

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY,
Petitioner,

v.

NEO WIRELESS LLC,
Patent Owner.

Case IPR2023-00763
Patent 10,447,450

EXHIBIT 2023
SECOND 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 *curriculum vitae* attached as Exhibit 2002, 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. 10,447,450 (“the ’450 patent”) in IPR2023-00763. I have been retained by Neo Wireless LLC (“Neo”), the Patent Owner in the above proceedings. The Petitioner is Ford Motor Company. (“Ford”).

3. For my work on this case, I am being compensated for my time at my standard hourly rate. 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.

5. I previously submitted a first declaration in this matter as Exhibit 2001, the content of which is hereby incorporated by reference as if fully set forth herein.

II. QUALIFICATIONS

6. 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 '450 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.

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 is attached with this Report as Exhibit 2002.

III. LEGAL STANDARDS

13. I am not a lawyer, and I do not intend to offer any opinions as to the interpretation of the law. When considering the '450 patent and stating my opinions, I rely on the following legal standards as described to me by the attorneys for Neo Wireless.

A. Priority Date Of Patent.

14. I understand that the analysis of alleged obviousness of the Patent should be performed from the perspective of a POSITA as of the priority date of the Patent. Through a series of continuations, the Patent claims priority to September 28, 2005. My opinions in this matter are from the perspective of a POSITA as of that date; however, my opinions do not change if the priority date is slightly changed.

B. Level Of Ordinary Skill In The Art.

15. My opinions in this declaration are based on the understandings of a person of ordinary skill in the art, as of the time of the invention. 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 claim of the '450 patent.

16. I understand that various factors should be considered when determining the person of ordinary skill in the art in connection with a particular

patent. I understand that these factors include, without limitation, 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.

17. I am readily familiar with the level of ordinary skill in the art as of the priority date of the Patent. My qualifications at that time far exceeded that of a POSITA, and I had worked with, as well as supervised, many POSITA's throughout my work in the field.

18. Dr. Cooklev opines that a POSITA:

A POSA at the time of the earliest claimed priority date, September 28, 2005, would have 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.

Ex. 1003 [Cooklev-Decl.] ¶ 36.

19. For the purpose of this declaration, I apply the level of ordinary skill proffered by Dr. Cooklev. My opinions as stated in this declaration are valid even if the Board adopts a slightly different level of ordinary skill in the art.

C. Claim Construction.

20. I understand that claims in a patent-at-issue in an IPR are generally interpreted according to the district court-type claim construction.

21. I further understand that claim terms are interpreted as they would have been interpreted by a person of ordinary skill in the art at the time of the invention, in light of the specification and the patent's prosecution history in the patent office.

D. Obviousness Legal Standard.

22. 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 invention.

23. 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. Objective indicia of non-

obviousness may include, for example, commercial success of an embodiment, a long-felt need, skepticism, failure by others to find the solution provided by the claimed invention, copying by others of the subject matter of the claim invention, unexpected results of the claimed invention, acceptance of others and industry praise, and licensing of the patents.

24. I also understand that obviousness may be established under certain circumstances by combining or modifying the teachings of the prior art. However, I have been informed that a claim is not proved obvious merely by demonstrating that each of the elements was independently known in the prior art. I have been informed that many, if not all, inventions rely on building blocks already previously known, and claimed discoveries almost of necessity will likely be combinations of what is already known. I have been informed that it is important to identify whether a reason existed at the time of the invention that would have motivated a person of ordinary skill in the art in the relevant field to combine the known elements in the way the claimed invention does. 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.

25. 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.

26. 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.

27. 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.

28. 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.

IV. CLAIMS-AT-ISSUE

29. I understand that Petitioner has challenged claims 7 and 11 of the '450 Patent under a single ground of obviousness based on the combination of Park and IEEE 802.16-2004. Pet., 9.

30. Of the challenged claims, only claims 7 is independent. In this declaration, I have only been asked to address arguments relating to the independent claim and, therefore, I do not address dependent claim 11.

V. OPINIONS

A. Petitioner Has Not Shown A “Mobile Device” That Is Configured To Perform The Recited Claim Limitations.

31. Claim 7 recites a “mobile device configured to: receive an identifier from a base station in a cell in which the mobile device is operating”). Ex. 1001 ['450 Pat.] cl. 7.

32. I understand that Petitioner relies on the IEEE 802.16-2004 as modified by Park’s resource allocation scheme for the disclosure of the claims. Pet., 14 (“A POSA would have been motivated to combine the teachings of Park and 802.16-2004 as proposed ...”); Ex. 1003 [Cooklev-Decl.] ¶ 77 (“A POSA would have considered it obvious to implement Park using 802.16-2004.”).

33. For reasons stated below, it is my opinion that Petitioner has not shown that the combination of Park and IEEE 802.16-2004 disclose or render obvious a “mobile device” that is configured to perform the claimed limitations.

1. *For Claim Limitations That Must Be Performed By A “Mobile Device,” Petitioner Relies Upon Park Embodiments For Resource Allocation Within The AMC Area Of The Frame.*

34. Claim 7 recites that:

the mobile device configured to:

[1] receive an identifier from a base station in a cell in which the mobile device is operating; and

[2a] receive a signal containing information from the base station over a segment of time-frequency resource, [2b] ***the segment having a starting time-frequency coordinate and the segment comprising N time-frequency resource units within a time interval***, [2c] each unit containing a set of frequency subcarriers in a group of OFDM symbols, [2d] ***where N = 2, 4 or 8***; and

[3] recover the information from the received signal ***using the starting time-frequency coordinate and N*** in conjunction with the received identifier.

Ex. 1001 [’450 Pat.] cl. 7.

35. I understand that the parties have stipulated that the preamble of claim 7 is limiting. I also understand that a preamble is limiting when the body of the

claim relies on it as antecedent basis. For example, here, in limitation [1], “the mobile device” relies on the “mobile device” of the preamble as antecedent basis.

36. Limitation 2[b] recites “the segment having a starting time-frequency coordinate and the segment comprising N time-frequency resource units within a time interval.” Ex. 1001 [’450 Pat.] cl. 7. Limitation 2[d] recites “where N = 2, 4 or 8.” Petitioner relies on Park alone, arguing that “Park teaches both of these limitations.” Pet., 31. Specifically, as I will explain below, Petitioner relies upon the allocation mode 01 in Park’s embodiments that modify the DL_MAP IE for allocation of resources within the AMC area for the alleged disclosure of these limitations. Pet., 31-40.

37. Park explains that its invention modifies the syntax definition for the DL_MAP IE that is used for indicating resource allocation information for the AMC area. Ex. 1005 [Park] [0013]; *see also id.*, [0043] (“According to the present invention, to indicate resource allocation information of an AMC area, allocation units having mutually difference sizes and shapes are defined”); *id.*, [0013]-[0029] (explaining that Park modifies the resource allocation mode definitions in the DL_MAP IE for allocation resources within the AMC region); *id.*, [0055] (“Table 2 shows DL(/UL)-MAP IE (Information Element), which indicates resource allocation information of the AMC area according to an embodiment of the present invention.”); *see also id.*, [0073]-[0074].

38. Park explains that in its invention, the entire AMC resource region is indexed per a pre-defined allocation unit. *Id.*, [0043]-[0046]. For example, Park Figure 3C, reproduced below, shows the region indexed with allocation units 1 to M-1.

INDEX 0	INDEX 1	INDEX 2	INDEX 3
INDEX 4	INDEX 5	INDEX 6	INDEX 7
⋮			
INDEX M-8	INDEX M-7	INDEX M-6	INDEX M-5
INDEX M-4	INDEX M-3	INDEX M-2	INDEX M-1

FIG.3C

39. Park then describes three allocation modes, 00, 01 and 10, for allocating the indexed allocation units to subscribers. *Id.*, [0064]-[0071]; Figs. 5A-5C. As relevant here, in allocation mode 01, the region assigned to a subscriber is defined by “the index value of the start allocation unit and the total number of allocation units.” *Id.*, [0067].

40. Park’s Figure 5B, reproduced below, provides an example for allocation mode 01, where the index number of the start allocation unit is j, and the number of allocation units is 3:

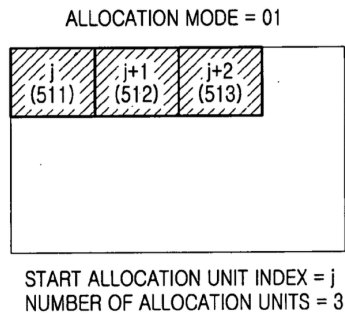


FIG.5B

41. Petitioner relies upon allocation mode 01 in Park embodiments described above for limitations 2[b] and 2[d]. Pet., 32-33. Specifically, Petitioner maps Park’s “start allocation unit index” to the claimed “starting time-frequency coordinate,” and Park’s “number of allocation units” to the claimed number N of time-frequency resource units:

Specifically, in Park’s “allocation mode ‘01’,” Park’s “allocation region” (i.e., segment) has: (1) an “index value of the start allocation unit” (i.e., a one- dimensional starting time-frequency coordinate) that identifies the start of the allocation region and; (2) the total number of allocation units (i.e., N time-frequency resource units). Park [0066] (“In the allocation mode ‘01’, the corresponding allocation region can be indicated by using the index value of the start allocation unit and the total number of allocation units.”) (emphases added); *see also id.* [0053], [0070], cl. 4 (“allocation region is indicated by using an index value of a start allocation unit and a total number of allocation units”); Cooklev Decl. ¶¶ 162-170 (explaining that this is part of Park’s improvement to 802.16-2004, which uses two- dimensional starting

time-frequency coordinates (start symbol offset and start logical channel offset)).

Pet., 32-33; *see also* Pet., 33-34 (discussing Park Figure 5B).

42. Petitioner similarly relies upon Park’s embodiments for limitation 3, which recites “recover the information using the starting time-frequency coordinate, N, and the identifier.” Specifically, Petitioner argues that its ground discloses this limitation because the DL_MAP IE as disclosed in Park embodiments transmits the “start allocation unit index” and the “number of allocation units.” Pet., 45 (“Park discloses using a DL-MAP IE message with revised syntax to communicate the parameters the mobile device will use to recover the information from the received signal...[Park’s] modified DL-MAP IE includes “Start allocation unit index” (the claimed “starting time-frequency coordinate), “Number of allocation units” (the claimed “N time-frequency resource units”), and “RCID_ID” (the claimed “identifier”)). Petitioner argues that the subscriber uses these values to recover the information contained in the frame. *Id.*

43. Accordingly, Petitioner necessarily relies upon Park’s disclosed embodiments that modify the DL_MAP IE for allocating resources within the band AMC region of the frame.

2. *Park Expressly Teaches That Its Embodiments For Resource Allocation Within The AMC Area Of The Frame Are Only For “Fixed Subscribers.”*

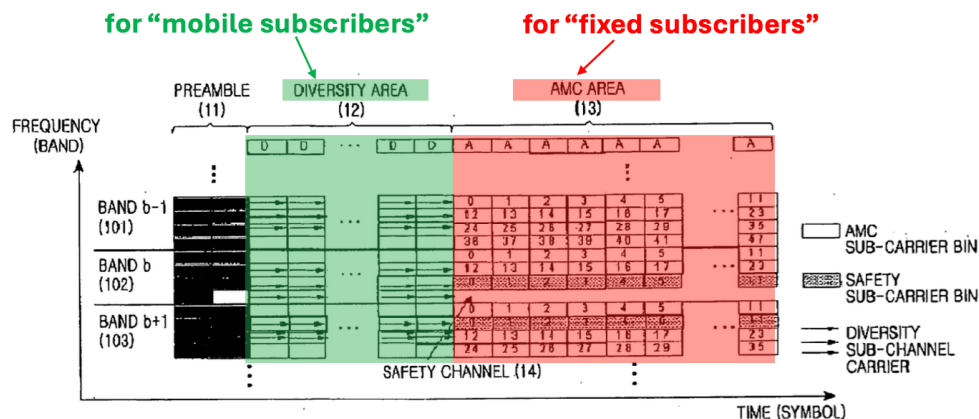
44. As I will explain in this section, Park expressly teaches that in a system such as WiBro that may support both mobile and fixed subscribers, Park’s embodiments only apply to fixed subscribers. Specifically, as I just explained, Petitioner relies on Park’s embodiments for allocating resources within the band AMC area of the frame. Park expressly teaches that the band AMC area of the frame, and therefore its embodiments, apply only to “fixed subscribers,” even though the network may otherwise support mobile subscribers. Therefore, Petitioner has not shown a “mobile device” configured to perform the recited claim limitations.

45. Park discloses a frame structure in its Figure 1, which Park states illustrates the frame structure for a WiBro system “or an IEEE 802.16 system applied to an OFDMA system.” *Id.*, [0007]. Park then explains that, in the frame structure of Figure 1, the frame area is divided into two mutually exclusive parts, one for “mobile subscribers” and one for “fixed subscribers:”

The *diversity area 12* is used for allocating resources *for mobile subscribers*, and *the AMC area 13* is used for increasing the transmission speed through a frequency-selective adaptive modulation *for fixed subscribers*.

Ex. 1005 [Park] [0011]; *see also id.*, [0010].

46. This is shown in the annotated version of Park’s Figure 1, where the diversity area allocated to mobile subscribers is shown in green, and the AMC area allocated to fixed subscribers is shown in red:



47. Park explains that its invention is for a modified resource allocation for the AMC area, which Park states is exclusively for “fixed subscribers.” Specifically, Park states that the DL_MAP IE “used for indicating resource allocation information of the AMC area in such a resource allocation structure is defined in Table 95 of the Institute of Electrical Engineers (IEEE) 802.16-2004 standard.” Ex. 1005 [Park] [0013]. The DL_MAP IE referenced by Park is an Information Element that informs the subscriber of the location within the band AMC region where the data for that specific subscriber is located. I also agree with Petitioner’s expert, Dr. Cooklev, that Park’s reference to Table 95 is intended to refer to Table 97 of IEEE 802.16-2004. Ex. 1003 [Cooklev-Decl.] ¶ 60; *see also*

Ex. 1006 [802.15-2004] 110 (“The format of Compact DL-MAP IE for Band AMC Subchannel is presented in Table 97.”).

48. Park explains that the “Allocation Mode” variable in its prior art DL_MAP IE message for the AMC area defined three modes of allocation, 00, 01 and 10. Ex. 1005 [Park] [0016]-[0027]. Park’s invention then, in Park’s embodiments, re-defines the three allocation modes for the DL_MAP IE for the AMC area according to Park’s invention. *Id.*, [0064]-[0071]; [0055]; Table 2; Fig. 5.

49. Park is clear that its resource allocation scheme is for the band AMC area of the frame. First, as explained above, the Information Element that Park modifies is explicitly the DL_MAP IE for the band AMC area. Second, Park elsewhere states that its embodiments relate to the AMC area allocation. *See, e.g., id.*, [0043] (“According to the present invention, to indicate resource allocation information ***of an AMC area***, allocation units having mutually different sizes and shapes are defined ...”); [0055] (“Table2 shows DL(/UL)-MAP IE (Information Element), which indicates resource allocation information ***of the AMC area*** according to an embodiment of the present invention.”); [0073]-[0074] (discussing the benefits of Park invention for the AMC region).

50. Notably, Park never refers to the subscriber stations in its embodiments as “mobile.” The only place where Park ever refers to “mobile

subscribers” is in the background of its invention, where it explains that the system overall may support mobile subscribers, and to do so, the frame area is divided between fixed and mobile subscribers. Ex. 1005 [Park] [0005], [0011]. But then Park proceeds to disclose its invention for the fixed subscribers within that system, as I explained above.

51. Therefore, Petitioner has not shown how Park discloses a “mobile device” configured to perform the recited claim limitations, where the embodiments of Park, which Petitioner has relied upon, are exclusively for the AMC area of the frame, which Park states is for “fixed subscribers.”

52. It appears from Dr. Cooklev’s declaration that he also agrees with my analysis that Park’s embodiments are for the band AMC region of the frame. *See, e.g.*, Ex. 1003 [Cooklev-Decl.] ¶ 113 (“As described above, the DL-MAP is for resource allocation in an AMC area of the OFDMA frame.”); ¶ 115 (“As Park indicates, its improvements to 802.16-2004 relate to the application of the DL-MAP IE (highlighted in blue) to the optional AMC zone (highlighted in orange).”); ¶ 139 (“Table 97, DL- MAP IE format for band AMC”) (citing Ex. 1006 [802.16-2004] 110); ¶ 159 (“In Park, the indexed total resource region is the ‘AMC area’ for which the allocation information is provided via the DL-MAP, as described above.”); ¶ 189 (“Park (which, as described above relates to AMC)”; ¶ 206 (“Park teaches that DL-MAP IE is used to allocate resources resource information in the

AMC area.”); ¶ 207 (“when Park and 802.16-2004 apply the modulation and coding scheme to an AMC area”).

53. Park’s teaching that the band AMC area modified by Park only supports fixed subscribers comports with the extrinsic evidence, WiBro and IEEE 802.16(e).

54. For example, Dr. Cooklev, Petitioner’s expert, has authored a book titled “*Wireless Communication Standards, A Study Of IEEE 802.11, 802.15 and 802.16.*” Ex. 2025 [Cooklev-Book]. In his book, Dr. Cooklev explained that IEEE 802.16-2004 did not support mobile stations. Ex. 2025 [Cooklev-Book] 332 (“IEEE 802.16’s major weakness is that it does not support mobility.”) (I explain more on that in the following section). Dr. Cooklev’s book then explained that the 802.16(e) committee was established to add mobility to 802.16-2004, and one of the changes they would need to make to the 802.16-2004 standard in order to support mobility was to divide the frame into two regions, one for “fixed stations” and one for “mobile stations”:

Another initiative within IEEE 802.16 is to support mobility. Task Group 802.16e was established to support this technology [B30], [B97], [B99], [B131]. *The solution that will be developed by 802.16e will likely be devoting one part of the superframe for fixed stations and one part for mobile stations.*

Ex. 2025 [Cooklev-Book] 331.

55. I understand that Dr. Cooklev also testified at his deposition that dividing the frame into two areas, one for mobile subscribers and one for fixed subscribers, was implemented as a part of the solution in IEEE 802.16(e) to add mobility to IEEE 802.16-2004. Ex. 2024 [Cooklev-1st-Depo.] 71:3-6 (“Q. To your knowledge, is your proposed likely solution was the solution ultimately adopted by 802.16(e)? A. I think, yes.”); 62:3-7 (“Q. Does 802.16-2004 divide a superframe between fixed and mobile stations? A. No, I—I don’t think the 2004 version of the standard has the superframe—this type of a superframe. It was brought by 16(e).”).

56. This division of the frame into two mutually exclusive areas, one for mobile stations and one for fixed stations, is similar to Park’s Figure 1, where the AMC area is exclusively for “fixed subscribers.”

57. Similarly, WiBro also confirms the division of the frame into diversity (for mobile subscribers) and band AMC (for fixed subscribers) regions. WiBro is based on IEEE 802.16(e). 2027 [WiBro-Article] 2 (“Specification of WiBro is somewhat similar to IEEE 802.16e ...”). I understand that Dr. Cooklev also agrees that WiBro was based on IEEE 802.16(e). Ex. 2024 [Cooklev-1st-Depo.] 36:11-13 (“So WiBro, they said, well, we’ll take draft two of 802.16(e), and that will be the foundation of the WiBro technology.”).

58. In order to support mobility, WiBro also divides the frame into two mutually exclusive areas, a diversity area for mobile subscribers, and an AMC area for fixed subscribers:

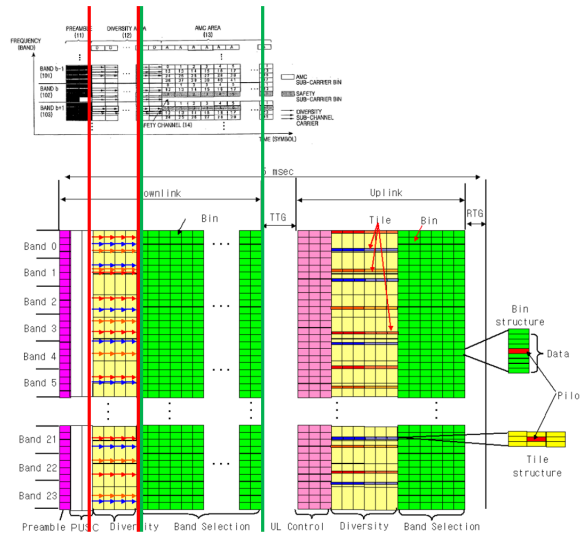
Specification of WiBro is summarized in table 1. Fig.1 shows the frame structure... Sub-channels are flexible for band selection and diversity. ***Fixed wireless indoor service is supported with band selection mode*** to maximize multi-user scheduling gain by utilizing channel selectivity for stationary users. And ***mobile wireless outdoor service is supported with diversity mode*** to maximize wideband frequency diversity and temporal diversity gain for mobile users.

Ex. 2027 [WiBro-Article] 1-2.

59. The article then produces a figure showing the frame structure for WiBro, which is similar to Park's Figure 1—showing a diversity area for mobile stations, and a band AMC area for fixed stations—as shown in the comparison of the two figures below:

diversity area for
mobile subscribers

band AMC area for
fixed subscribers



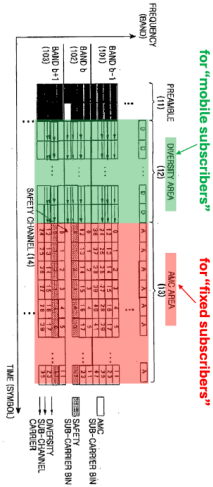
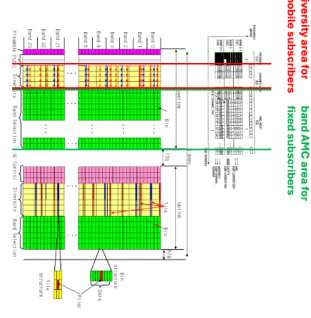
Ex. 1005 [Park] Figure 1

Ex. 2027 [WiBro-Article] Figure 1

60. I understand that Dr. Cooklev at his deposition also similarly testified that the frame structure of WiBro as shown in Exhibit 2027 is similar to Park's Figure 1, and both divide the frame into two regions, a diversity region for mobile subscribers, and a band AMC region for fixed subscribers. Ex. 2024 [Cooklev-1st-Depo.] 107:24-108:18. ("If you look at Figure 1 [of Ex. 2027], we see a figure. This figure is consistent with Figure 1 of Park. And we see there is a—and I think earlier we were—we were talking about different zones. So we see at the bottom—at the bottom we see a—so there is a diversity zone. This diversity zone is the zone dedicated to mobile users. There is a zone that here it's referred to as band selection. This is the zone that is for fixed users. So now this—so you were asking about that passage. And if we look, fixed wireless is supported with band selection mode. So I think here band selection mode is that—is that part of the

frame called “band selection.” That’s for stationary users. And you have diversity mode, again, that part of the frame which is directed to mobile users.”)

61. Combining all of the above, as summarized in the table below, IEEE 802.16(e), Dr. Cooklev’s book, WiBro and Park all uniformly teach that in a system that may otherwise support mobile devices, the band AMC area (and thus Park’s invention) only supports fixed subscribers:

Park Frame divided into diversity (mobile) and AMC (fixed)	802.16(e)/Cooklev Book Frame divided into “fixed stations” and “mobile stations”	WiBro Frame divided into diversity (mobile) and band (fixed)
Ex. 1005 [Park] Fig. 1 (annotations added)  Ex. 1005 [Park] [0007] (“FIG.1 is a view illustrating <i>a frame structure of a WiBro</i> stands for Wireless Broadband (WiBro) system or an <i>IEEE802.16 system</i> applied to an OFDMA system.”) Ex. 1005 [Park] [0011] (“<i>The diversity area 12 is used for allocating resources for mobile subscribers, and the AMC area 13 is used</i> for increasing the transmission speed through a frequency-selective adaptive modulation <i>for fixed subscribers.</i>”)	Ex. 2025 [Cooklev-Book] 331 (“<i>The solution that will be developed by 802.16e will likely be devoting one part of the superframe for fixed stations and one part for mobile stations.</i>”) Ex. 2024 [Cooklev-1st-Depo.] 71:3-6 (“Q. <i>is your proposed likely solution was the solution ultimately adopted by 802.16(e)? A. I think, yes.</i>”)	 Ex. 2027 [WiBro-Article] 1-2. (“<i>Fixed wireless indoor service is supported with band selection mode And mobile wireless outdoor service is supported with diversity mode</i>”) Ex. 2024 [Cooklev-1st-Depo.] 107:24-108:18. (“<i>This figure is consistent with Figure 1 of Park. ... This diversity zone is the zone dedicated to mobile users. There is a zone that here it's referred to as band selection. This is the zone that is for fixed users.</i>”)

62. Therefore, Park, consistent with other extrinsic evidence, teaches that its embodiments only apply to fixed subscribers, even though the network may otherwise support mobile subscribers.

3. *IEEE 802.16-2004 Does Not Modify Park's Disclosure Of Its Application To Only Fixed Subscribers Because IEEE 802.16-2004 Itself Only Disclosed Fixed Subscribers.*

63. Petitioner's ground is based on implementing Park within an IEEE 802.16-2004 system. Pet., 14 ("A POSA would have been motivated to combine the teachings of Park and 802.16-2004 as proposed ..."); Ex. 1003 [Cooklev-Decl.] ¶ 77 ("A POSA would have considered it obvious to implement Park using 802.16-2004."). However, implementing Park within IEEE 802.16-2004 does not modify Park's disclosure that its embodiments are exclusively applied to fixed subscribers. This is because, as explained in this section, it was well-known that IEEE 802.16-2004 did not support mobile devices. Therefore, implementing Park in IEEE 802.16-2004 does not disclose or render obvious applying Park's method to mobile devices, especially since Park teaches that its method only applies to fixed subscribers even in other systems such as WiBro that support mobile subscribers.

64. It was well-known in the field and to a POSITA that the IEEE 802.16-2004 standard were directed exclusively at stationary systems and did not support mobile devices. The title of standard itself states that it is the "Standard Air Interface *for Fixed Broadband Wireless Access Systems*," not for mobile systems:

Part 16: Air Interface for Fixed Broadband Wireless Access Systems

Ex. 1006 [802.16-2004] 0001 (Title).

65. Its abstract states that “[t]his standard specifies the air interface of fixed broadband wireless access (BWA) systems supporting multimedia services.”

Ex. 1006 [802.16-2004] 0004 (Abstract).

66. The word “mobile” does not appear in the standard even once.

67. This is also readily confirmed by various literature in the field, such as Ex. 2020 [Eklund-Article], which was co-authored by Carl Eklund, chair of the MAC task group that developed the IEEE 802.16 medium access protocol, and Roger Marks, chair of the IEEE 802.16 working group on broadband wireless access. Ex. 2020 [Eklund-Article] 107 (Biographies). Eklund provides a technical overview of the IEEE 802.16 standard. It explains that “[t]he broadband wireless access industry,” including the IEEE 802.16 standard, “provides high-rate network connections to *stationary sites*.” Ex. 2020 [Eklund-Article] 98 (Abstract); *see also* Ex. 2021 [Kiernan] 1-2 (Call for contributions to address feasibility of adding mobility to 802.16).

68. The IEEE 802.16 family of standards (including 802.16-2004) did not support mobile devices until version 802.16e, approved on December 7, 2005. *See* Ex. 1014 [802.16e] 3. This is confirmed by, for example, another article authored

by Roger Marks. Dr. Marks explains that the 802.16 working group “began a new project” to “add support for mobile terminals” in 2002. Ex. 2022 [Marks] 74.

While the project “brought in a large number of participants and new technology ideas,” it was not until 2005 when the details, including feasibility and desirability, were worked out and support for mobile terminals were supported through the IEEE 802.16e amendment. *Id*; see also Ex. 2022 [Mark] 74 (explaining that even after approving the IEEE 802.16e amendment in 2005, the working group continued its work on other “critical issues” to support mobility, leading to IEEE 802.16f amendment in 2005 and IEEE 802.16g amendment in 2007); Ex. 1025 [Eklund-Book] 26 (explaining additional aspects of mobility not resolved until 2007).

69. A book authored by Dr. Eklund, Dr. Marks and others on the IEEE 802.16 standard also supports the above. Specifically, the book expressly confirms that IEEE 802.16-2004 was directed at fixed devices, and it was the amendment in IEEE 802.16e that allowed mobility:

The current version of its fixed wireless standard was most recently updated as IEEE Std 802.16-2004 [B20], and an amendment adding mobility support (IEEE Std 802.16eTM-2005 [B24]) was published in late 2005.

Ex. 1025 [Eklund-Book] x. In fact, unlike the title of IEEE 802.16-2004 that states “Standard Air Interface *for Fixed Broadband Wireless Access Systems*,” not for

mobile systems (Ex. 1006 [802.16-2004] 0001 (Title)), the title for IEEE 802.16(e) expressly adds the word “Mobile”: “Air Interface for *Fixed and Mobile* Broadband Wireless Access Systems.” Ex. 1014, 1. This further confirms that IEEE 802.16-2004 did not support mobile stations.

70. I understand that a book authored by Dr. Cooklev also supports my opinion that IEEE 802.16-2004 did not support mobile devices.

71. Dr. Cooklev authored a book titled “Wireless Communication Standards, A Study Of IEEE 802.11, 802.15 and 802.16.” Ex. 2025 [Cooklev-Book]. It is my opinion that a POSITA would understand Dr. Cooklev’s book to apply to IEEE 802.16-2004. First, it was published in August 2004. *Id.*, 2. By that time, the details of IEEE 802.16-2004 were generally finalized. Furthermore, Dr. Cooklev in the book states that “I have made an effort within the text to reflect not only the state of the wireless standards at publication time (2004), but to provide guidance as to what developments might happen in the future.” *Id.*, xii. For example, as I noted above, Dr. Cooklev’s book explains the frame division between mobile and stationary users that would need to be made in IEEE 802.16(e) to add mobility. Thus, the topics discussed in Dr. Cooklev’s book apply to IEEE 802.16-2004. I also understand that Dr. Cooklev at deposition himself confirmed that the discussion of the IEEE 802.16 standard in his book applies to the 802.16-2004 version of the standard. Ex. 2024 [Cooklev-1st-Depo.] 39:5-8 (“Q. Is it fair to

say that your discussion of the 802.16 standard in your book applies to 802.16-2004 version standard, as well? A. I think so.”).

72. In his book, Dr. Cooklev is unambiguous that 802.16-2004 did not support mobile devices:

IEEE 802.16’s major weakness is that it does not support mobility.

While originally mobility was not required, recently demand has been increasing for mobile broadband wireless access. Within IEEE 802. there are two efforts to provide mobile BWA systems. First, ***IEEE 802.16 has created a task group to explore how to modify IEEE 802.16 so that it supports mobility.***

Ex. 2025 [Cooklev-Book] 332; *see also id.*, 22 (“***IEEE 802. 16e, being developed at present to support mobile subscribers.***”); 331 (“Another initiative within IEEE 802.16 is to support mobility. Task Group 802.16e was established to support this technology.”).

73. Dr. Cooklev’s book also provides a table summary of the various versions of the standard, reproduced below with annotations added, that shows that it was the IEEE 802.16(e) version of the standard (highlighted in green) that provided the “enhancement to support mobility”:

Table 1–4: 802.16 projects

Number	Description
802.16	Fixed broadband wireless systems between 10 and 66 GHz
802.16a	Amendment for operation between 2 and 11 GHz
802.16c	Enhancement including system profiles between 10 and 66 GHz
802.16.2	Coexistence between 10 and 66 GHz
802.16/Conf01 802.16/Conf02 802.16/Conf03	Test and conformance specifications (active)
802.16d	System profiles (active)
802.16e	Enhancement to support mobility (active)

Ex. 2025 [Cooklev-Book] 22 (color annotations added). In the table above, 802.16d (highlighted in red) is the version of the standard issued as IEEE 802.16-2004, which is the version relied upon by Petitioner here, but that did not support mobile devices.

4. Petitioner's Additional Arguments.

74. As discussed in the prior sections, Park expressly teaches that even in an 802.16(e)-type frame structure such as WiBro that may support mobile subscribers in addition to fixed subscribers, Park's invention only applies to fixed subscribers within that system. As also discussed in the prior sections, implementing Park's invention in IEEE 802.16-2004 does not change that fact because 802.16-2004 did not support mobile subscribers either. It appears that

even Dr. Cooklev to some extent agrees with my opinion since his declaration states that “Park and 802.16-2004 do not expressly state the ‘subscriber’ or ‘terminal’ is a mobile device.” Ex. 1003 [Cooklev-Decl.] ¶ 126.

75. But Dr. Cooklev additionally opines that a POSITA would understand that “Park’s changes to 802.16-2004 will apply to mobile devices, including mobile devices moving at vehicular speeds.” Ex. 1003 [Cooklev-Decl.] ¶ 101; *see also id.*, ¶ 126. I respectfully disagree with Dr. Cooklev’s conclusion.

76. Dr. Cooklev first relies on the fact that “802.16(e) was underway at the time of the invention.” Ex. 1003 [Cooklev-Decl.] ¶ 101. Dr. Cooklev, however, does not explain how this fact changes Park’s teaching that its embodiments apply only to fixed subscribers even within an 802.16(e)-type system that supports both fixed and mobile subscribers.

77. The fact that the drafts of IEEE 802.16(e) were under way at the time of the invention does not affect my analysis above. Park already recognized the existence of IEEE 802.16(e), as evidenced by the fact that its Figure 1 is a frame structure for an 802.16(e)-type frame, not a 802.16-2004 frame. Park also notes that its Figure 1 also represents the WiBro frame structure which, again, was based on 802.16(e). Thus, Park was fully aware of the expected frame structure for the versions of the standard after 802.16-2004 that supported mobility. Within such a system, Park explains that its embodiments only apply to the band AMC area

within those systems, which Park and other extrinsic evidence I reference above teach only applies to fixed subscribers. Thus, the existence of 802.16(e) drafts at the time does not show that Park's invention "will apply to mobile devices."

Rather, Park already discloses its invention in the context of an 802.16(e)-type system such as WiBro that supports both mobile and stationary subscribers, but explains that its invention applies only to fixed subscribers within those systems.

78. Similarly, the fact that "Park explicitly references WiBro" does not mean that "Park's changes to 802.16-2004 will apply to mobile devices." Ex. 1003 [Cooklev-Decl.] ¶ 101. WiBro was a system based on IEEE 802.16(e), and, as Park and Ex. 2027 [WiBro-Article] both explain, divided the frame into an area dedicated to mobile subscribers, and an area dedicated to fixed subscribers. Just as I explained in connection with 802.16(e) above, Park teaches that even in a system like WiBro that supports both mobile and fixed subscribers, Park's invention applies to the AMC area, which Park states supports only fixed subscribers. Thus, the POSITA's knowledge that WiBro existed at the time does not affect Park's express disclosure.

79. Dr. Cooklev next relies on the fact that the specific DL_MAP IE modified by Park's invention does not change from the 802.16-2004 version of the standard that did not support mobility, to the 802.16(e) version of the standard that supported mobility. Ex. 1003 [Cooklev-Decl.] ¶ 101. I agree with Dr. Cooklev

that the specific DL_MAP IE modified by Park's invention did not materially change between 802.16-2004 (which did not support mobility) and 802.16(e) (which did support mobility). Ex. 1003 [Cooklev-Decl.] ¶ 100. However, this fact is consistent with, and supports, the view that Park's invention does not apply to mobile devices. This is because the DL_MAP IE that Park modifies is, as Park teaches, only for fixed subscribers. Therefore, there is no surprise that this message did not change from IEEE 802.16-2004, because it did not need to support mobility and therefore did not need to change.

80. Notably, a reference book submitted by Petitioner explains that the DL MAP messages for the region of the frame that supported mobility in the later 802.16(e) version of the standard were different from the DL MAP messages in the 802.16-2004 version that did not support mobility:

One of the four major changes introduced in WirelessMAN-OFDM by the IEEE 802.16e amendment is the capability for provisioning subchannelization in the DL (the other three changes are *the additions of private MAPs*, private initial ranging opportunities, and open-loop power control). This DL subchannelization is provided as a separate zone, similar to the zone concept of the OFDMA PHY (see Chapter 12), *with its own* subchannelized preamble, FCH, and *MAPs so that it is completely independent of the remainder of the frame*. The DL subchannelization is restricted to the use of quadruple subchannel allocations (see Figure 11-3). *The DL MAP in this construct provides allocations only for future frames*, not for the current one, as it is

assumed that mobile devices do not have the computational power necessary to decode this MAP quickly enough to efficiently avoid receiving data not intended for the station itself; this would unnecessarily drain the battery.

Ex. 1025 [Eklund] 270.

81. Petitioner also appears to suggest that Park's Figure 1 and WiBro were based on IEEE 802.16-2004, with the insinuation that IEEE 802.16-2004 supported mobile devices. I respectfully disagree. First, the Petition quotes Park as depicting "a frame structure of ... an IEEE 802.16-2004 system applied to an OFDMA system." (Pet., 20, quoting Park [0007], [0036]). But that is an incorrect quote from Park. In paragraph [0007], Park only states that Figure 1 is the frame structure of an IEEE 802.16, not 802.16-2004. In fact, it is readily apparent that the frame structure of Park's Figure 1 is based on IEEE 802.16(e), which supported mobile devices, not IEEE 802.16-2004, which did not. For example, the frame structure in Park's Figure 1 divides the frame into two regions, one for mobile subscribers and one for fixed subscribers. Ex. 1005 [Park] [0011]. Such a division did not exist in IEEE 802.16-2004, which is not surprising as IEEE 802.16-2004 did not support mobile users. I understand that Dr. Cooklev at his deposition also agreed with my opinion the frame division in Park's Figure 1 did not exist in IEEE 802.16-2004. Ex. 2024 [Cooklev-1st-Depo.] 62:3-7 ("Q. Does 802.16-2004 divide a superframe between fixed and mobile stations? A. No, I—I don't think the 2004

version of the standard has the superframe—this type of a superframe. It was brought by 16(e).”).

82. Similarly, Dr. Cooklev’s declaration appears to suggest that WiBro was based on 802.16-2004, and not 802.16(e). Ex. 1003 [Cooklev-Decl.] ¶ 97 (“While the title of 802.16-2004 refers to “Fixed Broadband Wireless Access Systems,” the application of 802.16-2004 is not so limited. As explained above, WiBro, which touted its ability to cover mobile subscriber stations, adopted the 802.16 standard back in July 2004.”). Again, I respectfully disagree. WiBro was based on an early draft of IEEE 802.16(e). 2027 [WiBro-Article] 2 (“Specification of WiBro is somewhat similar to IEEE 802.16e ...”). I understand that Dr. Cooklev at his deposition also agreed with my opinion. Ex. 2024 [Cooklev-1st-Depo.] 36:11-13 (“So WiBro, they said, well, we’ll take draft two of 802.16(e), and that will be the foundation of the WiBro technology.”).

83. I have also reviewed a translation of Park’s Korean application that was filed in Korea. Ex. 2037 [Translation] 3; Ex. 2038 [Translation-Declaration] ¶¶ 8-12. I am advised by counsel that Park’s Korean application cannot constitute prior art because it was only filed in Korea, and was not filed as an international application under the treaty defined in 35 U.S.C. § 351. I am also advised by counsel that Park’s Korean application was not published until 2006, after the priority date of the Patent, and thus was not a part of the common knowledge of the

POSITA. *See* Ex. 1008, 20 (showing publication date of February 22, 2006 for Park’s Korean application); *accord* Ex. 2037, 1. But, nonetheless, I have incorporated Park’s Korean translation in my analysis, and it does not change my conclusions.

84. While Park’s U.S. application states that the AMC region is for “fixed subscribers” (Ex. 1005 [Park] [0011]), Park’s Korean application states that the AMC region is “for mostly stationary users.” Ex. 2038 [Translation-Declaration] ¶¶ 8-12. In context, a POSITA would understand that Park’s Korean application refers to the limited degree of mobility of the users, and is therefore referring to stationary users. This is readily confirmed by Park’s own U.S. patent application, which refers to those users as “fixed subscribers.” Ex. 1005 [Park] [0011]. This is also in accord with various other extrinsic evidence discussed above, explaining that the band-AMC region is for fixed subscribers. Ex. 2025 [Cooklev-Book] 331; Ex. 2027 [WiBro-Article] 1-2; Ex. 2024 [Cooklev-1st-Depo.] 107:24-108:18.

85. But, even if Park permitted limited movement of the device, that does not make the device “mobile device” based on its plain and ordinary meaning in this field. For example, as Dr. Cooklev’s book explains, “fixed or slowly moving stations” are not considered mobile stations in this field. Ex. 2025 [Cooklev-Book] 71. Dr. Cooklev confirmed this at his deposition, explaining that even a device moving at “pedestrian speed” of approximately 5 km/hr is not considered a

“mobile device” in this field. Ex. 2024 [Cooklev-1st-Depo.] 50:5-8, 153:8-14. I disagree that slowly moving stations, such as at pedestrian speed, are not considered a “mobile station” in this field.

86. Petitioner also argues that “even if the teachings in 802.16-2004 were limited to ‘fixed’ devices,” “the ’450 Patent admits that the claimed ‘mobile devices’ may be ‘fixed.’” Pet., 19 (citing Ex. 1001 [’450 Patent] 3:40-42). I disagree with this argument for multiple reasons. First, the ’450 patent makes the non-controversial observation that a mobile device may be stationary at some times, and mobile at other times. However, in the field of the Patent, a “mobile device” configured to perform the claimed limitations is capable of performing the claimed limitations while the device is in motion. Ex. 2025 [Cooklev-Book] 71 (“Mobile stations can participate in a network while in motion.”); Ex. 1025 [Eklund-Book] 33 (“Wireless devices may be classified based on whether the communicating devices are physically fixed at one location or allowed to move during a communication session.”). If a “mobile device” as claimed were simply a “fixed device,” that would render the word “mobile” superfluous.

B. Petitioner Has Not Shown A Segment Comprising N Time-Frequency Resource Units, “Where N=2, 4, Or 8.”

87. Claim 7 recites that the mobile device is configured to “receive a signal” “over a segment of time-frequency resource,” “and the segment comprising N time-frequency resource units,” “where N=2, 4 or 8.” Ex. 1001 [’450 Patent] cl.

7. Dr. Cooklev opines that Park allegedly discloses Claim 7 because, in Park, *N* can be literally anything:

*The possibilities for combinations of a starting time-frequency coordinate and *N* are practically endless.* As Park explains, the total resource (AMC area) can be divided into allocation units of “various sizes and shapes’ and the resource allocation regions can vary in size and shape, as well as location in the total resource (AMC area). Park [0046], [0081]-[0083]. “*N*” *can therefore be any number of allocation units* needed for a particular allocation region, expressed as a positive integer value from 1 up through the number needed to express the entire resource. Park [0070].

Ex. 1003 [Cooklev-Decl.] ¶ 180.

88. As I explain below, a reference such as Park that teaches that the value of *N* can be anything does not disclose or render obvious the claims. Instead, the plain meaning of the claims confirms that *N* must be selected from *N* = 2, 4 or 8, excluding other plural numbers. The specification readily confirms this plain meaning of the claims, as it explains that by limiting *N* in the manner described, the invention achieves benefits beyond a reference such as Park that permits *N* to be anything.

89. The plain meaning of the claim requires that *N*, when plural, must “equal” 2, 4 or 8. Of course, if *N* equals another number, such as 7, it does not “equal” 2, 4 or 8. Thus, based on the plain meaning, *N*, when plural, must be

selected from one of 2, 4 or 8, to the exclusion of any plural N other than N = 2, 4 or 8. This is because the claim expressly recites “N = 2, 4 or 8.” It does not recite, for example, that “N *can equal at least* 2, 4 or 8.” The claim is agnostic to the case of N = 1 because it requires a plural number of “resource units.”

90. I understand that the Institution Decision preliminarily found that N = 2, 4 or 8 does not exclude other values of N because of the presence of the term “comprising” in a preceding limitation:

We do not agree that the plain language of claim 7 excludes integers N=3, 5, 6, or 7. Claim 7 utilizes the open-ended term “comprising” in the recitation “the segment comprising N time-frequency resource units within a time interval.” Due to the use of the term “comprising” in the recitation, the full scope of claim 7 may include additional N time-frequency resource units, such as N=3, 5, 6, 7, in addition to the claimed “N time-frequency resource units within a time interval, . . . where N=2, 4, or 8.”

Paper 30 [Institution-Decision] 33-34.

91. I am advised by counsel that the word “comprising” is not a legal term of art here because it appears in the body of the claim, as opposed to being a transitional term linking the preamble to the body of the claim. As such, I am advised, it would have its plain and ordinary meaning. Therefore, the appearance of the word “comprising” does not affect my opinions above.

92. The specification confirms that the value of N, when plural, is limited to 2, 4 or 8. As described below, by limiting N, when plural, in the manner described, the invention achieves benefits beyond Park's basic indexing of its "allocation units." First, limiting N may further reduce overhead by linking the segment size to the modulation scheme. Second, limiting N may remedy the prior art's "irregular" arrangement of segments.

93. First, the inventors recognized that by limiting N, the control overhead may be reduced beyond what would be permitted through simple indexing of segments (as in Park). Specifically, the inventors recognized that if the claimed "time-frequency resource unit" did not have any arbitrary size, but, for example, the size of the "highest available MCS [Modulation and Coding Scheme]," then "the resource utilized by other MCS is simply an integer multiple of the basic unit." Ex. 1001 ['450 Patent] 6:46-52. The invention then explains that, as a result, the MCS can be linked to the size of the segment, and both can be transmitted through a single parameter:

The MCS [Modulation and Coding Scheme] index (MCSI) conveys the information about modulation and coding scheme. For a known vocoder, *MCSI also implies the number of AMC resource units* [the claimed "time-frequency resource unit"] required for a voice packet.

Ex. 1001 ['450 Patent] 6:55-68; *see also id.*, 2:54-57 ("In some embodiments, modular coding schemes associated with the packet streams may be selected

that further reduce the amount of necessary control information.”); Ex. 1001 [’450 Patent] 2:3-4 (explaining as an example of the large control overhead of the prior art that the MCS index would be a 4 bit transmission separate from the resource allocation).

94. The Patent describes this insight in connection with its Table 1, reproduced below with annotations added:

MCSI	Modulation	Coding rate	Information bits	Raw symbols	Units
1	16QAM	$\frac{1}{2}$	160	80	1
2	QPSK	$\frac{1}{2}$	160	160	2
3	QPSK	$\frac{1}{4}$	160	320	4
4	QPSK	$\frac{1}{8}$	160	640	8

95. As shown in the table above, a Modulation and Coding Scheme Index (MCSI) of, for example, 1 conveys two pieces of information: that the modulation and coding scheme is 16QAM at $\frac{1}{2}$ rate, and also that the allocated segment contains one time-frequency resource unit. Similarly, an MCSI value of 4 conveys two pieces of information: that the modulation and coding scheme is QPSK at $\frac{1}{8}$ rate, and also that the allocated segment contains eight time-frequency resource units.

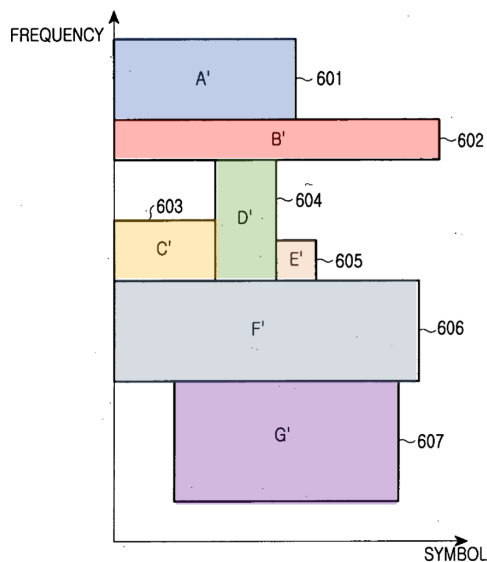
96. The Patent then explains that a single 2 bit MCSI index (*id.*, 10:16) can convey both the modulation and coding scheme, and the number of time-frequency resource units for a given segment. In contrast, Petitioner’s Park

reference does not disclose such an insight. Instead, its index merely conveys the resource allocation, which means that the modulation and coding scheme must be separately transmitted to the user through additional overhead. Ex. 1005 [Park] [0055]; *see also* Ex. 1001 ['450 Patent] 2:3-4 (explaining as an example of the large control overhead of the prior art that the MCS index would be a 4 bit transmission separate from the resource allocation).

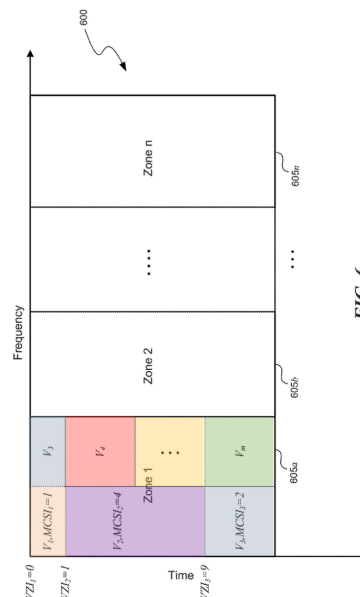
97. Second, the inventors further recognized that by limiting the number N as explained above, it can resolve another disadvantage of the prior art. Specifically, the Patent explains that in the prior art, “the allocated resources region is irregular from connection to connection.” Ex. 1001 ['450 Patent] 2:1-2. Addressing this and other issues, the inventors conceived “an alternative way of managing multiple packet streams” to “overcome the inefficiencies associated with maintaining” mappings under the prior art. Ex. 1001 ['450 Patent] 5:41-43. Instead of spreading the various applications carried in packet streams throughout the available resource region, per the prior art, the inventors took a different approach: they “group[ed] like applications together.” Ex. 1001 ['450 Patent] 5:43-53.

98. Because of this grouping, a “basic resource unit” could be defined with level of granularity that is high enough to accommodate the needs of the similar applications, but low enough such that the basic resource unit is large and

can be identified with a single time-frequency coordinate. Thus, this insight permitted inventors to define the granularity of the claimed “segment of time-frequency resources” using values of N as described in Table 1 (*id.*, 6:35-44). Defining the permitted sizes of the segment with a limited value of N as described in the invention permits the segment to have a regular size, unlike the “irregular” forms of the prior art segments. Ex. 1001 [’450 Patent] 2:1-2. This is shown through a side-by-side comparison of the segments in Park and the ’450 Patent, with color coding added:



Ex. 1005 [Park] Fig. 6B



Ex. 1001 [’450 Patent] Fig. 6

99. As can be seen above, Park, through its arbitrary segment sizes, does not address the “irregular” allocation problem that the invention addresses in part by limiting N in the manner described by the invention.

100. The Institution Decision preliminary stated that:

We also do not agree with Patent Owner's argument that the '450 Patent Specification requires the exclusion of intervening integers $N=3, 5, 6$ or 7 . The '450 Patent does not disclose the exclusive use of $N=2, 4$, or 8 , nor does it disclose the exclusion of other integers such as $N=3, 5, 6, 7$. *See* Ex. 1001, 6:22–7:6. In contrast to Patent Owner's argument, the '450 Patent Specification discloses Table 1 in exemplary and optional terms.

Paper 30 [Institution-Decision] 34.

101. I respectfully disagree. The Patent expressly discloses an embodiment where $N = 2, 4$ or 8 , and no other plural value, because $N = 2, 4$ or 8 have the specific advantages described above. Ex. 1001 ['450 Patent] 6:35-62. The choice of $N=2, 4$ or 8 is not arbitrary; rather, it was a deliberate selection that followed from the specific choice of time-frequency unit granularity the inventors discovered had additional benefits. The claims then expressly recite " $N = 2, 4$ or 8 ." *Id.*, cl. 7. This is not a situation where the specification is used to limit an otherwise broader plain meaning. Rather, the specification here merely confirms the plain meaning of the claim because it expressly discloses an identical embodiment corresponding to what is claimed. While the Institution Decision is correct that for other modulation schemes or for other types of data different values of N may be beneficial, that is not the embodiment claimed in claim 7.

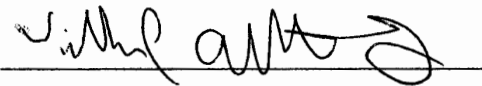
102. Therefore, the specification supports the plain meaning of the claim as excluding plural N other than $N = 2, 4$ or 8. For the reasons discussed above, Petitioner has not shown disclosure or obviousness of $N = 2, 4$ or 8 as claimed.

VI. CONCLUSION

103. I understand that my opinions discussed above support a legal conclusion that the challenged claims are nonobvious.

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.

December 30, 2024

SIGNED: 
William P. Alberth, Jr.

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