frank's preamble alone is 1ms long. Thus, Frank's random access signal, which include the preamble, 0.25ms guard time and data would be much longer than Kaiser's frame. *See* Ex. 1009 [Frank] 10:3-4. This not only severely limits the number of mobile stations that can connect to the system but also makes it impossible to divide the frame into multiple access slots as suggested by Frank. *See id.*, 9:5-24, 12:9-11. Moreover, such a long preamble would conflict with Kaiser's teaching that requires each frame start with a null symbol with no energy. Ex. 1007 [Kaiser] 102 ("Each OFDM-frame may start with a null symbol (without signal energy)"). This "null symbol can be used to enable each user a self-synchronization." *Id.* Since Frank's preamble extends beyond the length of a

frame in Kaiser it would step on the null symbol and interfere with the operation of the system proposed by Kaiser. Given the differences in their specifications, combining Kaiser-Gibson with Frank is not, as Dr. Cimini suggests, simply a matter of taking one element in Frank and adding it to Kaiser-Gibson. Rather, it would require a complete bottoms-up redesign or an entirely new system.

50. Designing the correct parameters for a RACH requires extensive simulation in multiple environments. For example, Kaiser simulates its performance in four different scenarios. Ex. 1007 [Kaiser] 103. A POSITA would not be able to perform such simulations. Furthermore, large teams at standards setting organizations spend years working on such specifications. In order to properly design the proposed combination, a POSITA would have to allocate a certain number of subcarriers to dedicate to the RACH, determine whether the subcarriers are to be spread over the entire spectrum or grouped in a certain portion of the spectrum. Then the POSITA would need to determine the type and length of the random access signal, the duration of the guard interval, as well as what data to put on the RACH. The POSITA would also have to redesign the hardware on both the mobile station and the base station to support the new functions. Simply put, this would require a team of POSITAs with powerful simulation software a significant time to create the proposed combination of Kaiser-Gibson and Frank.

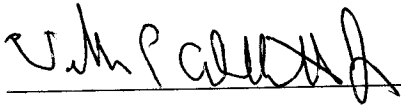
51. Dr. Cimini compares the duration of Frank's preamble and guard time interval with the duration of Kaiser's OFDM symbol. Ex. 1003 [Cimini Decl.] ¶ 111. This comparison does not demonstrate that the Kaiser-Gibson-Frank combination would meet the claim limitation, "*time duration of a combination of the random access signal and the guard period is greater than a time duration of at least one of the plurality of OFDM symbols.*" Comparing Frank's CDMA preamble and guard interval with Kaiser's OFDM symbol length is like proposing to combine a F1 racecar with a semi-truck and saying that the combination's quarter mile time would be less than the time it takes to stop the car from 60mph by comparing the quarter mile time of the unmodified racecar and the stopping time of the unmodified semi-truck. The comparison is simply nonsensical.

52. Assuming a team of engineers would be motivated to design, test, and simulate a combination of Kaiser-Gibson with Frank, they would need to make countless design choices that would affect the duration of the random access signal, the duration of the guard period, and the duration of the OFDM symbols. It can certainly be hypothesized that such a design could result in "*duration of a combination of the random access signal and the guard period [being] greater than a time duration of at least one of the plurality of OFDM symbols*" as required by the claims. However, it is also possible that the combination could be designed with long OFDM symbols such that the claim limitations would not be met. There

is simply nothing in any of these references to suggest that the combination should or should not necessarily practice the claim limitation.

VII. CONCLUSION

53. I declare under the penalty of perjury that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code. If called upon to testify, I would do so consistent with the statements and opinions contained in this declaration.

DATED: July 10, 2023 SIGNED: _____

William P. Alberth, Jr.