

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION**

IN RE NEO WIRELESS, LLC
PATENT LITIG.

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2:22-MD-03034-TGB

HON. TERRENCE G. BERG

**DECLARATION OF WILLIAM ALBERTH IN SUPPORT OF NEO WIRELESS'S
OPENING CLAIM CONSTRUCTION BRIEF**

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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 filed Curriculum Vitae, Dkt. 118, 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 by Neo Wireless LLC (“Neo”) to provide opinions concerning the claim construction and definiteness of certain limitations in the asserted claims of U.S. Patent Nos. 8,467,366 (“the ’366 patent”), 10,075,941 (“the ’941 patent”), 10,447,450 (“the ’450 patent”), 10,833,908 (“the ’908 patent”), 10,771,302 (“the ’302 Patent”), and 10,965,512 (“the ’512 Patent”) (collectively “the asserted patents”). 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.

My opinions regarding the proper construction of the terms at issue are set forth below. I understand that the Defendants in this case may submit arguments and expert declarations in support of their proposed constructions at a later date, and I reserve the right to supplement my opinions in response to those arguments.

3. I have personal knowledge of the facts and opinions set forth in this declaration, and, if called upon to do so, I would testify competently thereto.

4. In forming my opinions, I understand that the claims should be interpreted as they would be understood by a person of ordinary skill in the art of the patents at the times their respective

applications were filed. I understand that the claims are to be construed with reference to the patent's specification, the claims, the prosecution history, in light of the plain meaning of the terms used in the claims, and with reference to other sources of information, such as dictionaries, textbooks, and literature or other patents in the same or related fields.

5. 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 Defendants in this case.

II. QUALIFICATIONS

6. 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.

7. 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.

8. During the early stages of my career with Motorola (between 1987 and 2006, covering the Priority Dates of the asserted patents), 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.

9. 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).

10. 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.

11. 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.

12. Additional information concerning my background, qualifications, publications, conferences, honors, and awards are described in my Curriculum Vitae, a copy of which has been submitted to the Court. *See* Dkt. 118.

III. LEGAL STANDARD

13. 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. I have been informed by counsel of various legal standards related to claim construction and indefiniteness. I set forth my understanding below.

A. Person of Ordinary Skill in the Art

14. I understand that claim construction and indefiniteness are both analyzed from the perspective of a person having ordinary skill in the art. I understand that the person of ordinary skill in the art is a hypothetical person of ordinary creativity, not an automaton. I understand that a person of ordinary skill, while not someone who undertakes to innovate, is capable of drawing inferences and taking creative steps. I understand that, in determining the level of skill in the art, courts consider the type of problems encountered in the art, prior art solutions to those problems, rapidity with which innovations are made, sophistication of the technology, and the educational level of active workers in the field. I understand that not all of these factors will be relevant in a given case.

B. Patent Claims and Claim Construction

15. I understand that a patent may include two types of claims, independent claims and dependent claims, that an independent claim stands alone and includes only the limitations it recites, that a dependent claim can depend from an independent claim or another dependent claim, and that a dependent claim includes all the limitations that it recites in addition to all of the limitations recited in the claim from which it depends.

16. I understand that the words of a claim are generally given their ordinary and customary meaning. I understand the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention. I understand that the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.

17. I understand there are only two exceptions to the general rule that words of a claim are given their plain and ordinary meaning: first, when a patentee expressly sets out a definition and acts as his own lexicographer; and second, when the patentee clearly and unambiguously disavows the full scope of a claim term either in the specification or during prosecution. I understand that these standards are exacting. I understand that, to act as its own lexicographer, a patentee must set forth a definition of the disputed claim term other than its plain and ordinary meaning and clearly express an intent to redefine the term. I understand that disavowal requires a clear and unmistakable disclaimer. I understand that absent disavowal or lexicography, it is improper to import limitations into the claims from the patent specification, or to limit the claims to a particular embodiment. I understand that courts may consider extrinsic evidence outside of the patent and its file history, such as dictionaries, scientific treatises, and testimony from experts and inventors when determining the legal operative meaning of claim language. However, I also understand that extrinsic evidence is less significant than the intrinsic record in determining the legally operative meaning of claim language.

IV. LEVEL OF ORDINARY SKILL IN THE ART

18. It is my opinion that a person of ordinary skill in the art (POSITA) at the time of the alleged inventions of the asserted patents would have had an electrical engineering degree and at least 2 years of experience related to the design or implementation of wireless telecommunications systems or transceivers. Advanced education and degrees could compensate for less work experience, and equivalent knowledge gained through experience could compensate for less education.

19. My opinion regarding the POSITA is based on my own experience in the field of electrical engineering, computer systems, and computer science, the technologies discussed in

the asserted patents, my knowledge of the relevant backgrounds of co-workers and other individuals in the field, and my familiarity with the fields and related technologies.

20. 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 alleged priority dates of the asserted patents.

V. THE '366 PATENT

21. The '366 patent was filed August 8, 2011, and claims priority to a provisional application filed on March 9, 2004. The '366 patent describes methods and apparatuses in a multi-carrier cellular wireless network with random access. Generally, the asserted claims of the '366 patent relate to mobile stations and methods employed by mobile stations in establishing random access to a serving base station in a cell.

22. I understand that Defendants contend that the phrase “exhibits a low peak-to-average power ratio in the time domain” renders the claims indefinite. I disagree with Defendants’ conclusion, as detailed below.

23. The peak-to-average power ratio (also known as the PAPR or sometimes PAR) is typically expressed in decibels (dB), which is a relative unit of measure of powers on a logarithmic scale. For example, a signal may have an average power of 1 Watt. If the signal has a PAPR of 10dB this would mean that the peak power of the signal is 10 Watts (which is 10dB higher (or 10 times larger)) than the average power.

24. In my opinion, the '366 patent provides sufficient context for a POSITA to understand the meaning of “low peak-to-average power ratio” with reasonable certainty. In light of the remainder of the specification and how the term is used in the claims, a POSITA would understand that a “low” PAPR is (1) based on the transmitter and signaling system being considered and (2) that the PAPR of the target signal is low relative to the baseline PAPR of the

signal of the system such that it does not hinder the efficiency of the power amplifier (e.g., such that the target signal does not cause additional constraints on the power amplifier due to excessive PAPR, which would reduce efficiency and increase the current drain). *See, e.g.*, '366 Patent 4:34–38 (“relatively low peak-to-average power ratio . . . improves the power efficiency of the mobile station transmission power amplifier.”). As a related consideration, a POSITA would understand that a “low” PAPR is one that, in the particular system involved, is sufficiently below the baseline PAPR such that the transmitter does not need be specially designed to accommodate that signal. The POSITA at the time of the invention would understand the baseline PAPR of the system and understand that “low” means less than the system baseline PAPR so that the transmitter design is unaffected. Accordingly, a POSITA would be able to use these objective boundaries to determine what a “low peak-to-average power ratio” means.

25. For example, here, the claims cover a mobile station (and methods for a mobile station) “[i]n a multi-cell orthogonal frequency division multiple access (OFDMA) wireless communication system.” Accordingly, a POSITA would take into context that particular type of system and the baseline PAPR for signaling using that type of system when determining what it means to be a “low” PAPR. At the time of the '366 patent, circa 2004, a POSITA would understand that cellular OFDMA systems could have a typical PAPR of 12dBs. *See, e.g.*, Baxley et al., *Power Savings Analysis of Peak-to-Average Power Ratio Reduction*, IEEE TRANSACTIONS ON CONSUMER ELECS. (Aug. 2004) (showing a baseline PAR around 12dB at the 10^{-4} probability level for an OFDM signal); You et al., *A Simple Construction of OFDM-CDMA Signals With Low Peak-To-Average Power Ratio*, IEEE TRANSACTIONS ON BROADCASTING (Dec. 2003) (describing the creation of a signals with “Low Peak-To-Average Power Ratio” in contrast to transmissions having a PAPR greater than 11).

26. Indeed, it was a well-known problem for conventional OFDMA systems to have such a high PAPR. Accordingly, a signal that was approximately 3dBs or more below the system PAPR would not require additional constraints on the transmitter and would have low PAPR.

Accordingly, a POSITA would understand that a relative difference in PAPR of 3dBs for a reduced PAPR to be “low” in the context of the patented claims. *See, e.g.*, Baxley et al. (Fig. 2 showing a PAR reduction from 12dBs to approximately 9dBs); You et al. (achieving a reduction of the PAR of 2-3dBs). This is consistent with Neo’s alternative proposed construction that a “low” PAPR for a conventional OFDMA system would be a PAPR of 9dBs or less.

27. Of course, the claims of the ’366 patent are not limited to just conventional OFDMA systems, and different specific implementations of OFDM/OFDMA networks could have different baseline PAPRs. But the teachings above still provide a way for a POSITA to have reasonable certainty about the level of reduction required for a PAPR to be considered “low” relative to the pertinent baseline.

28. For at least these reasons, it is my opinion that the plain and ordinary meaning of “exhibits a low peak-to-average power ratio in the time domain” is reasonably certain and not indefinite.

29. I understand that Defendants contend that the phrase “the ranging signal is formed from a ranging sequence selected from a set of ranging sequences [associated with the cell] for identifying the mobile station” (appearing in Claims 1 and 17 of the ’366 patent) requires that the “ranging sequence” is “selected by said apparatus” (that is, the mobile station). I disagree with Defendants’ proposed construction at least because it excludes embodiments that a POSITA would understand to be covered by the plain and ordinary meaning.

30. For example, a POSITA would understand the phrase to also cover the scenario in which the serving base station selects the ranging sequence from a set of ranging sequences. Although the specification of the '366 patent does not explicitly describe how a serving base station would make this selection, it would have been well understood to a POSITA at the time of the patent that a ranging sequence, such as a random access preamble, could be selected by the serving base station and sent to a mobile station prior to the mobile station's attempt to send a random access to a base station. A similar technique was used according to the 3GPP standards 25.214 V5.7.0 (2003-12) in section 6.1 where a preamble scrambling code is provided from the base station via RRC (Radio Resource Control).¹

31. Accordingly, a POSITA would be aware of random access methods at the time of the '366 patent and understand that the ranging sequence, e.g., a random access preamble, may be "selected from a set of ranging sequences" in a variety of ways, including at least by either a mobile station or a base station.

VI. THE '941 PATENT

32. The '941 patent also relates to wireless communications systems and more specifically to the adaptability of a system to maximize capacity and efficiency without sacrificing integrity of the signaling. *See* '941 patent Abstract. Claim 8 of the '941 patent requires "receiving a control message from the serving base station . . . [containing] mobile-station specific transmission parameters [that] indicate an antenna transmission scheme . . . comprising a transmission diversity scheme or a multiple-input multiple-output (MIMO) scheme"

¹ This may be found online at https://www.3gpp.org/ftp/Specs/archive/25_series/25.214/25214-570.zip.

33. As described in the '941 patent, multiple antennas can be used to create a multiple-input multiple-output ("MIMO") system that increases transmission throughput by transmitting different data from each antenna. *See, e.g.,* '941 patent 6:63–65. Alternatively, multiple antennas can be used to improve transmission robustness by transmitting the same data from each antenna—a scheme sometimes called transmission diversity. *See, e.g., id.* 6:60–62.

34. I understand that all parties agree that the plain and ordinary meaning of the term above would not cover an embodiment where the mobile station is only capable of operating within a MIMO scheme (or only a transmit diversity scheme), for example, if the serving base station can only be operated using MIMO (or only using a transmit diversity scheme).

35. However, I understand Defendants have proposed a construction that intends to limit the claimed system to *only* those two options, excluding other transmission schemes that are neither MIMO nor transmission diversity. I disagree. Nothing in the specification or claim language suggests to me that the inventors intended to limit their inventions to systems where those were the *only* two antenna schemes available. And in my opinion, a POSITA would understand that a system capable of supporting a transmission diversity scheme or a MIMO scheme could also support other transmission schemes. As just one example, another known transmission scheme at the time was transmitting from multiple base stations, as was used in CDMA systems.

36. I understand the parties also dispute the related claim term requiring "the mobile station-specific transmission parameters indicate . . . a corresponding subchannel configuration, . . . the corresponding subchannel configuration characterized by distributed subcarriers or localized subcarriers in the frequency domain[.]" As with the previous dispute, I understand the parties agree that this claim language requires a system be capable of supporting both localized or distributed subcarrier configurations. But it appears that Defendants' interpretation of this claim,

by omitting the words “characterized by” and adding “alternatively indicates,” would require the subchannel configuration to explicitly include a “localized” or “distributed” indicator in the control message. This is not how a POSITA would interpret this claim term. In light of the record, a POSITA would instead recognize that the indicated subchannel configuration from the mobile station-specific parameters would only be “characterized” by either localized or distributed carriers. For example, whether the subchannel configuration is characterized by localized or distributed carriers could be determined based on the allocation of resources in the subchannel (which is indicated in the subchannel configuration itself).

VII. THE '450 PATENT

37. I understand that Defendants are attempting to construe the term “time-frequency resource unit” to mean “a combination of time and frequency units designed according to the application requirements of the application that is being grouped.” I disagree that a POSITA would understand Defendants’ construction as consistent with the plain and ordinary meaning of the term.

38. As explained in the ’450 patent specification, the ’450 patent’s inventors transformed the two independent dimensions of time and frequency into one time-frequency dimension measured by a basic resource unit or time-frequency resource unit having a fixed number of symbols in a fixed number of subcarriers that fits the resource requirements of a given application and thus achieves an advantageous reduction in the amount of data required to allocate resources. ’450 patent 7:28–30 (“Using basic resource units as the granularity of a location offset to the packet stream reduces the number of bits required to represent its location with[in] the zone 605a.”).

39. Given the identity (m) of the relevant packet stream (*id.* 6:3–21), the packet stream can be described by (1) the value of its one-dimensional time-frequency starting coordinate (VZL_m),

which defines where the packet stream's associated time-frequency resource segment (V_m) starts in the zone both in time and frequency (*id.* 7:10–27); and (2) the number of time-frequency basic resource units in the time-frequency resource segment (based on MCSIm), which defines where V_m ends, again both in time and frequency (*id.* 7:7–39). Using time-frequency resource units, “each . . . containing a set of frequency subcarriers in a group of OFDM symbols,” to define a new dimension of “time-frequency,” one can specify a resource in two parameters: a starting time-frequency coordinate and the number of time-frequency resource units in a time-frequency resource segment, as claimed.

40. The “time-frequency resource unit” recited in the claims was significant and innovative as it allowed for reduction of the overhead required to transmit and recover data in a multi-carrier packet communication system because, using this basic resource unit, the resource space can be defined with two parameters instead of four. This “time frequency resource unit” is thus not an arbitrary combination of time and frequency units. Instead, it is a parameter designed according to the application requirements of the application that is being grouped. By intentionally foregoing the flexibility of irregular resource allocation at the lowest granularity level, which requires multidimensional allocation, the inventors instead created regularly shaped time-frequency resource units allocated at the application granularity level. These resource units used a single dimension to provide the control overhead reduction. Without enforcing similar resource requirements between users of the same application the regularity of the time-frequency resource unit would not have been possible.

41. I note that while my discussion above (*supra* ¶¶ 37–40) references an embodiment wherein the inventors grouped resources by common application type, as shown in Figure 6 of the patent, the invention is not limited to that form of grouping. The inventors expressly

indicated that resource zones “designated for particular applications” are merely present “[i]n some embodiments,” ’450 patent 2:47, and that packet streams may also be classified, for example, “based on application type, quality of service (QoS) requirement, or other properties.” *Id.* 8:55–57. Thus, my discussion above, while illustrative of the concept that allowed the inventors to reduce control overhead, should not be read as an indication that a time-frequency resource unit is limited to a particular type of grouping. Indeed, a POSITA would understand that other forms of grouping would still allow for the reduction of control overhead envisioned by the inventors.

VIII. THE ’908 PATENT

42. With respect to the ’908 patent, I understand that, within the phrase “wherein the portion of the frequency band used for transmission of the random access signal does not include control channels,” the Defendants want to replace “control channels” with “channels carrying control information.” I do not see any basis in the specification or claims of the patent for making this substitution, which significantly alters the plain meaning of the claim language. A POSITA at the time of the invention of the ’908 patent would have known unmistakably what a “control channel” is, and would also have known that it is not just any channel that happens to carry control information. It was a well-known technique in the art at the time of the patent to create distinct channels within a wireless communication system based on the primary purpose of the channel—a control channel for control information, a shared channel for data transmission, or a random access channel for random access. But no POSITA would consider a shared channel, for example, a “control channel” merely because it incidentally carried some control information in addition to its primary purpose of data transmission. Thus, a POSITA would not misread the

plain language of the patent claim to broaden “control channel” to “channel carrying control information.”

43. I further understand that Defendants seek to construe the term “random access signal” as “direct sequence spread spectrum signal.” I disagree with Defendants’ proposal, since a “random access signal” was an extremely well-known term in the art at the time of this patent, and would not have had inherent limitations in the mind of a POSITA with respect to the *type* of signal used for the random access signal. In other words, “random access signal” has a plain and ordinary meaning to a POSITA that has nothing to do with the type of system—spread spectrum, DSSS, or otherwise—that should be used to generate it. Nor have I seen anything in the patent specification or prosecution history that suggests the inventors intended to limit their random access signal to exclusively DSSS signals.

IX. THE ’302 PATENT

44. With respect to this patent, I understand that the Defendants, as they did with the ’908 patent, seek to construe the term “probing signal” to mean “direct sequence spread spectrum signal.” As with “random access signal” above, the term “probing signal” was an extremely well-known term in the art at the time of this patent, and a POSITA would have a clear understanding of its meaning in the context of these claims and the specification without any limitation on the type of system—spread spectrum, DSSS, or otherwise—used to generate the signal.

45. The specification of the ’302 Patent does use a DSSS signal as an example of a probing signal, which a POSITA would understand to be a useful option since it would be sent over a broad spectrum of frequency resources and used to estimate the channel conditions across a large portion of the channel used for data. *See, e.g.*, ’302 Patent 9:39–52 (describing using the probing signal to “update the mobile station’s channel characteristics”).

46. But in my opinion, it does not follow that a POSITA would take the inventors to mean that the probing signal *must* be a DSSS signal in the patented claims. For example, a POSITA would understand that the probing signals disclosed in the patent could be implemented in an OFDM system at the time of the invention. For example, probing signals can be carried across multiple OFDM subcarriers, at times different than when those subcarriers are used to carry data, to accomplish the same functionality.

X. THE '512 PATENT

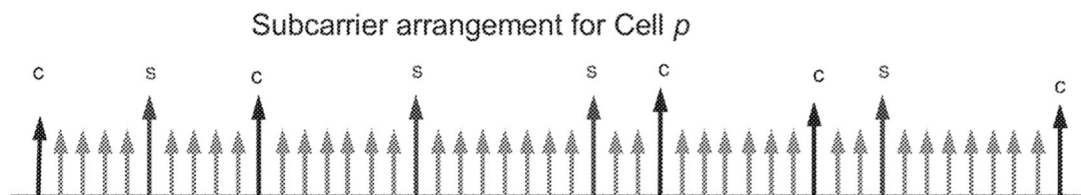
47. Regarding the '512 patent, I understand that Neo has proposed that the term “wherein the first plurality of subcarriers and the second plurality of subcarriers are received in at least one of the time slots” be clarified by specifying that the first and second plurality of subcarriers are received “in at least one of the *same* time slots.” I understand that Defendants oppose this construction. In my opinion, Neo’s proposed construction represents the proper interpretation of this claim language in view of the specification and claims of the '512 patent. As I will explain below, a POSITA would understand this limitation to require that there must be at least one time slot that contains both “the first plurality of subcarriers *and* the second plurality of subcarriers.”

48. The plain meaning of the claims requires that there be “at least one time slot” where “the first plurality of subcarriers *and* the second plurality of subcarriers” are both transmitted. In other words, both subcarriers should be transmitted in the same time slot at least once.

49. Further, a POSITA would understand that a time slot, as used in the patented claims, can be configured in an OFDM system to be further subdivided into smaller time-domain resources. For example, a time slot may be undivided or divided into multiple time-domain subdivisions, such as time symbols. OFDM systems can be configured to assign resources to channels or portions of signals on the individual time symbols or on the larger time slot level (or even on

larger aggregations of resources that span multiple time slots). As a result, two pilots can be in the same time slot even if not sent at the exact same time symbol.

50. This plain meaning reading of the claims accords with the embodiments in the '512 patent's specification. For example, the '512 patent's Figure 5, reproduced below, is a frequency-domain depiction of a transmission from cell *p*, showing common pilots (*c*), cell specific pilots (*s*) and data (shorter arrows) all being transmitted at different frequencies at the time of transmission:



'512 Patent Fig. 5; *see also id.* 5:34–38.

51. If, instead, the claims were interpreted to merely require that the signals generally be transmitted in one or more time slots, this entire limitation would be superfluous. This is because pilots, as with any other signal, are necessarily transmitted in some time slot, and transmitting them in one or more time slots does not add any meaningful limitation to the claims.

52. I understand the parties also dispute the construction of the term “second pilots of a second type,” with Defendants contending that these pilots must be “pilots possessing a set of characteristics common to all base stations of the system.” I disagree with Defendants’ proposal, since the plain meaning of “second pilots of a second type” does not suggest such a limitation. The claims make clear that the second pilots merely need to be of a “second type” from the first, cell-specific pilots, and that data can be recovered “using channel estimates from at least the second pilots.” While the specification describes “common” pilots as one example of these second pilots, a POSITA would recognize that the inventors specifically chose *not* to identify the

second pilots as “common” pilots in the claims (despite specifically identifying the first pilots as “cell-specific pilots”). And a POSITA would know that other types of non-cell-specific pilots might be used alongside the cell-specific pilots to help recover data, such as antenna-specific pilots or mobile station-specific pilots.

XI. CONCLUSION

53. I declare that the information contained in this declaration is true and accurate to the best of my knowledge. If called upon to testify, I would do so consistent with the statements and opinions contained in this declaration.

DATED: February 16, 2023

SIGNED: _____

A handwritten signature in black ink, appearing to read 'William P. Alberth, Jr.', written over a horizontal line.

William P. Alberth, Jr.