UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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VOLKSWAGEN GROUP OF AMERICA, INC.,
Petitioner,

v.

NEO WIRELESS LLC,
Patent Owner.

_____

Case IPR2021-01537
Patent 10,075,941

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. 10,075,941 ("the '941 patent") in IPR2021-01537. I have been retained by Neo Wireless LLC ("Neo"), the Patent Owner in the above proceedings. The Petitioner is Volkswagen Group of America Inc. ("VW"). I was previously retained by Neo to opine on this same patent and same claims in IPR2021-01468, 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 '941 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 VW 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 Dates of the '941 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 '941 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.

18. 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.

19. 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.

20. 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 (February 13, 2004) of US Provisional Application Serial No. 60/544,521, to which the '941 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 (February 14, 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 '941 patent.

IV. LEVEL OF ORDINARY SKILL IN THE ART

21. 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.

22. In this case, Dr. Wilson has asserted in her declaration the following standard for a person of ordinary skill in the art as of the time of the '941 patent:

> In my opinion, a person of ordinary skill in the art ("POSITA") in the context of the '941 patent as of February 13, 2004 (the earliest priority date of the '941 patent), 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, i.e., a doctorate in electrical engineering, computer engineering, computer science, or an equivalent field would also qualify as a POSITA for the '941 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 [Wilson Decl.] ¶ 53.

23. For the purposes of this declaration, I accept Dr. Wilson's proposed qualifications of a POSITA. I reserve the right to revisit the issue should the Petition be instituted. 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 IPR2021-01468 litigation I submitted a declaration concerning the ’941 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 25-41 of my declaration from IPR2021-01468. The citations to the Petition and exhibits in this section are to those in IPR2021-01468.

A. WLANs Like Wi-Fi Do Not Have Cells.

25. One type of wireless communication system is a cellular network. A cellular network is a radio network distributed over land through cells where each cell includes a fixed location transceiver known as base station. Each base station serves a single cell. These cells together provide radio coverage over larger geographical areas. The users in a cellular system travel rapidly within cells and between cells.

26. A wireless local-area network (WLAN) is a group of co-located computers or other devices that form a network based on radio transmissions rather than wired connections. WLANs based on the IEEE 802.11 standards are the most widely used computer networks in the world and are commonly called Wi-Fi. Walton-’269 is based on Wi-Fi. Ex. 1006 [Walton-’269] 1:25-29, 5:51-56. Unlike a cellular network, WLANs like Wi-Fi do not have cells. A key feature of cellular is the ability to support moving devices which can hand off between cells. In 2004

Wi-Fi did not support fast handoff between the Wi-Fi access points. Wi-Fi access points are deployed and devices can migrate between the access points, but not with the robust handoff mechanisms supported between cells of a cellular system.

B. Walton-'269 Does Not Teach A Subchannel That Is A Grouping Of Data Subbands/Subcarriers, As Described In The '941 Patent.

27. The '941 patent explains that the basic structure of an OFDM multi-carrier signal in the frequency domain is made up of subcarriers. Ex. 1001 ['941 Patent] 3:33-34. According to the patent: "[w]ithin a particular spectral band or channel, there are a fixed number of subcarriers, and there are three types of subcarriers[.]" *Id.*, 3:34-36. The patent identifies the following as the three types of subcarriers: data subcarriers, pilot subcarriers, and silent subcarriers. *Id.*, 3:37-43. The patent states that "[t]he data subcarriers can be arranged into groups called subchannels to support scalability and multiple-access." *Id.*, 3:44-45. Accordingly, the '941 patent explains that frequency subchannels are groups of data subcarriers. *Id.*

28. The WLAN system in Walton-'269 includes a communication channel with subcarriers but without subchannels like those described in the '941 patent. Walton-'269 explains that the "WLAN system employs OFDM to effectively partition the overall system bandwidth [the communication channel] into a number of (N_F) orthogonal *subbands* … also referred to as … *frequency*

channels." Ex. 1006 [Walton-'269] 5:33-36 (emphasis added). Walton-'269 further states that "each subband is associated with a respective *subcarrier* …." *Id.*, 5:37-38 (emphasis added). For example, Walton-'269 states that, in one embodiment, "the system bandwidth is 20 MHz," which is divided into 64 subbands (subcarriers), each having a bandwidth of 312.5 KHz. *Id.*, 6:6-8. In a preferred embodiment, 48 of those subbands are used for data, four are used for pilot, and the remaining subbands (DC and guard bands) are not used. *Id.*, 5:45-51.

29. This embodiment of Walton-'269, using terminology from the '941 patent, has a communication channel with 64 subbands ("subcarriers"), of which 48 are data subcarriers. Ex. 1006 [Walton-'269] 5:45-51; Ex. 1001 ['941 Patent] 3:33-43 ("The basic structure of a multi-carrier signal in the frequency domain is made up of *subcarriers*. Within a particular spectral band or channel, there are a fixed number of subcarriers, and there are three types of subcarriers: [*d*]*ata subcarriers* … [p]ilot subcarriers … and [s]ilent subcarriers.") (emphasis added in parenthetical).

30. Walton-'269 does not teach that data subbands or (again following the '941 patent's terminology) "data subcarriers" are arranged into groups, *i.e.*, subchannels. *Cf.* Ex. 1001 ['941 Patent] 3:44-45 ("The data subcarriers can be arranged into groups called subchannels to support scalability and multiple-

access.”). No such grouping of data subbands (data subcarriers) is taught by Walton-’269. Walton-’269 does discuss that “a control channel used for transmitting control information is partitioned into a plurality of subchannels” (Ex. 1006 [Walton-’269] Abstract) but those “subchannels” are different data structures than the “subchannels” described in the ’941 patent. Walton does not discuss arranging data subcarriers into subchannels and it is not obvious to a POSITA to extend subchannels from control channels to data channels.

31. I note that Dr. Ding does not allege that any such grouping exists in Walton-’269. Such a data structure that groups data subbands/subcarriers into subchannels is not found in the 802.11 standard on which Walton-’269 is based. Adding to Walton-’269 the frequency subchannels from Li would require reengineering its entire frequency grouping structure, along with its control mechanisms as well as losing compatibility with 802.11.

C. It Would Not Have Been Obvious To Combine Walton-’269 And Li.

32. Walton-’269’s WLAN/Wi-Fi system does not share the same concerns as Li’s cellular system. Li teaches that, in a cellular system, there are fast-moving “mobile subscribers” that rapidly travel within a cell and between cells (e.g., in a car); and there are “fixed subscribers,” some close to the base station and some at the cell boundaries. Ex. 1007 [Li] 15:52-59. The “subscriber and the base

station intelligently selects diversity clusters to mobile subscribers or fixed subscribers at cell boundaries, and coherence clusters to fixed subscribers close to the base station." *Id.*

33. A network like that taught in Walton-'269 does not have this mix of users. Most devices in a WLAN/Wi-Fi network like that taught in Walton-'269 are either stationary or move slowly. They tend to stay within the coverage area of the access point. Fast-moving users in a WLAN/Wi-Fi network like Walton-'269's are unusual. Instead, user devices are assumed to be fixed or nearly fixed close to the base station.

34. Incorporating Li's teachings of using diversity clusters and coherence clusters to accommodate both fast-moving and fixed subscribers in Walton-'269 would only benefit users that generally don't exist in Walton-'269's system (fast-moving users) to the detriment of the vast majority of users (fixed users). The modification would add additional overhead to the system that would otherwise be used for providing fixed and slow-moving users with higher throughput. Adding such overhead for an unnecessary implementation feature is the opposite of Walton-'269's goal of providing a "method and apparatus for providing an *efficient* control channel structure in a wireless communication system." Ex. 1006 [Walton-'269] Title.

35. Moreover, Dr. Ding does not articulate how an FCCH message would assign subchannels made out of multiple subbands (subcarriers) within the system of Walton-'269. Doing so would also require reconfiguring Walton-'269's frequency resources and control scheme, which would not be a simple task.

D. Opinions Regarding Airy.

36. The Petitioner cites to the Airy reference's Fig. 6, reproduced below.

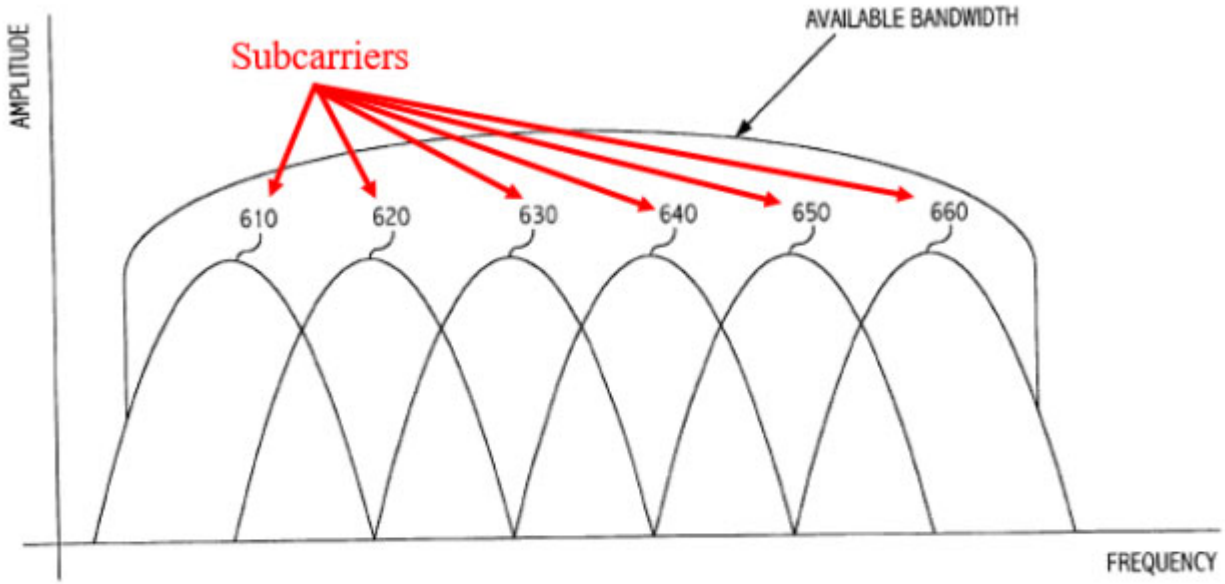

FIGURE 6

Pet., 77.

37. This figure shows subcarriers 610, 620, 630, 640, 650, and 660. *See* Ex. 1010 [Airy] 9:15-18. It does not, however, disclose whether these subcarriers

are grouped or, if they are grouped, how they are grouped. Neither this figure, nor any other section of Airy teaches that subcarriers are localized as taught in the ’941 patent (i.e., subcarriers in one subchannel that are adjacent or close to each other in the frequency domain, Ex. 1001 [’941 Patent] 7:1-3); or distributed as taught in the ’941 patent (i.e., subcarriers belonging to one user that are scattered in the frequency domain, *id.*, 7:6-7) as those terms are used in the ’941 patent. Airy’s Fig. 6 appears to show that the subcarriers are equally distributed across the channel width but does not teach either the localized or distributed configurations described in the ’941 patent.

38. The ’941 patent teaches localized or distributed configurations for one particular mobile station (Ex. 1001 [’941 Patent] 7:1-7); but Airy’s distribution in Fig. 6 is generic to OFDM and all mobile stations interacting with the system. Given this generic distribution of subcarriers there is no reason why Airy would have had a control message to indicate whether the subchannel configuration uses localized or distributed subcarriers.

39. Airy’s Figs. 7A-7C are maps of time slots and frequency blocks. *See* Ex. 1010 [Airy] 9:31-33; 10:3-8; 10:11-16. These frequency blocks may be assigned to subscribers but Airy does not detail how these frequency blocks are selected or what frequencies they include. Airy also does not teach how to build

these maps as opposed to how to use them. There is no indication that Airy considered the movement and speed of the mobile stations, like the inventors of the '941 patent did.

E. Opinions Regarding PCT819.

40. 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.*, Ex. 1001 ['941 Patent] 6:63-65. Alternatively, multiple antennas can be used to improve transmission robustness by transmitting the same data from each antenna – scheme sometimes called transmission diversity. *See e.g.*, Ex. 1001 ['941 Patent] 6:60-62; *see also* Ex. 2002 [Derryberry] 69 ("Transmit diversity … reduces the impact of fading by offering multiple independent copies of the digitally modulated waveform at the receiver, where the chance that all copies are simultaneously in a fade is very small."). PCT819 describes a MIMO communication system. *See, e.g.*, Ex. 1009 [PCT819] ¶ 1007. Thus, there is no reason for the base station to send a parameter indicating to the mobile station that it should use MIMO. PCT819 does not disclose transmission diversity scheme as an alternative to MIMO but rather teaches that a MIMO system can use time diversity, frequency diversity, and spatial diversity.

41. **INTENTIONALLY LEFT BLANK**

VI. OPINIONS WITH RESPECT TO ISSUES IN THIS PROCEEDING

A. 802.16a

42. The primary reference for Ground 1 of the Petition is the combination of 802.16a-2001 [Ex. 1005] and 802.16a-2003 [Ex. 1006]. Dr. Wilson states that "a POSITA would have understood 802.16a-2001 and 802.16a-2003 to be considered as a single document based on the explicit statements in 802.16a-2003." Ex. 1003 [Wilson Decl.] ¶ 170. She refers to these standards together as "802.16a." *Id.*, ¶ 172. For the purposes of this declaration I will accept her conclusion on this point as correct and, like her, will refer to these documents together as "802.16a." Note that when I cite to 802.16a, I will refer to the original page numbers printed on the pages of the documents, rather than the new page numbers added in the exhibits at the middle of the bottom margin of each page.

43. The 802.16a reference discloses a frame control header ("FCH") that contains a DL-MAP message. Ex. 1006 [802.16a-2003] 184 ("The FCH is transmitted at the beginning of each frame. It is a data structure that contains the DL-MAP message"). The DL-MAP is described in the following table:

Table 116bp—OFDMA DL-MAP_Information_Element format

Syntax	Size	Notes
DL-MAP_Information_Element() {		
DIUC	4 bits	
if (UIUC == 15) {		
Extended DIUC dependent IE	variable	AAS_DL_IE()
} else {		
OFDM Symbol offset	10 bits	
Subchannel offset	6 bits	
No. OFDM Symbols	10 bits	
No. Subchannels	6 bits	
}		
}		

Ex. 1006 [802.16a-2003] 188. Here, "**DIUC**" is a "Downlink interval usage code used for the burst." *Id.* "**OFDM Symbol Offset**" is "The offset of the OFDM symbol in which the burst starts." *Id.* "**Subchannel offset**" is "The lowest index OFDM subchannel used for carrying the burst." *Id.* "**No. OFDM symbols**" is "The number of OFDM symbols that are used (fully or partially) to carry the DL PHY Burst." *Id.* "**No. of subchannels**" is "The number of OFDMA subchannels with subsequent indexes, used to carry the burst." *Id.*

44. Dr. Wilson identifies five items within the DL-MAP as "transmission parameters" within that control message as claimed. Ex. 1003 [Wilson-Decl.] ¶¶ 216-220; *see also* Pet., 45 ("Specifically, DL-MAP specifies a burst profile (DIUC value), OFDM Symbol offset, subchannel offset, number of OFDM symbols, and

number of subchannels for a specific DL burst."). These items are shown in 802.16a's Table 116bp I just reproduced above, which appears to refer to them as information elements. However, I disagree that these items are "transmission parameters allocated to the mobile station" as claimed. Even if they are transmission parameters, they are allocated to bursts, not the alleged SSs.

45. A burst, as used in the telecommunications field, describes a unit of transmitted data. *See* Ex. 2006 [Newton-Dictionary] 126 ("Burst: In data communication, a sequence of signals, noise, or interlace counted as a unit in accordance with some specific criterion or measure"); Ex. 2008 [McGraw-Hill-Dictionary (2002)] 301 ("A group of bits of characters that are transmitted together as a unit"). 802.16a defines a "burst profile" as a "[s]et of parameters that describe the uplink or downlink transmission properties ***associated with an interval usage code***." Ex. 1005 [802.16a-2001] 5. In my opinion these meanings are consistent with how the ordinary artisan at the time the claimed invention was made would have understood a "burst" to describe here.

46. Dr. Wilson has not cited to any evidence in the DL-MAP, or anywhere else in the FCH, 802.16a generally, or anywhere else that links 802.16a's bursts to particular SSs, which she asserts to be the "mobile stations" of the claims. Each element within the DL-MAP is tied to a particular burst rather

than a SS. Ex. 1006 [802.16a-2003] 188. As such, I am unaware of any basis on which one could possibly conclude that, from the point of view of an ordinary artisan at the time of the invention and in light of the '941 patent's disclosure, the FCH described in 802.16a could be a "control message [that] contains transmission parameters ***allocated to the mobile station***" as recited in the claims. *See* Ex. 1001 ['941 Patent] cls. 1, 6.

47. 802.16a has a quite different method of allocating transmission parameters than the one claimed in the '941 patent. The claims require "the control message contains transmission parameters allocated to the mobile station." Ex. 1001 ['941 Patent] cls. 1, 6. In contrast, 802.16a uses the DL-MAP within the FCH to allocate transmission parameters to a set of preset downlink bursts rather directly to the supposed "mobile stations." *See* Ex. 1006 [802.16a-2003] 188. Each SS (which Dr. Wilson asserts constitutes the claimed "mobile station") using 802.16a must read all downlink bursts it is able to read. *See* Ex. 1005 [2001-802.16a] 217. 802.16a states that, "[e]ach SS receives and decodes the control information of the downlink and looks for MAC headers indicating data for that SS in the remainder of the downlink subframe." *See id.*, 220. Since this teaches that the SS should look at multiple MAC headers in the "remainder of the downlink subframe," a POSITA would recognize that an individual SS looks within each

burst to see whether the burst has its address. *See id.*, 24, 220. The SS then discards the data in the burst if the MAC header is addressed to a different SS. *See id.*, 24. Thus, in 802.16a the transmission parameters (such as the antenna transmission scheme or subchannel configuration) are, in my opinion, allocated by downlink burst and thus not "allocated to the mobile station" as required by the claims. *See* Ex. 1001 ['941 Patent] cls. 1, 6. Moreover, to the extent that the data in the bursts are assigned to individual SSs, this assignment is done without the involvement of FCH, the supposed "control message."

48. The '941 patent contains many extended discussions of how "[t]he ***adaptation process adjusts*** the allocated modulation schemes, coding rates, pilot patterns, power levels, spatial processing schemes, subchannel configurations, etc. ***in accordance with the transmission channel state and condition***, for improving system performance and/or capacity." Ex. 1001 ['941 Patent] 3:66-4:4; *see also id.*, 6:50-53; 7:10-13; 7:50-58. Differing channel conditions is the primary reason disclosed in the patent for adapting transmission parameters to be specific to each mobile station. *Id.*, 2:33-41. It teaches that this provides many advantages, including "better throughput." *Id.*, 4:62-64. A POSITA would understand that other advantages include better efficiency when there are a small number of users in the system with widely different capabilities or a wide distribution of potential

channel conditions. Adapting to individual operating conditions is especially advantageous when there is a wide distribution of mobile station capabilities or other conditions that do not occur in a consistent or predictable way. Thus, a POSITA reading the claims would understand that adaptation to mobile station-specific operating conditions is a primary reason for the recited "mobile station-specific transmission parameters." *Id.*, cls. 1, 6, 8, 13.

49. In 802.16a the "transmission parameters" identified by Dr. Wilson (such as the start and end of a burst, the selection of STC or AAS-enabled traffic, and the selection of distributed-carrier or adjacent-carrier) are allocated by downlink burst. Ex. 1005 [200-802.16a] 115. Dr. Wilson has not identified any evidence that they can be adapted to "mobile station-specific operating conditions." Instead, the 802.16a reference predefines bursts with certain properties and then allows the SSs to switch between bursts if the particular bursts they are assigned do not provide the appropriate channel characteristics (as embodied in the carrier to noise and interference ratio). *Id.* Thus, a POSITA would understand that the 802.16a reference does not describe "mobile station-specific transmission parameters" as that term is used in the '941 patent.

50. To offer an approximate analogy for purposes of clarifying the relevant comparison I am making between the "mobile-specific transmission

parameters" described in the claims and the relied-upon disclosures of 802.16a, the "mobile-specific transmission parameters" might be thought of as analogous to a private chef who can tailor a diner's meals according to her taste preferences and allergies. By contrast, the relied-upon teachings of 802.16a provides a set of boxed lunches from which a diner can select, but offers no way of altering the lunch boxes. In this way 802.16a is like the less flexible prior art systems that the '941 patent distinguishes in its specification. Furthermore, 802.16a only provides for 12 types of bursts. Ex. 1006 [2006-802.16a] 124. Thus, all of the SSs served by the base station must choose between this limited selection of bursts. Turning back to the boxed lunch analogy, there are a maximum of 12 types of lunch boxes so if none of them are gluten-free, then a diner with celiac disease would not be able to eat.

51. The claims also recite "transmission parameters" that include "an antenna transmission scheme and a corresponding subchannel configuration, the antenna transmission scheme comprising a transmission diversity scheme or a multiple-input multiple-output (MIMO) scheme and the corresponding subchannel configuration characterized by distributed subcarriers or localized subcarriers in the frequency domain." Ex. 1001 ['941 patent] cls. 1, 6, 8, 13. Dr. Wilson contends that 802.16a's STC meets the claimed "transmission diversity scheme,"

and contends that 802.16a's AAS meets the claimed "MIMO scheme." Ex. 1003 [Wilson-Decl.] ¶¶ 221-229; *see also* Pet., 47-48. Dr. Wilson further contends that 802.16a's distributed-carrier permutation meets the claimed "distributed subcarriers" subchannel configuration, and that 802.16a's adjacent-carrier permutation meets the claimed "localized subcarriers." *Id*., ¶¶ 249-263; *see also* Pet., 55-56.

52. 802.16a teaches that enabling either the STC or AAS option requires ***all*** subsequent bursts in that group to use that option. Ex. 1006 [2003-802.16a] 189 ("Within a frame, ***the switch from non-AAS to AAS-enabled*** traffic is marked by using the extended DIUC = 15 with the AAS_DL_IE() to ***indicate that the subsequent allocations***, until the start of the first UL-MAP allocation using TDD, and until the end of the frame using FDD, ***shall be for AAS traffic***."); *id.* ("In the DL-MAP an STC enabled BS (see 8.5.8) may transmit DIUC=15 with the ***STC_IE() to indicate that the subsequent allocations shall be STC encoded***.").

53. 802.16a does not allow for selecting the distributed-carrier permutation or adjacent-carrier permutation for non-AAS traffic, including STC. "The BS shall always return to the distributed carrier permutation for broadcast (***non-AAS***) traffic." Ex. 1006 [2003-802.16a] 200. This indicates that STC, which is not AAS, must always use distributed carriers. Thus, the selection of the

802.16a's distributed carrier permutation or adjacent carrier permutation can only be made if AAS (the contended MIMO option) is enabled. Ex. 1006 [2003-802.16a] 200 ("A BS using the AAS option may change from the 'distributed carrier permutation' described in 8.5.6.1 and 8.5.6.2 to the 'adjacent carrier permutation'"). Dr. Wilson has not identified, and I have not found, any disclosure in 802.16a that selection between the distributed carrier permutation or adjacent carrier permutation is possible if STC (the contended "transmission diversity scheme") is enabled.

54. If AAS (the contended MIMO option) is enabled and the adjacent carrier permutation is selected in 802.16a, then all the rest of the bursts in that group must also use that option. *Id.* ("After this change, the ***BS shall only transmit/receive*** AAS-enabled traffic ***using the adjacent carrier permutation*** until the end of the frame.").

55. As already discussed, 802.16a defines the supposed "transmission parameters" for bursts rather than for individual SSs. *See* Ex. 1006 [2003-802.16a] 188. It would be difficult, if not impossible, under 802.16a's teachings to configure these "transmission parameters" for bursts for the purpose of accounting for operating conditions of a specific SS. This is because of the fact that, as I have already discussed above, when 802.16a selects a particular transmission parameter

for one burst in a group of bursts, all subsequent bursts in that group must also use that transmission parameter. For example, if in a group of 12 bursts starting with the default setting of using a single antenna, burst #3 needed to use AAS (the contended "multiple-input-multiple-output (MIMO) scheme"), then bursts #4-12 would also need to use AAS. Ex. 1006 [2003-802.16a] 189. It would be impossible for any of these subsequent bursts in the group to use STC (the contended "diversity scheme") even if STC were appropriate for the SSs assigned to these subsequent bursts. Indeed, it appears to be impossible for a group of bursts to use both AAS and STC. *See id.*

56. In its subchannel configuration, 802.16a is even less flexible than that. The "adjacent-carrier permutation" is only available if AAS is selected. *Id.*, 189, 200. Thus, as far as 802.16a discloses, it would be impossible, for example, for a mobile carrier to use both 802.16a's alleged "transmission diversity scheme" (contended to be 802.16a's STC option) and alleged "localized subcarriers" (contended to be 802.16a's adjacent-carrier permutation). Additionally, once one subchannel configuration is selected for a burst in a group, all subsequent bursts in the group must also use that configuration. *Id.*, 189. This lack of flexibility would make it very difficult, if not impossible, to select transmission parameters for the bursts based on the channel conditions of the SSs assigned to those bursts. This

would further lead a POSITA to understand that the transmission parameters for 802.16a's bursts would not be "mobile station-specific."

57. In sum, for the reasons I have discussed above, 802.16a does not allow for STC, the alleged "antenna transmission scheme," that is contended to be a "transmission diversity scheme" as claimed, to be selected when AAS_DL_IE() is enabled. *See* Ex. 1006 [2003-802.16a] 189, 200. Moreover, 802.16a does not enable selection of its distributed carrier permutation or adjacent carrier permutation (which are the only elements contended to satisfy the "corresponding subchannel configuration characterized by distributed subcarriers or localized subcarriers in the frequency domain" limitation) when AAS_DL_IE() is enabled. Thus, 802.16a's "transmission parameters" are shown to be capable of indicating "a corresponding subchannel configuration" only, at most, when the AAS, the alleged "multiple-input multiple-output (MIMO) scheme," is selected. Thus, a POSITA would understand that when AAS_DL_IE() is enabled, 802.16a does not have an "antenna transmission scheme ***comprising*** a transmission diversity scheme," even under the terms of the Petition's own theory of Ground 1.

B. Li017

58. The remaining grounds after Ground 1 of the petition rely primarily on the Li017 and Walton019 references.

59. Li017 groups its subcarriers into clusters, which form the alleged "subchannel configuration." Ex. 1009 [Li017] ¶ 40 ("A cluster, such as cluster 102, is defined as a logical unit that contains at least one physical subcarrier, as shown in FIG. 1A."). These clusters, according to Li017, are either "coherence clusters, containing multiple subcarriers close to each other" or "diversity clusters, containing multiple subcarriers with at least some of the subcarriers spread far apart over the spectrum." *Id.*, ¶ 111. Li017's base station takes into account the subchannel configurations of other surrounding base stations and the ratio of mobile to fixed subscribers when setting up these clusters but as far as I am pointed to, and as far as I have found, it never teaches adjusting the clusters in a "mobile station-specific" manner based on the channel conditions of the subscribers.

60. Li017 provides examples of how the spectrum is divided up into diversity and coherence clusters. Ex. 1009 [Li017] Fig. 9, 10, 12. It appears in the figures of Li017, and the description accompanying the figures, that subchannels assigned to diversity clusters are uniformly distributed across the available spectrum, as are the groups of subchannels assigned to coherence clusters. If the subchannels were grouped based on the operating conditions of the individual subscribers, one would not expect them to be regularly distributed across the

available spectrum. These figures, therefore, do not teach or suggest that Li017's subchannels are grouped based on "mobile station-specific" channel conditions.

61. Li017 teaches that its subchannels configuration is significantly influenced by the channel coherence bandwidth. Ex. 1009 [Li017] ¶ 111. The channel coherence bandwidth referred to in Li017 is a function of the physical environment of the base station and the aggregate conditions of the subscribers, rather than the operating conditions of any individual mobile station. Notably, Li017 does not teach mobile-station specific channel coherence bandwidth. Rather, it teaches at most only a single system-wide coherence bandwidth value, identifying a "typical" value of channel coherence bandwidth "for many cellular systems." *Id.*, ¶¶ 93, 111.

62. Li017 also teaches that the subchannel configuration of one cell can affect the performance of other cells. Ex. 1009 [Li017] ¶ 113. The POSITA would thus understand that any change to a base station's clusters in Li017 would have the potential to deleteriously increase interference in Li017's adjacent cells. Given that each individual base station must take into account potential interference from surrounding base stations, it would generally need to take into account more variables in adjusting the clusters according to the operating conditions of the individual subscribers. As such it would be more difficult, or

impossible, to successfully implement "mobile station-specific transmission parameters" according to Li017's teachings.

63. Li017 teaches that the aggregate ratio of fixed to mobile receivers is used to change the ratio of diversity to coherence clusters. Ex. 1009 [Li017] ¶ 126. It does not, however, teach that the operating conditions of particular subscribers should be considered in configuring the clusters.

64. Li017 provides detailed instructions for subcarrier clustering. For example, it describes how to determine the closeness of multiple subcarriers in coherence clusters and the spread of subcarriers in diversity clusters. Ex. 1009 [Li017] ¶ 111. Li017 also instructs that the configuration of adjacent cells should be taken into account when the subchannels are assigned to clusters. *Id.*, ¶ 113. Also, the aggregate number of fixed versus mobile subscribers may be taken into account. *Id.*, ¶ 126. These are all base station-specific transmission parameters, in that they are determined based on the conditions of the base station, its assigned frequency band, its neighboring cells, and its overall population of subscribers. I find nothing in Li017 suggesting that channel conditions of individual subscribers should be used to determine the subchannel configuration. Thus, I find nothing in Li017 that suggests the "mobile station-specific transmission parameters" claimed in the '941 patent.

65. The ’941 teaches and its claims require “mobile station-specific transmission parameters.” Ex. 1001 [’941 Patent] cls. 1, 6, 8, 13. Li017 uses a different approach than the “mobile station-specific parameters [that] indicate … a corresponding subchannel configuration.” *Id.* Instead of tailoring the subchannel configuration to the individual characteristics of one or more subscribers, Li017 attempts to assign each subscriber to the pre-existing cluster that provides it with the best performance. *See* Ex. 1009 [Li017] ¶ 46. In my opinion, there are benefits and drawbacks to each of these approaches, and the Petition shows no reason for the ordinary artisan at the time the claimed invention was made to modify Li017’s approach of assigning specific subscribers to pre-existing clusters for best performance, to be like the ’941 patent’s different approach of creating a tailored subchannel configuration for one or more specific mobile stations based on their specific channel characteristics at the time. While a mobile station-specific subchannel configuration may yield better performance, it likely requires more overhead in the control signals. Li017’s fixed subchannel configuration may not be as efficient in some ways, but it requires less computation and overhead in other ways, and likely overall, than the approach described in the ’941 patent. The point, however, is that Li017’s approach is not the same as the approach using “mobile station-specific transmission parameters” claimed and disclosed in the ’941 patent.

66. In other words, while Li017 may select that a particular subscriber should be using a particular cluster, that does not make that cluster's parameters "mobile station-specific," and it does not mean that the selection of that cluster renders its parameters "mobile station-specific transmission parameters." It simply means that the cluster, with its specific parameters, is now to be used by that subscriber. This may be thought of as analogous to an assignment of cluster-specific transmission parameters to the mobile station. It is not an assignment of mobile station-specific parameters to the mobile station.

C. Walton040

67. Walton040 [Ex. 1008] discusses scheduling and channel assignment at length, including dedicated sections of the patent specification starting at paragraph 384 to 539; indeed, Walton040 includes almost 11 pages of text dedicated to scheduling methods. Walton040's scheduling and channel assignment methods are different from those of Li017. Li017 defines a method of scheduling where the available subcarriers are grouped into clusters. *See* Ex. 1009 [Li07] Fig. 13, ¶ 89. A subscriber may make measurements on some or all of the subcarriers and report the information back to the base station. *See Id.*, ¶ 26 . The method of Li017 may reduce the amount of overhead required to report channel state information (CSI) and to schedule since reporting and scheduling is done for

clusters of subchannels. However, this also means the system will not be able to maximize performance across any channel variation in the subcarriers within a cluster.

68. Dr. Wilson fails to provide any motivation to replace the detailed methods for scheduling provided in Walton040 with those provided in Li. Dr. Wilson's, and the Petition's, sole reason that the POSITA would supposedly have found it obvious to modify Walton040 to add Li017's alleged "distributed"/"localized" subchannel configuration method is that Walton040 does not explicitly describe how to assign or group subcarriers and so "[a] POSITA would have therefore looked to the prior art, e.g., Li017, for determining how to assign or group subcarriers and how to inform a mobile station of the subcarriers it should use to receive information." Ex. 1003 [Wilson Decl.] ¶¶ 352 (asserting "that while Walton040 describes transmitting OFDM symbols on any number of subcarriers N_F to different terminals, Walton040 does not explicitly describe how to assign or group subcarriers for use in the multi-carrier based MIMO system utilizing OFDM" (citing Ex. 1008 [Walton040] ¶¶ 47-48, 52, 71, 91, 129-135, 140, 170-171, 283, 293, 323, 325, 332-333) and "also does not explicitly disclose how the base station informs a mobile station of the subcarriers it should use to receive information"), 353; *see* Pet., 77-78. However, I disagree with Dr. Wilson's

assertions here. As I have already explained above, Walton040 discusses scheduling and channel assignment at great length, including dedicated sections of the patent specification starting at paragraph 384 to 539. I note that Dr. Wilson fails to cite any of the paragraphs 384 to 539 of Walton040 in making her assertions.

VII. CONCLUSION

68. I hereby declare that all statements made herein of my own knowledge are true and all statements made herein on information and belief were and are believed by me to be true, and that all statements herein were and are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that any such willful false statements may jeopardize the validity of the application or any patents issued thereon.

DATED: February 8, 2023 SIGNED: _____

William P. Alberth, Jr.