

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIGN TECHNOLOGY, INC.,
Petitioner,

v.

DENTAL MONITORING SAS,
Patent Owner.

Case No. IPR2023-01369
Patent No. 10,755,409

REPLY DECLARATION OF DR. MAUREEN VALLEY

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I, Maureen Valley, declare as follows:

I. INTRODUCTION

1. I have been retained on behalf of Align Technology, Inc. (“Align” or “Petitioner”) for the above-captioned *inter partes* review to provide my expert opinions and expert knowledge. I understand that this proceeding involves claims 1-15 of U.S. Patent No. 10,755,409 to Salah et al. (“the ’409 patent,” EX1001), entitled “Method for Analyzing an Image of a Dental Arch.” I understand that the ’409 patent is currently assigned to Dental Monitoring SAS (“Dental Monitoring” or “Patent Owner”).

2. I have been asked to provide my independent review, analysis, insights, and opinions regarding technical aspects raised by Dental Monitoring during the above-captioned proceeding relating to the ’409 patent.

3. In preparing this declaration, I have reviewed and am familiar with the references cited herein, including the ’409 Patent and the declaration of Dr. Budi Kusnoto (EX2030) submitted by Dental Monitoring. Lists of materials I have cited in this declaration are provided in the Appendices.

4. In this declaration, I set forth the independent opinions that I have reached and the basis for those opinions using the information currently available to me. Such opinions are based, at least in part, on my skills, knowledge, training, education, and experience, including my experience in dental and orthodontic

practice, as well as on my examination of the materials utilized in preparing this declaration.

II. QUALIFICATIONS

5. My curriculum vitae (“CV”), a copy of which is provided as EX1036, provides details on my education, experience, and other qualifications. It also includes a list of other cases in which, during the previous eighteen years, I testified as an expert by reports, at trial, and/or by deposition.

6. In 1987, I earned a Bachelor of Arts Degree in Biology from the University of California, Santa Barbara. In 1992, I also earned a Doctor of Medicine in Dentistry Degree from Harvard School of Dental Medicine and a Master of Public Health Degree from Harvard School of Public Health. Additionally, in 1994, I earned a Master of Science and a Certificate in Orthodontics from Northwestern University School of Dentistry.

7. Since 1999, I have maintained my current dental license from the California Board of Dental Examiners. I have been a practicing dental professional since 1987, and a practicing orthodontist since 1994. I am currently an orthodontist for an orthodontic/pediatric/oral surgery dental service organization called Kids Care Dental and Orthodontics in Lodi, California. In my career, I have been involved in the treatment and care of approximately 10,000 patients, including approximately 2500 patients using aligners.

8. For over twenty years, including during and beyond the 2017 period that I discuss in this declaration, I was a member of numerous professional organizations, including the California Association of Orthodontists, the California Dental Association, the American Association of Orthodontists, and the American Dental Association.

9. I was a faculty member and taught a variety of university courses at the Harvard School of Dental Medicine and the University of the Pacific Arthur A. Dugoni School of Dentistry. I also have experience as an educational consultant where I created course content for Align Technology presentations, and as a speaker where I taught Invisalign® certification and advanced courses for dentists and orthodontists, both nationally and internationally. I have received honors and awards, including the Arthur A. Dugoni School of Dentistry, Faculty Recognition Award.

III. RETENTION AND COMPENSATION

10. I am being compensated for my work in this matter at a rate of \$550 per hour (or \$650 per hour for testimony) plus expenses, which is my customary rate for consulting and expert work. My compensation is in no way tied to the outcome of this case or to the content of this declaration.

IV. LEGAL STANDARDS

11. When considering the '409 patent and stating my opinions, I rely on the following legal standards as described to me by the attorneys for Align.

A. Level of Skill in the Art

12. I understand that various factors should be considered when determining a person of ordinary skill in the art ("POSA"). I understand that these include, without limitation: (a) the educational level of the inventors and that of practitioners and other inventors in the art (e.g., degrees, subjects, etc.); (b) the type of problems encountered in the art; (c) prior art solutions to such problems; (d) the speed at which innovations are made in the art; and (e) the sophistication of the invention.

13. My specific understanding of a POSA with respect to the field of the '409 patent is summarized below in section V.

B. Effective Filing Date

14. I understand that a claim in a patent or patent publication has an effective filing date corresponding to the earliest date in which the claimed invention was disclosed, either in the application filed for the patent or patent publication, or in a prior application to which the patent or patent publication claims priority.

15. I understand that, in deciding whether the patent or patent publication satisfies the written description and enablement requirements, one must consider the description from the viewpoint of a person skilled in the field of technology of the patent or patent publication when the application was filed. The written description requirement is satisfied if a person having skill in the art reading the original patent application would have recognized that it describes the full scope of the claimed invention as it is finally claimed, and such that the inventor possessed the full scope by the filing date of the original application. Further, the enablement requirement is satisfied if a person of ordinary skill in the art would be able to practice the claimed invention based on the description.

16. I have been instructed to assume that the effective filing date of the '409 patent is July 21, 2017. I understand that this is the date for which the level of skill is assessed when interpreting the knowledge and skill of a POSA.

17. I understand that the Carrier Provisional (EX1006) was filed on November 4, 2016. I understand that this is the date relevant to understanding its disclosure from the perspective of a person of ordinary skill in the art; however, my opinions would not change even if the relevant date for the Carrier Provisional were July 21, 2017.

V. PERSON OF ORDINARY SKILL IN THE ART

18. I understand that Align has provided a description of a person of ordinary skill in the art as of July 21, 2017. Specifically, a POSA would typically have an advanced degree, such as a Masters' Degree or Ph.D. in computer science or a related field, with at least two years of work in computer vision, image analysis, medical imaging, or related areas. A POSA could have less education but significant professional experience in one or more of these fields. A POSA could be a member of an interdisciplinary team including persons with backgrounds such as electrical engineering, computer science, optical imaging, and dentistry or orthodontics, and could call upon the knowledge of other team members as appropriate.

19. I also understand that Dental Monitoring has provided an alternative description of the POSA as follows:

[A POSA] would have had a bachelor's degree or higher in computer science, bioinformatics, or a related engineering discipline, and several years of work experience relating to the development of machine learning or artificial intelligence models or algorithms. A POSA would have also worked as part of a multidisciplinary team, which would have included individuals familiar with medical imaging, dental imaging, dentistry, and/or orthodontics.

EX2030, ¶27.

20. However, I also understand that Dental Monitoring has indicated that these two definitions are not materially different. My opinions thus treat the two definitions as alternative descriptions of essentially the same categories of persons.

21. Either definition makes it optional, though not required, to include dental professionals as part of a multidisciplinary team in which the POSA may be a member. The definitions further allow the POSA to call on the knowledge of such professionals when needed. My opinions set forth below are presented from the perspective of a dental professional that may be a member of such a team, and I provide responses below to certain opinions expressed by Dr. Kusnoto.

VI. THE CARRIER PROVISIONAL

22. I have reviewed U.S. Provisional Patent Application No. 62/417,985 to Carrier et al., the “Carrier Provisional” (EX1006). I have also reviewed U.S. Patent Publication No. 2021/0068923 to Carrier, et al. (EX1005, the “Carrier Publication”), which I understand claims priority to the Carrier Provisional. In this section, I discuss the Carrier Provisional in more detail; in subsequent sections, I discuss disclosure found in both the Carrier Publication and the Carrier Provisional (collectively, “Carrier”), so I cite both exhibits in those sections.

23. The Carrier Provisional describes “methods and apparatuses to obtain an image of a patient’s teeth for therapeutic use.” EX1006, Abstract (p. 47). This can include “displaying an overlay comprising an outline of teeth in a

predetermined view” on a device such as a mobile phone, “moving the mobile phone so that the overlay approximately matches the patient's teeth in the view of the patient’s teeth,” and “capturing an image of the view of the patient's teeth.” *Id.*

24. The Carrier Provisional teaches guiding the user to take an image at various predetermined views and gives examples of overlays showing tooth outlines corresponding to several views that may be used to capture standard orthodontic photos. EX1006, ¶¶35-36, 50, Figs. 4A-H.

25. Claim 1 of the Carrier Publication (EX1005) reads as follows:

1. A computer-implemented method comprising:

providing a mobile application on a mobile device associated with a patient, the mobile application configuring a user interface for display on the mobile device;

guiding the patient through the user interface to take a first plurality of photos of teeth of the patient, the first plurality of photos corresponding to a first plurality of predetermined views of the teeth, wherein guiding the patient to take the first plurality of photos comprises showing a first plurality of overlays over the teeth in accordance with the first plurality of predetermined views;

guiding the patient through the user interface to take a second plurality of photos of the teeth, the second plurality of photos corresponding to a second plurality of predetermined views of their teeth, wherein guiding the patient to take the second plurality of photos comprises showing a second plurality of overlays over the teeth in accordance with the second plurality of predetermined views; and

transmitting the first plurality of photos and the second plurality of photos so the first plurality of photos and the second plurality of photos can be evaluated for medical treatment.

26. Dr. Kusnoto expresses the opinion that the Carrier Provisional does not disclose that (1) the mobile device may be associated with a patient; and (2) that the mobile device does not guide the patient through the user interface to take the first and second plurality of photos. EX2030, ¶¶24, 53-75. Specifically, Dr. Kusnoto asserts that the Carrier Provisional “does not disclose a method for guiding patients to acquire dental photographs using a cell phone associated with the patient,” but instead is directed solely to the dental professional as the user of the cell phone being guided to take the photographs. EX2030, ¶¶24, 74.

27. I disagree. When introducing its overlay-guidance technique, the Carrier Provisional describes that its techniques “may use a user’s own handheld electronics apparatus having a camera (e.g., smartphone) and adapt it so that the user’s device guides the user in taking high-quality images.” EX1006, ¶54. This guidance may use an “‘overlay’ on a real-time image of the screen.” *Id.* Immediately following this sentence, the Carrier Provisional describes the overlay, as an outline of teeth, and specifically indicates that the user may be a patient, saying that the “overlay may be based on a generic image of teeth, or it may be customized to the user’s teeth.” EX1006, ¶55. A dental professional reading this disclosure would understand that the teeth referred to as “the user’s teeth” are the

patient's teeth, meaning that the person being referred to as the “user” can be the patient.

28. Indeed, in the first sentence of paragraph 75 of his declaration, Dr. Kusnoto refers to instances in the Carrier Provisional cited by Dr. Foroosh where “‘user’ implies ‘patient.’” EX2030, ¶75 (citing EX1006, ¶55). Dr. Kusnoto does not deny that these parts of the Carrier Provisional refer to the user as a patient, but rather he asserts that “in other instances, ‘user’ clearly refers to a dental professional.” *Id.* I agree that the Carrier Provisional discloses that dental professionals may *also* be users. However, I disagree with Dr. Kusnoto’s later statement that a POSA taking into consideration the “entirety” of the Carrier Provisional would have understood that the method taught was directed towards dental professionals being the only user. Even if some parts of the Carrier Provisional discuss dental professionals being users, that does not mean that the Carrier Provisional does not also teach that patients can be users. Indeed, the Carrier Provisional elsewhere confirms that the “user” can be a “patient,” such as its discussion in paragraph 62 of using a “patient-specific overlay derived from the patient's teeth,” in which the apparatus “may image the users teeth or may receive data derived from a scan, including digital scan, of the users teeth and may generate an overlay.” EX1006, ¶62. Again, this paragraph plainly refers to the patient as a user, whose teeth are imaged and whose teeth are the source of scan

data received to generate the overlay. These portions expressly identifying patients as users, along with references throughout the remainder of the provisional application referring to a “user” generically, confirm that the Carrier Provisional contemplates the user as being either a dental professional or a patient. In other words, the user in the Carrier Provisional is simply the person operating the mobile phone in order to take the images; the user can be either a dental professional or the patient themselves.

29. Moreover, Dr. Kusnoto points to the discussion in paragraph 51 of the Carrier Provisional as indicating that the user is a dental professional, but this is mistaken. Paragraph 51 is addressing the use of prior techniques “to image a patient’s teeth” with “expensive and bulky SLR cameras,” and it indicates that “dentist, orthodontist, technician” are examples of users. *See* EX1006, ¶51. The discussion in paragraph 51 of the Carrier Provisional is meant to describe the challenges faced in the past when taking dental photographs, using a type of dental-specific, expensive, heavy, and cumbersome camera system that patients would be less likely to own or know how to operate. I became familiar with such camera systems as those discussed in paragraph 51 and shown in Fig. 1A of the Carrier Provisional when taking dental photography courses in dental school in the late ’80s and early ’90s. *See also* EX2030, ¶41 (discussing such training).

30. The discussion in paragraph 51 of the Carrier Provisional is in contrast to subsequent paragraphs, which discuss Carrier's new techniques to take images using devices like smartphones, which patients would typically own and be familiar with using. *See id.*, ¶¶52-55. As I discussed above, the paragraphs discussing smartphone use indicate that the user can be a patient. *See id.*; *see also id.*, ¶62 (again referring to patient as user). A dental professional reading the Carrier Provisional would thus understand that it discloses both that a patient may be the user guided to take photographs and that a dental professional may be the user guided to take the photographs. In other words, the application contemplates both patients and dental professionals as being users guided to take photographs by a smartphone.

31. Dr. Kusnoto also suggests that certain optional features disclosed in the Carrier Provisional (such as the ability to select an overlay, as depicted in Fig. 5A as a phone screen with the word "Patients" in the upper left) would be more appropriate for dental professionals than for patients. EX2030, ¶75 (referring to Fig. 5A of the Carrier Provisional as an "example of a user interface to enable a user to select" overlays); *see also id.*, ¶¶56-58. However, even if some optional features disclosed by the Carrier Provisional would be useful to dentists, this does not negate the fact that the Carrier Provisional discloses that the user (i.e., the one guided to take photos by the cell phone) can be the patient. Even if certain optional

features, such as the particular interface shown in Fig. 5A, were viewed as appropriate only for certain users, a dental professional reading the Carrier Provisional would understand that, given that these features are not disclosed as being mandatory, such features would not be required to be included for other users, such as patients.

32. Dr. Kusnoto further suggests that some images taught by the Carrier Provisional would be difficult or impossible for a patient to take of themselves. EX2030, ¶55. In fact, the Carrier Provisional discloses many angles that a patient could easily take of themselves. Dr. Kusnoto says that the image in Fig. 5D would be difficult or impossible for a patient to take (EX2030, ¶55), but Fig. 5D of the Carrier Provisional shows an ordinary picture of a smiling face that would be captured in a typical, easily taken “selfie.” *See* EX1006, Fig. 5D. Similarly, the images in Figs. 3A, 3B, 7B, and 7C show images patients can easily take of themselves, as each shows a frontal image of a patient’s teeth, with teeth either separated or closed together. Likewise, the angles reflected in various overlays shown in Figs. 2A-2C (depicting either a straight frontal angle or an angle of approximately 45 degrees from the center) would be possible for a patient to take of themselves. EX1006, Figs. 2A-2C; *see also id.*, 4A-B, 4E-H (showing variants of same with teeth separate or together).

33. And even if some images might be more difficult for some patients to take due to difficulty seeing the screen, such as an occlusal image of an upper or lower arch, the Carrier Provisional teaches that audible or tactile guidance may be used to aid in alignment. EX1006, ¶63. At best, Dr. Kusnoto suggests that a few images taught by the Carrier Provisional would be somewhat difficult for a patient to take of themselves without help, but the fact remains that the Carrier Provisional teaches that a patient can be the user who is guided to take images, and a dental professional would recognize that many of those images would be possible for a patient to take. Claim 1 in the Carrier Publication does not require that the patient be guided to obtain images from every perspective shown in the figures. Indeed, the Carrier Provisional teaches that users can select which images to take, and also allows for images from custom angles. EX1006, ¶¶75-78. A dental professional reading the Carrier Provisional would have appreciated that in many cases it would be useful to obtain fewer than all of the images depicted in the figures and would not have interpreted the disclosure of the Carrier Provisional to be restricted to capturing each and every one of the images shown in the figures.

34. Dr. Kusnoto also suggests that because the Carrier Provisional teaches that in some cases retractors or dental mirrors may be used, this means that patients cannot be the user because, for example, they “did not have a dental retractor unless they were specifically provided with one in a kit.” EX2030, ¶59 (citing

EX1006, ¶96). However, he concedes that it was known to provide patients with such kits, and indeed that the earlier Salah reference expressly disclosed doing so. *Id.* (citing EX1008, 11:13-15). Thus, as Dr. Kusnoto admits, it was known to provide patients with kits with dental instruments such as retractors that can be used in the manner taught by the Carrier Provisional—that is, to take images of their own teeth as guided by a smartphone application. For example, Dr. Kusnoto identifies one such retractor supplied by Dental Monitoring as exemplary of such retractors that were provided to patients. EX2030, ¶¶90-91 (showing retractor from 2018 and stating that similar “were available prior to the ’409 patent”). Such retractors, when inserted into a patient’s mouth, provide tension to move the lips and cheeks away from the teeth, thus improving visibility and access for camera viewing of the dentition. By inserting such cheek retractors into their mouths, patients can easily take images of their own mouth with their lips and cheeks held apart, similar to the view shown in Fig. 7B of the Carrier Provisional.

35. Accordingly, it is my opinion that a dental professional reading the Carrier Provisional would conclude that the Carrier Provisional discloses that a mobile application on a patient’s smartphone may guide a patient to take multiple pluralities of images of their teeth from different viewpoints, and thus that the Carrier Provisional discloses and enables each of these elements as recited in claim 1 of the Carrier Provisional. Similarly, it is my opinion that the Carrier Provisional

would not be viewed as limited to only dental professionals being the users guided to take the photos by the smartphone application.

VII. CARRIER DISCLOSES ENSURING REQUIRED TEETH ARE VISIBLE

36. In addition to the parts of Carrier discussed above relating to guiding users to align and capture an image, Carrier further discloses that its “method or apparatus may be configured to check the image quality of the captured image,” and Carrier further teaches that this can include “evaluating the image quality,” as well as “using image recognition algorithms to ensure that all required teeth are visible.” EX1006, ¶¶80-81; EX1005, ¶¶126-28. Regarding the identities of the “required teeth” that should be visible, Carrier teaches that the “overlay with an outline of teeth in a predetermined view can further provide information such as required visible teeth in the predetermined view,” and specifically that it can “show[] what teeth should be visible in the view.” EX1006, ¶60; EX1005, ¶105.

37. Dr. Kusnoto suggests that a POSA, as part of a multidisciplinary team, would not understand the disclosure in Carrier to teach detecting each required tooth. EX2030, ¶76. In discussing this disclosure, Dr. Kusnoto gives two different interpretations of what Carrier’s “required teeth” are. First, Dr. Kusnoto says that “‘required’ teeth in this context means the teeth that are intended to be the subject of the specific predetermined view in the photograph.” EX2030, ¶64. Then, in the same paragraph, he says that instead of being the *intended* teeth, “the ‘required

teeth’ for such an image are those that are visible when a photograph of the patient’s dental arch is captured from the appropriate viewpoint,” that is when the camera has been aligned using Carrier’s alignment techniques. *Id.*; *see also id.*, ¶78 (repeating these two different interpretations).

38. These are two different definitions of the same term, since the teeth that are *intended* to be captured are not necessarily the same as the teeth that are *actually* captured, even if a camera has been aligned to have the correct viewpoint. I thus agree with Dr. Kusnoto’s first statement (that the “required teeth” are the teeth that should be visible in the predetermined view), but I do not agree with his second statement (that the “required teeth” are whatever teeth end up being visible when an image is taken with the right camera position).

39. From the point of view of a dental professional, it is easy to appreciate that even if a camera is perfectly aligned to a particular predetermined viewpoint, it may not capture all the teeth that are intended to be visible from that viewpoint. Notwithstanding perfect alignment, some teeth may be obscured by objects, such as the patient’s tongue or lips, or a retractor that has been positioned at an incorrect angle, or a hand or finger of the operator mistakenly inserted in front of the camera lens. For example, depending on the tightness (or looseness) of the patient’s lips and cheeks when using a cheek retractor and whether or not the patient squeezes the sides of the cheek retractors with their lips and cheeks when in place, the actual

number of visible teeth within the cheek retractors can vary. Other reasons some “required” teeth might not be visible could be the presence of shadows (e.g., if the lighting source was partially obstructed, casting a shadow over one or more teeth) or improper focus. Thus, contrary to Dr. Kusnoto’s assertions, the teeth that are intended to be visible are not necessarily the teeth that are actually visible, and Carrier is teaching that image recognition algorithms can be used to ensure that the teeth that are intended to be visible (the “required teeth”) are the teeth that were actually visible in the image. EX1005, ¶¶81, EX1005, ¶128.

40. Dr. Kusnoto further discusses that patients have different sizes, relative positions and numbers of teeth. For example, patients may have missing, unerupted, ectopically positioned or transposed teeth, and that in such cases, the set of required teeth would be wrong if a generic overlay was used. EX2030, ¶¶79-80. However, this discussion overlooks Carrier’s teaching that either a patient-specific overlay or a treatment-specific overlay, both of which are customized to the patient’s teeth, may be used. EX1006, ¶¶55, 62, 64-65; EX1005, ¶¶100, 107, 109-10. If a patient had missing or unerupted teeth, this fact would be indicated in dental records, including the scans discussed by Carrier (*see* EX1006, ¶62; EX1005, ¶107), and thus the patient-specific overlay would indicate the absence of those teeth, meaning that the “required teeth” for such a patient would *not* include teeth the patient didn’t have (or that were not visible as they were unerupted).

VIII. THE USE OF REGISTRATION MARKS IN SALAH IN RELATION TO THE ALIGNMENT TECHNIQUES OF CARRIER

41. Dr. Kusnoto discusses the disclosure in Salah that aligning dental images may employ cheek retractors that have “registration marks.” EX2030, ¶¶90-94 (citing EX1008, 10:22-26, 28:13-29:17, 31:26-27, 32:1-12, 32:27-29, 33:18-19, 54:12-15). Dr. Kusnoto also provides an image of cheek retractors having these registration marks in the form of four small green spots in corners located outside the area where the patient’s teeth would be. *See* EX2030, ¶¶90-91. Dr. Kusnoto appears to suggest that these registration marks would provide a more reliable reference for aligning images of teeth than the patient’s teeth themselves, such as by using methods like those taught by Carrier. *See* EX2030, ¶92. For example, he says that “there is significant variation in the size and position of teeth between patients and also that during the course of an orthodontic treatment, an individual patient’s teeth are expected to move relative to each other.” *Id.*

42. As I discussed above, Carrier teaches using patient- and treatment-specific overlays when aligning to patients’ teeth. *See* EX1006, ¶¶55, 62, 64-65; EX1005, ¶¶100, 107, 109-10. To the extent there was a concern regarding variation between patients in tooth size or position, Carrier’s use of customized patient-specific overlays and treatment-specific overlays would eliminate such a concern. This is because, a patient-specific overlay or a treatment-specific overlay would reflect the patient’s specific dental anatomy, including differences of a specific

patient from the norm. Moreover, to the extent that there was a concern that during the course of an orthodontic treatment a patient's teeth move relative to each other, Carrier's use of treatment-specific overlays would eliminate such a concern. This is because a treatment-specific overlay can reflect predicted tooth positions as treatment progresses.

43. Regarding changes during treatment, Salah teaches that images can be obtained on timescales during treatment as short as "1 week, 2 weeks, 1 month," etc. During such timescales, patient tooth movement will generally be quite small. For example, in aligner treatment, each stage moves a tooth, if at all, on average only a fraction of a millimeter (e.g., 0.25 mm). Any more could risk the health of the teeth and surrounding bone and gingiva, unintended tooth movements, and/or pain. For even a full month interval, a given tooth would typically move at most half a millimeter to one millimeter (depending on the frequency of aligner changes), and often less, so differences in patient tooth position would be small for the types of images contemplated by Salah. Thus, a dental professional could expect patient tooth movement during treatment to produce only small adjustments that can be accounted for in a patient-specific or treatment-specific overlay. The changes are also generally predictable, and Carrier once again teaches that its treatment-specific "overlay can be modified according to the predicted or actual

changes of teeth of the patient with treatment (e.g., sequential alignment treatment).” EX1006, ¶64; EX1005, ¶109.

44. By contrast, registration marks on a retractor would be expected to provide a less reliable link to the patient’s teeth. Cheek retractors like those disclosed in Salah and Carrier (as well as the one shown by Dr. Kusnoto) are typically made of flexible material (e.g., plastic) that deforms upon placement in a patient’s mouth due to pressure from the lips and cheeks. As a result, when worn by a patient, the positions of registration marks like the ones shown in Salah or in Dr. Kusnoto’s declaration will move relative to the patient’s teeth. Further, the position of the registration marks will depend on the way the retractor is worn—if a patient inserts the retractor at an angle, the registration marks at the edges of the retractor will move significantly relative to the patient’s teeth. Unlike expected movement of teeth, these types of registration marks would be expected to move unpredictably over distances much more than a millimeter. Where the purpose is to produce images *of a patient’s teeth*, the teeth themselves would provide a better reference for alignment than registration marks, which can move substantially relative to the teeth to be imaged.

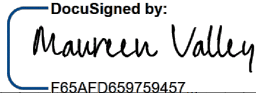
IX. CONCLUDING STATEMENTS

45. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of

the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

46. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: August 19, 2024

By:  F65AFD659759457
Maureen Valley, D.M.D., M.P.H., M.S.

X. APPENDIX – PETITIONER EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 10,755,409 to Salah et al.
1005	U.S. Patent Pub. No. 2021/0068923 to Carrier et al.
1006	Provisional Patent Application No. 62/417,985 to Carrier et al.
1008	Translation of PCT Pub. No. WO 2016066651 to Salah et al.
1036	Curriculum Vitae of Dr. Maureen Valley

XI. APPENDIX – PATENT OWNER EXHIBITS

Exhibit No.	Description
2030	Declaration of Dr. Budi Kusnoto