

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AGILENT TECHNOLOGIES, INC.,
Petitioner,

v.

THERMO FISHER SCIENTIFIC INC. and
THERMO FISHER SCIENTIFIC (BREMEN) GMBH,
Patent Owner.

Case IPR2018-00297
Patent RE45,553 E

Before MICHAEL R. ZECHER, JOHN F. HORVATH, and
DANIEL J. GALLIGAN, *Administrative Patent Judges*.

ZECHER, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314(a)

I. INTRODUCTION

Petitioner, Agilent Technologies, Inc. (“Agilent”), filed a Petition requesting an *inter partes* review of claims 1–66 of U.S. Patent No. RE45,553 E (Ex. 1001, “the ’553 patent”). Paper 1 (“Pet.”). Patent Owner, Thermo Fisher Scientific Inc. and Thermo Fisher Scientific (Bremen) GmbH (collectively, “Thermo”), filed a Preliminary Response (Paper 14 (“Prelim. Resp.”)), along with a statutory disclaimer pursuant to 35 U.S.C. § 253(a) and 37 C.F.R. § 1.321(a) that disclaims claims 1–31 and 36–61 (Ex. 2020). Consequently, only claims 32–35 and 62–66 remain for our consideration.

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the Petition shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Taking into account the arguments presented in Thermo’s Preliminary Response, we conclude that the information presented in the Petition establishes that there is a reasonable likelihood that Agilent would prevail in challenging at least one of claims 32–35 and 62–66 of the ’553 patent as unpatentable under 35 U.S.C. §§ 102(b) or 103(a). Pursuant to § 314, we hereby institute an *inter partes* review as to these claims of the ’553 patent.

A. Related Matters

The parties represent that the ’553 patent is at issue in a district court case captioned *Thermo Fisher Scientific Inc. v. Agilent Technologies, Inc.*, No. 17-600 (LPS) (CJB) (D. Del.). Pet. 5 (citing Ex. 1005); Paper 7, 2. In addition to this Petition, Agilent filed three other petitions challenging the patentability of all the claims in the following two patents owned by Thermo: (1) U.S. Patent No. 7,230,232 B2 (Case IPR2018-00299); and

(2) U.S. Patent No. RE45,386 E (Cases IPR2018-00298 and IPR2018-00313). Pet. 5.

B. The '553 Patent

The '553 patent, titled “Mass Spectrometer and Mass Filters Therefor,” reissued June 9, 2015, from U.S. Patent Application No. 14/032,110, filed on September 19, 2013. Ex. 1001, [54], [45], [21], [22]. The '553 patent is a reissue of U.S. Patent No. 7,211,788 B2, which issued May 1, 2007, from U.S. Patent Application No. 10/497,396, the Patent Cooperation Treaty application of which was filed on May 13, 2003. *Id.* at [64].

The '553 patent generally relates to a method for improving the operational characteristics of mass spectrometers, particularly those with quadrupole mass filter arrangements. Ex. 1001, 1:21–25. The '553 patent states that “[q]uadrupole, or multiple mass filters [were] known in the mass spectroscopy art and operate to transmit ions having a mass/charge ratio which lie within a stable operating region.” *Id.* at 1:29–31. By reducing the size of the stable operating region, the range of mass/charge ratios within the transmitted ion beam may be reduced. *Id.* at 1:38–40. This prevents rejected ions from being transmitted to the detector of the mass spectrometer. *Id.* at 1:40–41. A substantial portion of these rejected ions strike the quadrupole rods, thereby depositing dielectric material on the rods. *Id.* at 1:42–44. According to the '553 patent, this and other problems considerably reduces the mass resolving power or transmission of the mass spectrometer and, in some instances, renders the mass spectrometer useless. *Id.* at 2:18–21. Ultimately, “[w]hen the [mass] spectrometer’s performance

falls below a tolerable level it is necessary to replace or refurbish the mass filter at considerable cost.” *Id.* at 2:26–28

The ’553 patent purportedly addresses this and other problems by disclosing a two stage mass filter arrangement, wherein the filter closest to the ion beam source is called a “sacrificial filter” and the filter closest to the detector is called the “analysis filter.” Ex. 1001, 5:44–47, Fig. 1. “[T]he sacrificial filter acts to pre-filter the beam before it enters the analysis filter.” *Id.* at 5:52–53. As a result, a large amount of unwanted materials is removed by the sacrificial filter before it enters the analysis filter, yet at the same time the sacrificial filter allows substantially all ions of the required mass/charge ratio to be transmitted to the analysis filter. *Id.* at 5:58–62; *see also id.* at 4:66–5:1 (disclosing an advantage of “removing a majority of ions from the ion beam in the first filter stage, and hence reducing the beam current in the second filter stage”). The purported benefit of this arrangement is that the material deposited on the analysis filter is reduced, thereby allowing this filter to operate with very high resolving power for a longer period of time. *Id.* at 5:2–5; *see also id.* at 4:10–12 (disclosing an advantage of “operating with high resolution over much longer periods, compared to previous systems”).

C. Illustrative Claim

Of the challenged claims that remain for our consideration, claim 32 is the only independent claim at issue, and this claim is directed to “[a] method for reducing the deposition of material on multipole elements of a primary resolving filter of a mass spectrometer.” Ex. 1001, 11:43–45. Claims 33–35 and 62–66 directly or indirectly depend from independent claim 32.

Independent claim 32 is illustrative of the claims that remain for our consideration and is reproduced below:

32. A method for reducing the deposition of material on multipole elements of a primary resolving filter of a mass spectrometer, comprising:

emitting an ion beam from a beam source into a first mass filter stage, the ions in the beam having mass/charge ratios within a range of mass/charge ratios,

selecting at the first mass filter stage only ions having a sub-range of mass/charge ratios which includes a selected mass/charge ratio,

receiving only ions in said sub-range at a second mass filter stage in series with said first mass filter stage, said second mass filter stage constituting said primary resolving filter, and

selecting at the second mass filter stage only ions having a selected mass/charge ratio within the sub-range, thereby reducing the number of ions rejected in said primary resolving filter.

Id. at 11:43–59.

D. Prior Art Relied Upon

Agilent relies upon the following prior art references:

Inventor or Applicant¹	Patent or Publication No.	Relevant Dates	Exhibit No.
Douglas	U.S. Patent No. 6,191,417 B1	issued Feb. 20, 2001, filed Nov. 10, 1998	1007
Saito	JP Patent App. Pub. No. H10-214591, with certified translation	published Aug. 11, 1998, filed Jan. 30, 1997	1009 and 1010 (certified translation)
Marriott (“PCT375”)	PCT Pub. No. WO 00/16375	published Mar. 23, 2000, filed Sept. 16, 1999	1012
Vandermey	U.S. Patent No. 6,340,814 B1	issued Jan. 22, 2002, filed July 15, 1991	1013

Non-Patent Literature	Exhibit No.
Scott D. Tanner & Vladimir I. Baranov, <i>A Dynamic Reaction Cell for Inductively Coupled Plasma Mass Spectrometry (ICP-DRC-MS). II. Reduction of Interferences Produced Within the Cell</i> , 10 J. Am. Soc’y for Mass Spectrometry 1083 (1999) (“Tanner”)	1006

E. Asserted Grounds of Unpatentability

Agilent challenges claims 32–35 and 62–66 of the ’553 patent based on the asserted grounds of unpatentability (“grounds”) set forth in the table below. Pet. 8, 20–80.

¹ For clarity and ease of reference, we only list the first named inventor or applicant.

Reference(s)	Basis	Challenged Claim(s)
PCT375	§ 102(b)	32–35, 63, and 66
Tanner	§ 102(b)	32, 35, and 63–66
Douglas and Tanner	§ 103(a)	32–35 and 62–66
Douglas, Tanner, and Vandermey	§ 103(a)	62
Saito	§ 102(b)	32 and 62
Saito and Douglas	§ 103(a)	32–35, 62, and 63

II. ANALYSIS

A. Claim Construction

In an *inter partes* review proceeding, claim terms of an unexpired patent are given their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Under the broadest reasonable interpretation standard, claim terms are generally given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art, in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

In its Petition, Agilent proposes a construction for the claim phrase “a sub-range of mass/charge ratios which includes a selected mass charge ratio,” as recited in independent claim 32. Pet. 15–16. Throughout its substantive analysis of each asserted ground, Agilent contends that the preamble of independent claim 32 is not limiting, but even if it were limiting, the asserted prior art anticipates or renders obvious the features recited therein. *Id.* at 19–20, 29 (citing Ex. 1012, 1:31–2:7; Ex. 1004 ¶ 108),

50 (citing Ex. 1004 ¶ 178), 63 (citing Ex. 1004 ¶ 263), 73 (citing Ex. 1004 ¶ 329), 78. In response, Thermo proposes an alternative construction for the claim phrase “a sub-range of mass/charge ratios which includes a selected mass charge ratio,” as recited in independent claim 32. Prelim. Resp. 29–32. Thermo also presents arguments as to why the preamble of independent claim 32 is limiting. *Id.* at 38–40. Beginning with the preamble of independent claim 32, we address the disputes between the parties regarding claim construction in turn.

1. “[a] method for reducing the deposition of material on multipole elements of a primary resolving filter of a mass spectrometer”
(preamble of independent claim 32)

In its Petition, Agilent contends that the preamble of independent claim 32 is not limiting because it merely states the intended purpose of the method recited therein and does not limit the scope of this claim in any way. Pet. 19–20 (citing *Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp.*, 320 F.3d 1339, 1345 (Fed. Cir. 2003)). Even if the preamble of independent claim 32 is limiting, Agilent argues that the asserted prior art either anticipates or renders obvious the features recited therein, regardless of whether the prior art explicitly discloses the stated purpose of this claim. *Id.* at 20, 29, 50, 63, 73, 78.

In response, Thermo contends the preamble of independent claim 32 is limiting because it provides structural antecedent basis for the claim term “primary resolving filter” recited in the body of this claim, which, according to Thermo, serves as the essence of the claimed invention. Prelim. Resp. 39–40 (citing *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952–53 (Fed. Cir. 2006)). Thermo further argues that, like the words “growing” and “isolating” that appear in the preamble at issue in *Boehringer*, the recitation

of “reducing” in the preamble of independent claim 32 is “the *raison d’etre* of the claimed method itself,” and, therefore, is limiting. *Id.* (quoting *Boehringer*, 320 F.3d at 1345).

In considering whether a preamble is limiting, we analyze the preamble to ascertain whether it states a necessary and defining aspect of the invention, or whether it is simply an introduction to the general field of the claim. *On Demand Mach. Corp. v. Ingram Indus., Inc.*, 442 F.3d 1331, 1343 (Fed. Cir. 2006); *see also Bicon*, 441 F.3d at 952 (whether a preamble limits a claim is determined on a claim-by-claim basis). We construe a preamble as limiting “if it recites essential structure or steps, or if it is ‘necessary to give life, meaning, and vitality’ to the claim.” *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)). A preamble, however, is not limiting “where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.” *Id.* (quoting *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997)).

On the current record, we are persuaded by Thermo’s argument that the recitation of “a primary resolving filter” in the preamble of independent claim 32 is limiting because it states necessary and defining aspects of the invention embodied in this claim. “When limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention.” *Eaton Corp. v. Rockwell Int’l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003). Here, the recitation of “a primary resolving filter” in the preamble of independent claim 32 provides antecedent basis for the same claim term

recited in the body of this claim. The presence of this structure permits the performance of the last two method steps of independent claim 32. That is, without “a primary resolving filter” as recited in the preamble, the method steps of “receiving only ions in said sub-range at a second mass filter stage in series with said first mass filter stage” and “selecting at the second mass filter stage only ions having a selected mass/charge ratio within the sub-range” could not be performed.

On the current record, we are persuaded by Thermo’s argument that “reducing the deposition of material on multipole elements of a primary resolving filter” in the preamble of independent claim 32 is a limiting component of this claim because the aforementioned language is tied inextricably to the method steps recited therein, particularly to the claim phrase “thereby reducing the number of ions rejected in said primary resolving filter” recited in the body of independent claim 32. Indeed, the reduction in the number of ions rejected at the primary resolving filter is the natural result of the claimed “first mass filter stage” acting as a pre-filter that serves to reduce the number of ions received by the primary resolving filter that can be deposited thereon. Nonetheless, at this stage of the proceeding, we are persuaded equally by Agilent’s argument that, if the asserted prior art discloses all the method steps recited in independent claim 32 other than the preamble, it would also properly account for the preamble because it would result in reducing the deposition material at the primary resolving filter.

2. *“a sub-range of mass/charge ratios which includes a selected mass/charge ratio” (independent claim 32)*

In its Petition, Agilent contends that the broadest reasonable interpretation of the claim phrase “a sub-range of mass/charge ratios which

includes a selected mass/charge ratio” is “one or more m/z [mass/charge] ratios, including at least an m/z ratio selected by the second mass filter stage.” Pet. 15. To support its proposed construction, Agilent relies on the doctrine of claim differentiation, particularly the difference in language between independent claim 32 and now disclaimed, dependent claim 36. *Id.* at 16.

In response, Thermo contends that the broadest reasonable interpretation of this claim phrase is “a subset of a range of mass/charge ratios, the subset including a selected mass/charge ratio and at least one other mass/charge ratio.” Prelim. Resp. 29 (citing Ex. 1001, 11:50–51). Thermo argues that its proposed construction is consistent with the plain language of independent claim 32, which requires that the claimed “sub-range” include the selected mass/charge ratio—not that the claimed “sub-range” can consist only of the selected mass/charge ratio. *Id.* Thermo also argues that the claimed “sub-range of mass/charge ratios” includes more than just a single mass/charge ratio. *Id.* (citing Ex. 1001, 11:49–51, 11:56–57 (emphasis added)). Thermo directs us to a portion of the specification of the ’553 patent that purportedly distinguishes between a broader sub-range of mass/charge ratios that includes the selected ratio, and the narrower selected mass/charge ratio itself. *Id.* at 30 (citing Ex. 1001, 4:12–15).

Thermo contends that Agilent’s proposed construction, which provides that a single, selected mass/charge ratio satisfies the claimed “sub-range of mass/charge ratios,” is inconsistent with the plain language of independent claim 32 and the specification of the ’553 patent. Prelim. Resp. 30–31. Thermo also argues that Agilent’s reliance on the doctrine of claim

differentiation is misplaced as this doctrine cannot trump the plain language of independent claim 32 and the specification, neither of which is addressed specifically by Agilent. *Id.* at 31–32.

On the current record, we are persuaded that Thermo’s proposed construction of the claim phrase “a sub-range of mass/charge ratios which includes a selected mass/charge ratio” constitutes the broadest reasonable interpretation in light of the specification of the ’553 patent. The U.S. Court of Appeals for the Federal Circuit has instructed us that “claims [should be] interpreted with an eye toward giving effect to all terms in the claim.” *Bicon*, 441 F.3d at 950 (citations omitted). Here, Thermo’s proposed construction is consistent with the plain meaning of “ratios,” which is plural, and gives effect to all the terms of independent claim 32—specifically, both a sub-range of “mass/charge ratios” and a selected “mass/charge ratio.” That is, Thermo’s proposed construction requires the claimed “sub-range of mass/charge ratios” to include at least two mass/charge ratios—namely, “a selected mass/charge ratio and at least one other mass/charge ratio.” On the other hand, interpreting the claimed “sub-range of mass/charge ratios” to encompass only “one mass/charge ratio,” as urged by Agilent, would render the claim term “ratios” in independent claim 32 superfluous over the claim term “ratio.”

Thermo’s proposal to construe the claimed “sub-range of mass/charge ratios” to include at least two mass/charge ratios is also consistent with the specification of the ’553 patent. The claimed “sub-range of mass/charge ratios” appears verbatim in the specification on six occasions. Ex. 1001, [57], 3:7–8, 3:16–17, 3:40–41, 3:57, 4:2. In each of these six occurrences, the specification refers to the “sub-range of mass/charge ratios” using the

plural form “ratios” and immediately thereafter refers to that sub-range as including a “selected mass/charge ratio” using the singular form “ratio.”

We are not persuaded that Agilent’s proposed construction constitutes the broadest reasonable interpretation for three reasons. First, as we explain above, Agilent’s proposed construction does not give effect to all the terms in independent claim 32 because interpreting the phrase claimed “sub-range of mass/charge ratios” to encompass only “one mass/charge ratio” would render the claim term “ratios” in independent claim 32 superfluous. Second, “the protocol of giving claims their broadest reasonable interpretation . . . does not include giving claims a legally incorrect interpretation” that is “divorced from the specification and the record evidence.” *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015) (first quoting *In re Skvorecz*, 580 F.3d 1262, 1267 (Fed. Cir. 2009); and then quoting *In re NTP, Inc.*, 654 F.3d 1279, 1288 (Fed. Cir. 2011)). Here, Agilent relies solely on the doctrine of claim differentiation to support its proposed construction and does not explain adequately how construing the claimed “sub-range of mass charge ratios” to encompass only “one mass/charge ratio” is supported by the specification of the ’553 patent.

Third, Agilent’s reliance on the doctrine of claim differentiation is misplaced. This doctrine “is based on ‘the common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope.’” *Andersen Corp. v. Fiber Composites, LLC*, 474 F.3d 1361, 1369 (Fed. Cir. 2007) (quoting *Karlin Tech. Inc. v. Surgical Dynamics, Inc.*, 177, F.3d 968, 971–72 (Fed. Cir. 1999)). Generally, this doctrine is applied to resolve ambiguity when a claim would otherwise be superfluous. *See id.* at 1369–70 (“To the

extent that the absence of such difference in meaning and scope would make a claim superfluous, the doctrine of claim differentiation states the presumption that the difference between claims is significant.”). Of particular importance to the instant proceeding, the Federal Circuit “has declined to apply the doctrine of claim differentiation where ‘the claims are not otherwise identical in scope.’” *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1238 (Fed. Cir. 2016) (quoting *Indacon, Inc. v. Facebook, Inc.*, 842 F.3d 1352, 1358 (Fed. Cir. 2016)); *see also Andersen*, 474 F.3d at 1370 (holding that another “reason for not applying the doctrine of claim differentiation in this case is that the . . . claims are not otherwise identical Instead, there are numerous other differences varying the scope of the claimed subject matter.”). Here, Agilent primarily relies on the difference in language between independent claim 32 and now disclaimed, dependent claim 36. *See* Pet. 16. Dependent claim 36, however, includes additional limitations not recited in independent claim 32 (i.e., “a multi-pole mass filter” and a “[radio frequency]:[direct current] ratio [that] determines a band pass width of the multipole mass filter”). *Compare* Ex. 1001, 11:43–59, *with id.* at 12:1–8. Indeed, dependent claim 36 supports Thermo’s proposed construction because it explicitly requires the band pass width of the first filter stage (i.e., a sub-range of mass/charge ratios) to be broader than, rather than co-extensive with, the band pass width of the second filter stage (i.e., a selected mass/charge ratio). *Id.*

On the current record, and for purposes of this Decision, we are persuaded by Thermo’s argument that the broadest reasonable interpretation of “a sub-range of mass/charge ratios which includes a selected mass/charge

ratio” is “a subset of a range of mass/charge ratios, the subset including a selected mass/charge ratio and at least one other mass/charge ratio.”

B. Anticipation by PCT375

Agilent contends that claims 32–35, 63, and 66 are anticipated under § 102(b) by PCT375. Pet. 20–42. Agilent explains how PCT375 purportedly discloses the subject matter of each challenged claim. *Id.* Agilent also relies upon the Declaration of Richard A. Yost, Ph.D. to support its positions. Ex. 1004 ¶¶ 108–115, 126, 127. On this record, we are persuaded by Agilent’s explanations and supporting evidence.

We begin our analysis with the principles of law that generally apply to a ground based on anticipation, followed by a brief overview of PCT375, and then we address the parties’ contentions with respect to independent claim 32.

1. Principles of Law

To establish anticipation, “all of the elements and limitations of the claim must be shown in a single prior reference, arranged as in the claim.” *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). When evaluating a single prior art reference in the context of anticipation, the reference must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)). Accordingly, “the dispositive question regarding anticipation [i]s

whether *one skilled in the art*² would reasonably understand or infer from the [prior art reference's] teaching' that every claim element was disclosed in that single reference." *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003) (alterations in original) (quoting *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991)). We analyze this asserted ground based on anticipation with the principles stated above in mind.

2. PCT375 Overview

PCT375 generally relates to inductively coupled plasma mass spectrometry, but readily admits that the concepts disclosed therein may be applied to any type of mass spectrometer that generates unwanted ions, as well as ions of analytical significance. Ex. 1012, 1:6–14. According to PCT375, a common problem in mass spectrometry, especially when performed using low-resolution devices such as quadrupoles, is the presence of unwanted ions in the mass spectrum that impair the detection of certain elements. *Id.* at 1:31–34. PCT375 purportedly addresses this and other problems by disclosing a mass spectrometer with two quadrupoles in tandem. *Id.* at 5:13–29, Fig. 2. Both quadrupoles are capable of operating

² Relying on the testimony of Dr. Yost, Agilent offers an assessment as to the level of skill in the art as of May 2002, which is the earliest priority date on the face of the '553 patent. Pet. 9–10 (citing Ex. 1004 ¶ 23). Thermo's assessment is different from Agilent's assessment insofar as it requires one of ordinary skill in the art to have *approximately* two to three years of experience—not *at least* two to three years of experience, as urged by Agilent. Prelim. Resp. 5–6 n.4. To the extent necessary, and for purposes of this Decision, we accept the assessment offered by Agilent with Thermo's qualification of "approximately two to three years of experience" because it is consistent with the '553 patent and the asserted prior art.

as mass selective ion optical devices. *Id.* at 8:11–31. In particular, PCT375 discloses that the first ion optical device may be a “mass selective device” that “can be driven so as to transmit only ions of a specific [mass/charge] ratio (m/e) or a range of m/e ” and “functions as an auxiliary mass filter.” *Id.* at 8:9–16. PCT375 also discloses a mass-to-charge ratio analyzing means that may “include[] a main mass filter.” *Id.* at 8:5–8. These filters are in series as the ion beam passes from the source to the “auxiliary mass filter,” and then eventually to the “main mass filter.” *Id.* at 8:17–20.

3. Claim 32

Agilent contends that PCT375’s disclosure of removing unwanted ions from a mass spectrometer using an auxiliary mass filter discloses all the limitations recited in independent claim 32. Pet. 29–32. Beginning with the language in the preamble of “[a] method for reducing the deposition of material on multipole elements of a primary resolving filter of a mass spectrometer” (Ex. 1001, 11:43–45), Agilent argues that the features recited therein are not limiting, but even if these features are limiting, PCT375’s experiments are directed to the “same purpose and achieve the same results.” Pet. 29 (citing Ex. 1012, 1:31–2:7). Relying on the testimony of Dr. Yost, Agilent argues that one effect of having a first mass filter stage, such as the auxiliary mass filter disclosed in PCT375, is to reduce the deposition of material on subsequent multipole elements in the mass spectrometer. *Id.* (citing Ex. 1004 ¶ 108 (citing Ex. 1001, 4:67–5:15)).

The first step in independent claim 32 recites “emitting an ion beam from a beam source into a first mass filter stage, the ions in the beam having mass/charge ratios within a range of mass/charge ratios.” Ex. 1001, 11:46–48 (“emitting’ step”). Agilent contends that PCT375 discloses this

“emitting” step because an “inductively coupled plasma” source emits an ion beam from a source to the auxiliary mass filter. Pet. 30 (citing Ex. 1012, 1:18–30, 5:3–29, 8:9–20, 9:7–14; Ex. 1004 ¶ 109).

The second step in independent claim 32 recites “selecting at the first mass filter stage only ions having a sub-range of mass/charge ratios which includes a selected mass/charge ratio.” Ex. 1001, 11:49–51 (“‘first selecting’ step”). Agilent contends that PCT375 discloses this “first selecting” step because the auxiliary mass filter, which constitutes the claimed “first mass filter stage,” is configured to select ions having mass/charge ratios within a particular range of mass/charge ratios that is a subset of the range of mass/charge ratios emitted from the “inductively coupled plasma” source. Pet. 25, 30 (citing Ex. 1012, 8:9–16; Ex. 1004 ¶ 67).

The third step of independent claim 32 recites “receiving only ions in said sub-range at a second mass filter stage in series with said first mass filter stage, said second mass filter stage constituting said primary resolving filter.” Ex. 1001, 11:52–55 (“‘receiving’ step”). Agilent contends that PCT375 discloses this “receiving” step because the auxiliary mass filter passes ions having mass/charge ratios that are within a selected sub-range of mass/charge ratios to the main mass filter, which constitutes the claimed “second mass filter stage” or “primary resolving filter.” Pet. 31 (citing Ex. 1012, 8:17–20; Ex. 1004 ¶¶ 109, 110). Agilent also argues that PCT375 discloses that the ions that pass through the auxiliary mass filter have mass/charge ratios that are within a sub-range of mass/charge ratios that is broader than and includes the mass/charge ratio selected at the main mass filter. *Id.* (citing Ex. 1012, 8:9–16, 8:23–9:4; Ex. 1004 ¶¶ 109, 110).

The fourth step of independent claim 32 recites “selecting at the second mass filter stage only ions having a selected mass/charge ratio within the sub-range, thereby reducing the number of ions rejected in said primary resolving filter.” Ex. 1001, 11:56–59 (“‘second selecting’ step”). Agilent contends that PCT375 discloses this “second selecting” step because the auxiliary mass filter removes ions having mass/charge ratios outside its transmission bandpass, thereby allowing the main mass filter to operate on an ion current having reduced intensity. Pet. 32 (citing Ex. 1012, 8:36–9:4; Ex. 1004 ¶¶ 111, 112). Stated differently, Agilent argues that PCT375 discloses filtering the range of ions at the auxiliary mass filter to a range of mass/charge ratios, which would decrease the number of ions that reach the main mass filter. *Id.* (citing Ex. 1012, 8:12–20; Ex. 1004 ¶ 112). Based on the aforementioned disclosures in PCT375, we understand Agilent to take the position that PCT375’s main mass filter is capable of being operated in a manner that only allows ions having a particular mass/charge ratio within the sub-range to pass. *See id.*

Based upon our review of the current record, we discern no deficiency in Agilent’s characterization of PCT375 and the knowledge in the art, or in Agilent’s assertions as to the reasonable inferences one of ordinary skill in the art would be expected to draw from the disclosures in PCT375. In addition, for purposes of this Decision, we accept Dr. Yost’s testimony concerning the relevant disclosures in PCT375.

In its Preliminary Response, Thermo presents two arguments directed to independent claim 32. First, Thermo contends that the preamble of independent claim 32 is limiting. Prelim. Resp. 40–41. Thermo then argues that Agilent’s position that PCT375 properly accounts for the preamble

because it is directed to “the same purpose and achieve[s] the same result[.]” tells us nothing about reducing the deposition of material on the primary resolving filter. *Id.* at 41 (citing Ex. 1012, 1:31–2:7). According to Thermo, the background section of PCT375 relied on by Agilent simply discusses the general problem of interferences in mass spectrometry. *Id.* Thermo further argues that we should not find Dr. Yost’s supporting testimony on this issue persuasive as he relies on the teachings of the ’553 patent to guide his analysis and, therefore, his testimony in this regard is the epitome of impermissible hindsight reconstruction. *Id.* Thermo also argues that Dr. Yost’s supporting testimony fails to address the specific language of the preamble—namely, reducing deposits on the “multipole elements of the primary resolving filter.” *Id.* at 41–42.

As we explain in our claim construction section above, we are persuaded by Thermo’s argument that the preamble of independent claim 32 is limiting because it states necessary and defining aspects of the invention embodied in this claim. *See supra* Section II.A.1. Nonetheless, we are persuaded by Agilent’s argument that, if the asserted prior art discloses all the method steps recited in independent claim 32 other than the preamble, it would properly account for the preamble because it would result in reducing the deposition material at the primary resolving filter. *Id.* PCT375 readily admits that a common problem in mass spectrometry, especially when using low-resolution devices such as quadrupoles, is the presence of unwanted ions in the mass spectrum that impair the detection of certain elements. Ex. 1012, 1:31–34. PCT375 addresses this problem by disclosing a two stage filtration process, in which the auxiliary mass filter may be configured to select ions having mass/charge ratios with a particular range of

mass/charge ratios, thereby decreasing the number of ions that reach the main mass filter. *See id.* at 8:9–20.

These aforementioned disclosures in PCT375 are consistent with Dr. Yost's testimony that one effect of PCT375's auxiliary mass filter is that it reduces the deposition of material on subsequent multipole elements. Ex. 1004 ¶ 108. We understand Dr. Yost to testify that one of ordinary skill in the art would have reasonably understood that PCT375's disclosure of using an auxiliary mass filter (i.e., first mass filter stage) to reduce the material transmitted to the main mass filter results in reducing the deposition of material on the main mass filter (i.e., second mass filter stage or primary resolving filter). Dr. Yost's reliance on the specification to the '553 patent in this context appears to be limited to showing the natural result of a process that is otherwise disclosed in PCT375. *See King Pharm., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1275–76 (Fed. Cir. 2010). Therefore, on the current record, Agilent has presented sufficient evidence that would support a finding that PCT375 properly accounts for the preamble of independent claim 32.

Second, Thermo contends that Agilent does not explain adequately how PCT375 discloses the “first selecting” step recited in independent claim 32. Prelim. Resp. 42–43. In particular, Thermo argues that Agilent's position as to how PCT375's auxiliary mass filter selects ions only having “a sub-range of mass/charge ratios which includes a selected mass/charge ratio” is based on a flawed claim construction. *Id.* at 43.

As we explain in our claim construction section above, we are persuaded by Thermo's argument that the broadest reasonable interpretation of “a sub-range of mass/charge ratios which includes a selected mass/charge

ratio” is “a subset of a range of mass/charge ratios, the subset including a selected mass/charge ratio and at least one other mass/charge ratio.” *See supra* Section II.A.2. PCT375 discloses that the auxiliary mass filter, which constitutes the claimed “first mass filter stage,” is configured to select ions having mass/charge ratios within a particular range of mass/charge ratios that is a subset of the range of mass/charge ratios emitted from the “inductively coupled plasma” source. Ex. 1012, 8:9–27. These selected ions having mass/charge ratios within a particular range of mass/charge ratios include ions having different mass/charge ratios. *See id.* at 8:12–16 (disclosing that auxiliary mass filter “can be driven so as to transmit only ions of a specific mass to charge ratio (m/e) or a range of m/e”). Agilent, therefore, presents sufficient evidence that would support a finding that PCT375 properly accounts for selecting “a sub-range of mass/charge ratios which includes a selected mass/charge ratio,” as properly construed.

In summary, based on the current record, Agilent has demonstrated a reasonable likelihood that it would prevail on its assertion that the subject matter of independent claim 32 is anticipated by PCT375.

4. *Claims 33–35, 63, and 66*

We have reviewed Agilent’s explanations and supporting evidence regarding dependent claims 33–35, 63, and 66. Pet. 34–40. At this stage in the proceeding, we need not reach the merits of the parties’ arguments as to whether PCT375 discloses the subject matter of dependent claims 33 and 34 (*compare* Pet. 34–40, *with* Prelim. Resp. 44–45) because, as we explain above, there is a reasonable likelihood that Agilent would prevail on its assertion that the subject matter of at least one of the challenged claims is anticipated by PCT375.

C. Anticipation by Tanner

Agilent contends that claims 32, 35, and 63–66 are anticipated under § 102(b) by Tanner. Pet. 43–54. Agilent explains how Tanner purportedly discloses the subject matter of each challenged claim. *Id.* Agilent also relies upon the Declaration of Dr. Yost to support its positions. Ex. 1004 ¶¶ 178–187, 207–210. On this record, we are persuaded by Agilent’s explanations and supporting evidence.

We begin our analysis with a brief overview of Tanner, and then we address the parties’ contentions with respect to independent claim 32.

1. Tanner Overview

Tanner discloses an inductively coupled plasma mass spectrometer with two quadrupoles in tandem. Ex. 1006, 1086–87.³ The first quadrupole is either a fixed or dynamic bandpass filter and the second quadrupole is referred to as a mass analyzer or as a downstream mass filter. *Id.* According to Dr. Yost, a “bandpass filter” transmits ions in a range or band that spans between high and low mass/charge ratio cutoff values. Ex. 1004 ¶ 131 n.4. Likewise, Dr. Yost testifies that a “mass analyzer allows ions of a specific mass-to-charge ratio (m/z or m/e) to pass through a detector apparatus while filtering out all other ions to prevent those extraneous ions from reaching the detector while the detector is measuring ions of a set m/z value.” *Id.* ¶ 33. Tables 1 and 2 of Tanner disclose experiments in which the bandpass filter

³ All references to the page numbers in Tanner refer to the original page numbers that appear in the top, left-hand corner or top, right-hand corner of each page in Exhibit 1006.

selects ions have a sub-range of mass/charge ratios that includes a selected mass/charge ratio of an analytic ion. Ex. 1006, 1089–90; Ex. 1004 ¶ 139.

2. Claim 32

Agilent contends that Tanner’s disclosure regarding the operation of its inductively coupled plasma mass spectrometer with two quadrupoles in tandem discloses all the limitations recited in independent claim 32. Pet. 50–52. Beginning with the language in the preamble of independent claim 32, Agilent argues that the features recited therein are not limiting, but even if these features are limiting, Tanner discloses methods that fulfill the recited purpose of this claim. *Id.* at 50. Relying on the testimony of Dr. Yost, Agilent argues that one effect of having a first mass filter stage, such as the bandpass filter disclosed in Tanner, is to reduce the deposition of material on subsequent multipole elements in the mass spectrometer. *Id.* (citing Ex. 1004 ¶ 178 (citing Ex. 1001, 4:67–5:15)).

Agilent contends that Tanner discloses the “emitting” step recited in independent claim 32 because its source emits an ion beam into the bandpass filter in series with the downstream mass filter. Pet. 50 (citing Ex. 1006, 1084–85; Ex. 1004 ¶ 179). Agilent argues that the experiments disclosed in Tanner introduce samples (e.g., “a 1-ppb mixed analyte sample”) into the inductively coupled plasma source of a mass spectrometer having a bandpass filter and a downstream mass filter. *Id.* (quoting Ex. 1006, 1088). Agilent further argues that Tanner’s ion beam contains ions having mass/charge ratios within a range of mass/charge ratios (e.g., “impurity gases”). *Id.* (quoting Ex. 1006, 1084–85).

Agilent contends that Tanner discloses the “first selecting” step recited in independent claim 32 because “the quadrupole reaction cell offers

the potential to define a mass bandpass window.” Pet. 46 (quoting Ex. 1006, 1085; Ex. 1004 ¶ 138), 50 (citing Ex. 1006, 1085–86). According to Agilent, the experiments disclosed in Tables 1 and 2 of Tanner, and those illustrated in Figures 2, 6, 8b, and 9, serve as evidence that the quadrupole reaction cell—configured as a bandpass filter—constitutes the claimed “first mass filter stage” that selects ions having a sub-range of mass/charge ratios that includes a selected mass/charge ratio of an analytic ion. *Id.* at 46 (citing Ex. 1006, 1089–90; Ex. 1004 ¶ 139), 50–51 (citing Ex. 1006, 1091–93; Ex. 1004 ¶¶ 180–83).

Agilent contends that Tanner discloses the “receiving” step recited in independent claim 32 because a downstream mass filter, which constitutes the claimed “second mass filter stage” or “primary resolving filter,” receives ions within the transmission bandpass of the quadrupole reaction cell (i.e., within a sub-range of mass/charge ratios that are pre-filtered by transmission through the bandpass filter). Pet. 51–52 (citing Ex. 1006, 1089–1093; Ex. 1004 ¶ 184). Agilent contends that Tanner discloses the “second selecting” step recited in independent claim 32 because the experiments disclosed in Tanner indicate that the downstream mass filter selects analyte ions having a particular mass/charge ratio within the subset of mass/charge ratios in the transmission bandpass of the reaction cell. *Id.* at 52 (citing Ex. 1006, 1089–90; Ex. 1004 ¶ 185). Agilent further argues that, because the reaction cell filters out ions having mass/charge ratios outside its transmission bandpass, the downstream mass filter operates on a reduced number of ions (i.e., on a reduced ion beam current). *Id.* (citing Ex. 1004 ¶ 186).

Based upon our review of the current record, we discern no deficiency in Agilent's characterization of Tanner and the knowledge in the art, or in Agilent's assertions as to the reasonable inferences one of ordinary skill in the art would be expected to draw from the disclosures in Tanner. In addition, for purposes of this Decision, we accept Dr. Yost's testimony concerning the relevant disclosures in Tanner.

In its Preliminary Response, Thermo contends that Tanner does not anticipate independent claim 32 because Tanner fails to account for the preamble of this claim. Prelim. Resp. 45. Thermo argues that Agilent fails to address Tanner's disclosure that, when presenting the collision cell with gas having trace level contaminants, new interference ions may be produced in the collision cell itself. *Id.* at 46. Based on this particular scenario, Thermo asserts that Agilent has not demonstrated that it would necessarily result in the reduction of deposition material on the downstream mass filter, as required by the preamble of independent claim 32. *Id.*

As we explain in our claim construction section above, we are persuaded by Thermo's argument that the preamble of independent claim 32 is limiting because it states necessary and defining aspects of the invention embodied in this claim. *See supra* Section II.A.1. Nonetheless, we are persuaded by Agilent's argument that, if the asserted prior art discloses all the method steps recited in independent claim 32 other than the preamble, it would properly account for the preamble of this claim because it would result in reducing deposition material at the primary resolving filter. *Id.* Tanner states that it offers the potential to achieve "efficiency in the removal of interfering ions prior to mass analysis." Ex. 1006, 1083; *see also id.* at 1086 ("It is shown that sweeping the bandpass of the reaction cell in concert

with the mass analyzer allows optimum transmission of the analyte ions across the mass spectrum” while at the same time providing for the elimination of interferences and the suppression of new interferences within the reaction cell.). Tanner achieves such efficiency by disclosing a two stage filtration process, in which the reaction cell operates as a bandpass filter that selects ions having a mass/charge ratio within a sub-range of mass/charge ratios that includes a selected mass/charge ratio of an analyte ion, thereby decreasing the number of ions that reach the downstream mass filter. Ex. 1006, 1086–1093, Tbls. 1–2, Figs. 2, 6, 8b, 9.

These aforementioned disclosures in Tanner are consistent with Dr. Yost’s testimony that one effect of Tanner’s bandpass filter is that it reduces the deposition of material on subsequent multipole elements. Ex. 1004 ¶ 178. We understand Dr. Yost to testify that one of ordinary skill in the art would have reasonably understood that Tanner’s disclosure of using a reaction cell as a bandpass filter (i.e., first mass filter stage) reduces the deposition of material on the downstream mass filter (i.e., second mass filter stage or primary resolving filter). Dr. Yost’s reliance on the specification to the ’553 patent in this context appears to be limited to showing the natural result of a process that is otherwise disclosed in Tanner. *See King Pharm.*, 616 F.3d at 1275–76. Therefore, on the current record, Agilent has presented sufficient evidence that would support a finding that Tanner properly accounts for the preamble of independent claim 32.

In summary, based on the current record, Agilent has demonstrated a reasonable likelihood that it would prevail on its assertion that the subject matter of independent claim 32 is anticipated by Tanner.

3. Claims 32, 35, and 63–66

We have reviewed Agilent’s explanations and supporting evidence regarding dependent claims 32, 35, and 63–66. *See* Pet. 53–55. At this stage in the proceeding, we need not reach the merits of Agilent’s arguments as to whether Tanner properly accounts for the subject matter of these dependent claims (*id.*) because, as we explain above, there is a reasonable likelihood that Agilent would prevail on its assertion that the subject matter of at least one of the challenged claims is anticipated by Tanner.

D. Obviousness Based on the Combined Teachings of Douglas and Tanner

Agilent contends that claims 32–35 and 62–66 are unpatentable under § 103(a) over the combined teachings of Douglas and Tanner. Pet. 54–68. Agilent explains how this proffered combination purportedly teaches the subject matter of each challenged claim, and asserts that a person of ordinary skill in the art would have had a sufficient reason to combine or modify the teachings of the references. *Id.* Agilent also relies upon the Declaration of Dr. Yost to support its positions. Ex. 1004 ¶¶ 215, 216, 263–268, 299–60. On this record, we are persuaded by Agilent’s explanations and supporting evidence.

We begin our analysis with the principles of law that generally apply to a ground based on obviousness, followed by a brief overview of Douglas, and then we address the parties’ contentions with respect to independent claim 32.

1. Principles of Law

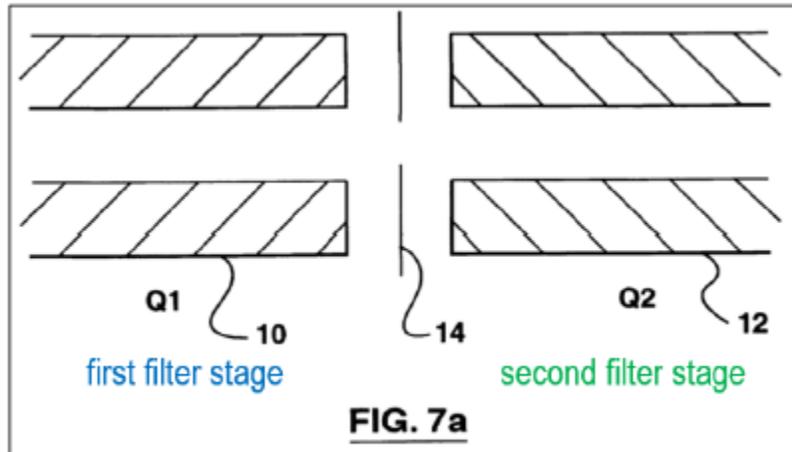
A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a

whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective indicia of non-obviousness (i.e., secondary considerations).⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze this asserted ground based on obviousness with the principles identified above in mind.

2. *Douglas Overview*

Douglas generally relates to a mass spectrometer that includes multiple mass analysis stages, such as a tandem quadrupole spectrometer system. Ex. 1007, 1:7–10. In particular, Douglas discloses a mass spectrometer with two quadrupoles, each of which operates in a mass analyzing mode. *Id.* at 2:65–67. Figure 7a of Douglas, reproduced below with annotations added by Agilent, illustrates an embodiment of a tandem quadrupole apparatus. Pet. 55; Ex. 1007, 5:35–38.

⁴ Thermo does not present arguments or evidence of such secondary considerations in its Preliminary Response. *See* Prelim. Resp. 52.



As illustrated in Figure 7a of Douglas, reproduced above, two quadrupoles Q1 and Q2 operate in tandem and in a manner in which both quadrupoles mass select the same ion. *Id.* at 9:13–17, 9:41–46. Although Douglas discloses that each quadrupole may operate at the same constant resolution, Douglas also contemplates that the two quadrupoles may operate at different resolutions. *Id.* at 13:15–16, 13:25–27.

3. Claim 32

Agilent contends that Douglas’s mass spectrometer with two quadrupoles operating in tandem discloses all the limitations recited in independent claim 32, except the “first selecting” step, the “receiving” step, and the “second selecting” step. Pet. 63 (citing Ex. 1012, 13:43–49; Ex. 1004 ¶¶ 263, 264). Agilent turns to Tanner’s technique of operating two mass filter stages in tandem to teach these remaining steps. *Id.* (citing Ex. 1006, 1086–87, Tbls. 1–2, Ex. 1004 ¶ 265). Agilent then argues that it would have been obvious to one of ordinary skill in the art to operate Douglas’s instruments in the manner taught by Tanner—namely, having a bandpass filter as the first filter stage and a conventional mass analyzer as

the second filter stage—in order to improve the resolution of Douglas’s mass spectrometer. *Id.* at 59 (citing Ex. 1004 ¶ 216). Agilent asserts Douglas discloses a mass spectrometer having two filter stages that are capable of operating in different resolutions at the same tip of a given stability region. *Id.* at 58–59 (citing Ex. 1007, 13:25–27; Ex. 1004 ¶ 216). According to Agilent, one of ordinary skill in the art would have understood that Douglas’s teaching in this regard meant that the first filter stage may be a bandpass filter (i.e., having a lower resolution), and the second filter stage may be a conventional mass analyzer (i.e., having a higher resolution), as taught by Tanner. *Id.* (citing Ex. 1004 ¶ 216).

Based upon our review of the current record, we discern no deficiency in Agilent’s characterization of Douglas, Tanner, and the knowledge in the art, or in Agilent’s reasoning as to why one of ordinary skill in the art would have been prompted to modify or combine the teachings of Douglas and Tanner. In addition, for purposes of this Decision, we accept Dr. Yost’s testimony concerning the relevant teachings of Douglas and Tanner.

In its Preliminary Response, Thermo contends that Agilent has not provided a sufficient rationale to combine the teachings of Douglas and Tanner because modifying Douglas in the manner proposed by Agilent would defeat the entire purpose of Douglas. Prelim. Resp. 47–48. According to Thermo, Dr. Yost’s supporting testimony on this issue is hindsight-driven (*id.* at 47) and does not account for Douglas’s statement that “the present invention provides for two quadrupoles operated in tandem and at conditions such that they both mass select the same ion. Then their two characteristics or peak shapes can be combined to give a single, enhanced, higher resolution peak” (*id.* at 47–48 (quoting Ex. 1007, 9:13–

15)). Thermo further argues that Agilent does not address how the proximity of the quadrupoles in Douglas would impact the operation of its mass spectrometer if one of the quadrupoles were modified to operate as a bandpass filter, as taught by Tanner. *Id.* at 48. Thermo also argues that Agilent does not address how the differences between the apparatuses taught by Douglas and Tanner would impact the reasonable expectation of success in combining the relevant teachings of these references. *Id.*

On the current record, we are not persuaded by Thermo's argument that modifying Douglas in the manner proposed by Agilent would defeat the entire purpose of Douglas. Thermo's argument in this regard gives cursory treatment to the explicit teaching in Douglas that provides an option for operating the two quadrupoles at different resolutions. *See* Prelim. Resp. 47; Ex. 1007, 13:25–27. This disclosure in Douglas is consistent with Dr. Yost's testimony that a person of ordinary skill in the art would have understood that Douglas's first filter stage may be a bandpass filter (i.e., having a lower resolution), and the second filter stage may be a conventional mass analyzer (i.e., having a higher resolution). Ex. 1004 ¶ 216.

On the current record, we also are not persuaded by Thermo's argument that Agilent does not address how the proximity of the quadrupoles in Douglas would impact the operation of its mass spectrometer if one of the quadrupoles were modified to operate as a bandpass filter, as taught by Tanner. Nor are we persuaded by Thermo's argument that Agilent fails to address how the differences between the apparatuses taught by Douglas and Tanner would impact the reasonable expectation of success in combining the relevant teachings of these references. Apart from mere attorney argument, the record before us does not include sufficient or

credible evidence that the proximity of the quadrupoles in Douglas would impact the operation of its mass spectrometer if one of the quadrupoles were modified to operate as a bandpass filter, as taught by Tanner. Nor does the record before us include sufficient or credible evidence that the differences between the apparatuses taught by Douglas and Tanner would impact the reasonable expectation of success in combining their relevant teachings in the manner asserted by Agilent. *Cf. In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (explaining that attorney arguments and conclusory statements that are unsupported by factual evidence are entitled to little probative value). Instead, on the current record, we are persuaded that Agilent has presented sufficient evidence that would support its explanation as to why one of ordinary skill in the art would have been motivated to incorporate Tanner's technique of operating two mass filter stages in tandem into Douglas's mass spectrometer. *See* Pet. 58–59; Ex. 1007, 13:25–27; Ex. 1004 ¶¶ 215, 216.

In summary, based on the current record, Agilent has demonstrated a reasonable likelihood that it would prevail on its assertion that the subject matter of independent claim 32 would have been obvious over the combined teachings of Douglas and Tanner.

4. *Claims 33–35 and 62–66*

We have reviewed Agilent's explanations and supporting evidence regarding dependent claims 33–35 and 62–66. Pet. 64–68. At this stage in the proceeding, we need not reach the merits of the parties' arguments as to whether the combined teachings of Douglas and Tanner account for the subject matter of dependent claims 33–35 and 62–66 (*compare* Pet. 64–68, *with* Prelim. Resp. 48–49) because, as we explain above, there is a

reasonable likelihood that Agilent would prevail on its assertion that the subject matter of at least one of the challenged claims would have been obvious over the combined teachings of Douglas and Tanner.

E. Anticipation by Saito

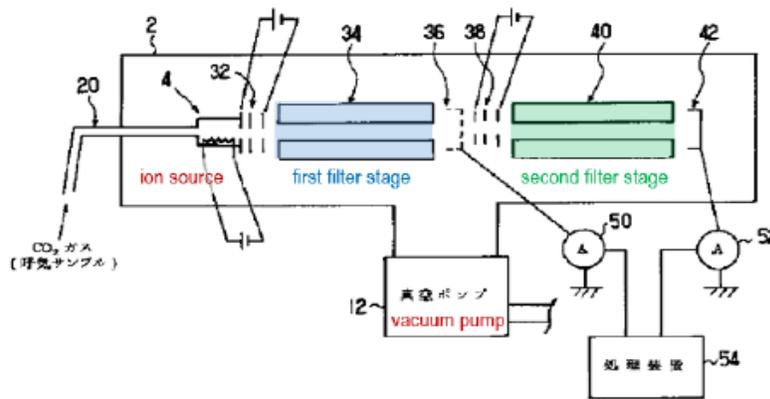
Agilent contends that claims 32 and 62 are anticipated under § 102(b) by Saito. Pet. 70–74. Agilent explains how Saito purportedly discloses the subject matter of each challenged claim. *Id.* Agilent also relies upon the Declaration of Dr. Yost to support its positions. Ex. 1004 ¶¶ 329–332, 334. On this record, we are persuaded by Agilent’s explanations and supporting evidence.

We begin our analysis with a brief overview of Saito, and then we address the parties’ contentions with respect to independent claim 32.

1. Saito Overview

Saito generally relates to an isotope analyzing device and, in particular, to an isotope analyzing device that uses a mass filter to selectively pass particles of specific mass numbers. Ex. 1010 ¶ 1. In one embodiment, Saito discloses an isotope analyzing device that includes two quadrupole filters in series. *Id.* ¶ 49. The quadrupole filter on the front stage side is referred to as the “front stage filter,” and the quadrupole filter on the back stage side is referred to as the “back stage filter.” *Id.* The front stage filter and the back stage filter are set to different filter characteristics. *Id.* Figure 7 of Saito, reproduced below with annotations added by Agilent, illustrates a structural diagram of the isotope analyzing device in accordance with the embodiment discussed above. Pet. 71.

【図7】 Figure 7



As illustrated in Figure 7, reproduced above, ionizing device 4 emits ions into front stage filter 34, which, in turn, passes certain ions based on its filter characteristics to back stage filter 40. Ex. 1010 ¶¶ 58, 61–65.

2. Claim 32

Agilent contends that Saito’s disclosure regarding the operation of its isotope analyzing device that includes two filters in series discloses all the limitations recited in independent claim 32. Pet. 73. Beginning with the language in the preamble of independent claim 32, Agilent argues that the features recited therein are not limiting, but even if these features are limiting, Saito’s experiments are directed to the “same purpose to achieve the same results.” *Id.* (citing Ex. 1004 ¶¶ 329–332). Relying on the testimony of Dr. Yost, Agilent argues that, when in operation, one of ordinary skill in the art would have known that the first mass filter in Saito’s isotope analyzing device reduces the deposition of material on the second mass filter. *Id.* (citing Ex. 1004 ¶ 329 (citing Ex. 1001, 4:67–5:15)).

Agilent contends that Saito discloses the “emitting” step recited in independent claim 32 because ionizing device 4 emits an ion beam to front stage filter 34. Pet. 72 (citing Ex. 1010 ¶¶ 11, 57, Fig. 7; Ex. 1004 ¶ 317),

73. Agilent contends that Saito discloses the “first selecting” step recited in independent claim 32 because front stage filter 34 and back stage filter 40 are in series. *Id.* at 72 (citing Ex. 1010 ¶¶ 49, 57; Ex. 1004 ¶ 318), 73.

Agilent argues that Saito’s front stage filter 34 is configured to select for transmission only ions having a sub-range of mass/charge ratios (i.e., $^{12}\text{CO}_2$ (mass number 44) and $^{13}\text{CO}_2$ (mass number 45)) that includes the selected mass/charge ratio (i.e., $^{13}\text{CO}_2$ (mass number 45)). *Id.* at 72 (citing Ex. 1010 ¶¶ 50–52, 63–65, Fig. 6; Ex. 1004 ¶ 319), 73.

Agilent contends that Saito discloses the “receiving” step recited in independent claim 32 because back stage filter 40 receives only ions having a sub-range of mass/charge ratios (i.e., $^{12}\text{CO}_2$ (mass number 44) and $^{13}\text{CO}_2$ (mass number 45)) that are permitted to pass through front stage filter 34. *See* Pet. 72–73. Agilent contends that Saito discloses the “second selecting” step recited in independent claim 32 because back stage filter 40 is configured to select only ions of a selected mass charge ratio (i.e., $^{13}\text{CO}_2$ (mass number 45)). *Id.* (citing Ex. 1010 ¶¶ 50–52, 63–65, Fig. 6; Ex. 1004 ¶ 320).

Based upon our review of the current record, we discern no deficiency in Agilent’s characterization of Saito and the knowledge in the art, or in Agilent’s assertions as to the reasonable inferences one of ordinary skill in the art would be expected to draw from the disclosures in Saito. In addition, for purposes of this Decision, we accept Dr. Yost’s testimony concerning the relevant disclosures in Saito.

In its Preliminary Response, Thermo contends that Saito does not anticipate independent claim 32 because Saito fails to account for the preamble of this claim. Prelim. Resp. 50. Thermo argues that, contrary to

Agilent's assertion that Saito's experiments are directed to the "same purpose to achieve the same results," Saito's experiments were conducted to distinguish between two different isotopes—not to reduce the deposition materials on the primary resolving filter, as required by the preamble of independent claim 32. *Id.* (citing Ex. 1010, [57]). Thermo further argues that Agilent does not direct us to a disclosure in Saito that indicates reduction of material deposited on back stage filter 40 was achieved. *Id.* Rather, Thermo argues that, because CO₂ is a gas, one of ordinary skill in the art would have no expectation of deposition on Saito's back stage filter 40, much less appreciate that deposition was a problem based on Saito's experiments resolving two isotopes of a gas. *Id.*

As we explain in our claim construction section above, we are persuaded by Thermo's argument that the preamble of independent claim 32 is limiting because it states necessary and defining aspects of the invention embodied in this claim. *See supra* Section II.A.1. Nonetheless, we are persuaded by Agilent's argument that, if the asserted prior art discloses all the method steps recited in independent claim 32 other than the preamble, it would properly account for the preamble because it would result in reducing deposition material at the primary resolving filter. *Id.* Saito states that its method of analyzing particles with different mass numbers using multiple filters results in the reduction of "error factors." Ex. 1010 ¶ 94. Saito achieves this reduction in error factors by disclosing a two stage filtration process, in which the front stage filter 34 may be configured to select a sub-range of mass/charge ratios (i.e., ¹²CO₂ (mass number 44) and ¹³CO₂ (mass number 45)) that includes a selected mass/charge ratio

(i.e., $^{13}\text{CO}_2$ (mass 45)), thereby decreasing the number of particles that reach back stage filter 40. *Id.* ¶¶ 49–65, Fig. 7.

These aforementioned disclosures in Saito are consistent with Dr. Yost's testimony that, when in operation, one of ordinary skill in the art would have known that the first mass filter (i.e., front stage filter 34) in Saito's isotope analyzing device reduces the deposition of material on the second mass filter (i.e., back stage filter 40). Ex. 1004 ¶ 329. Stated differently, Dr. Yost testifies that one of ordinary skill in the art would have reasonably understood that Saito's disclosure of using front stage filter 34, which passes certain particles based on its filter characteristics, reduces the deposition of material on back stage filter 40. Dr. Yost's reliance on the specification to the '553 patent in this context appears to be limited to showing the natural result of a process that is otherwise disclosed in Saito. *See King Pharm.*, 616 F.3d at 1275–76. To the extent Thermo argues that one of ordinary skill in the art would have expected that such reduction could not be achieved at Saito's back stage filter 40 because its experiments involve a gas (i.e., CO_2) (*see* Prelim. Resp. 50), this is mere attorney argument that is not supported by factual evidence and, therefore, is entitled to little probative value at this stage in the proceeding. *Cf. Geisler*, 116 F.3d at 1470. On the current record, Agilent has presented sufficient evidence that would support a finding that Saito properly accounts for the preamble of independent claim 32.

In summary, based on the current record, Agilent has demonstrated a reasonable likelihood that it would prevail on its assertion that the subject matter of independent claim 32 is anticipated by Saito.

3. Claim 62

We have reviewed Agilent's explanations and supporting evidence regarding dependent claim 62. *See* Pet. 74. At this stage in the proceeding, we need not reach the merits of Agilent's arguments as to whether Saito discloses the subject matter of this dependent claim (*id.*) because, as we explain above, there is a reasonable likelihood that Agilent would prevail on its assertion that the subject matter of at least one of the challenged claims is anticipated by Saito.

F. Obviousness Based on the Combined Teachings of Saito and Douglas

Agilent contends that claims 32–35, 62, and 63 are unpatentable under § 103(a) over the combined teachings of Saito and Douglas. Pet. 74–80. Agilent explains how this proffered combination purportedly teaches the subject matter of each challenged claim, and asserts that a person of ordinary skill in the art would have had a sufficient reason to combine or modify the teachings of the references. *Id.* Agilent also relies upon the Declaration of Dr. Yost to support its positions. Ex. 1004 ¶¶ 336, 337, 364–367, 379, 380. On this record, we are persuaded by Agilent's explanations and supporting evidence.

We begin our analysis by addressing the parties' contentions with respect to independent claim 32.

1. Claim 32

Agilent contends that its same analysis of independent claim 32 in the context of the anticipatory ground based on Saito equally applies to this obviousness ground based on the teachings of Saito and Douglas. *See supra* Section II.E.2; Pet. 78. Agilent does not rely on the teachings of Douglas to

account for any limitation recited in independent claim 32, but instead only relies on the teachings of Douglas to account for the limitations of certain dependent claims—namely, dependent claims 35 and 63. Pet. 79–80.

Based upon our review of the current record, we discern no deficiency in Agilent’s characterization of Saito and the knowledge in the art, or in Agilent’s assertions as to the reasonable inferences one of ordinary skill in the art would be expected to draw from the disclosures in Saito. In addition, for purposes of this Decision, we accept Dr. Yost’s testimony concerning the relevant disclosures in Saito.

In its Preliminary Response, Thermo contends that, for the same reasons presented with respect to the anticipatory ground based on Saito, a person of ordinary skill in the art would not have understood Saito to teach all the limitations of independent claim 32. Prelim. Resp. 51. Thermo also asserts that Agilent does not provide a sufficient rationale for combining the teachings of Saito and Douglas, and instead largely tracks its rationale for combining the teachings of Douglas with those of Tanner. *Id.*

For the same reasons discussed above with respect to the anticipatory ground based on Saito, we disagree with Thermo’s argument that a person of ordinary skill in the art would not have understood Saito to teach all the limitations of independent claim 32. *See supra* Section II.E.2; *see also In re McDaniel*, 293 F.3d 1379, 1385 (Fed. Cir. 2002) (“It is well settled that ‘anticipation is the epitome of obviousness.’” (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983))). We also are not persuaded by Thermo’s argument that Agilent does not provide a sufficient rationale for combining the teachings of Saito and Douglas. As we explain

above, Agilent only relies on the teachings of Saito to account for all the limitations of independent claim 32.

In summary, based on the current record, Agilent has demonstrated a reasonable likelihood that it would prevail on its assertion that the subject matter of independent claim 32 would have been obvious over the teachings of Saito.

2. Claims 33–35, 62, and 63

We have reviewed Agilent’s explanations and supporting evidence regarding dependent claims 33–35, 62, and 63. Pet. 78–80. At this stage in the proceeding, we need not reach the merits of the parties’ arguments as to whether the combined teachings of Saito and Douglas account for the subject matter of dependent claims 33–35, 62, and 63 (*compare* Pet. 78–80, *with* Prelim. Resp. 51–52) because, as we explain above, there is a reasonable likelihood that Agilent would prevail on its assertion that the subject matter of at least one of the challenged claims would have been obvious over the combined teachings of Saito and Douglas.

G. Obviousness Based on the Combined Teachings of Douglas, Tanner, and Vandermey

Agilent contends that claim 62 is unpatentable under § 103(a) over the combined teachings of Douglas, Tanner, and Vandermey. Pet. 68–69. Agilent explains how this proffered combination purportedly teaches the subject matter of this claim, and asserts that a person of ordinary skill in the art would have had a sufficient reason to combine or modify the teachings of the references. *Id.* Agilent also relies upon the Declaration of Dr. Yost to support its positions. Ex. 1004 ¶¶ 306, 313. On this record, we are not

persuaded that Agilent has presented a sufficient rationale for combining the teachings of Douglas and Tanner with those of Vandermey.

We begin our analysis with a brief overview of Vandermey, and then we address the parties' contentions with respect to whether there is a sufficient rationale to combine the teachings of Douglas and Tanner with those of Vandermey.

1. Vandermey Overview

Vandermey generally relates to mass spectrometers that have multiple mass analysis stages and, in particular, to “coupling the multiple mass analysis stages to minimize the effects of stray capacitances between the stages, especially when the stages are positioned close together.” Ex. 1013, 1:7–12. Vandermey discloses three stability regions and provides at least one example where a two stage filtration process takes place in the third stability region. *Id.* at 3:51–4:14.

2. Claim 62

Dependent claim 62 recites “operating the first and second mass filters stages in a same stable operating region.” Ex. 1001: 13:9–10. Agilent contends that Vandermey teaches this limitation because it discloses operating its two stage filtration process in the third stability region. Pet. 69 (citing Ex. 1013, 3:51–4:14, Fig. 2; Ex. 1004 ¶ 313). Agilent further argues that a person of ordinary skill in the art would have been motivated to combine the teachings of Douglas and Tanner with those of Vandermey because all three references teach improvements in the operation of mass spectrometers with multiple mass analysis stages. *Id.* at 68 (citing Ex. 1013, [57], Ex. 1009, 1:9–14; Ex. 1004 ¶ 306).

On the current record, we are not persuaded that Agilent has presented a sufficient rationale to combine the teachings of Douglas and Tanner with those of Vandermey. Agilent’s assertion that each of Douglas, Tanner, and Vandermey teaches improvements in the operation of mass spectrometers with multiple mass analysis stages, at best, indicates that these references are directed to the same art or same techniques. Merely asserting that these prior art references are directed to the same art or same techniques, however, does not suffice as an articulated reason with a rational underpinning to combine their respective teachings—more is required to support the legal conclusion of obviousness. *See KSR*, 550 U.S. at 418; *see also Microsoft Corp. v. Enfish, LLC*, 662 F. App’x 981, 990 (Fed. Cir. 2016) (determining that the Board correctly concluded that Microsoft “gave no reason for the motivation of a person of ordinary skill [in the art] to combine Visual Basics and Salton except that the references were directed to the same art or same techniques”). Moreover, Agilent’s assertion that “Vandermey teaches the operation of two quadrupole mass analyzers in order to have greater resolution of ion signals” (Pet. 68) may evidence a general benefit of Vandermey’s arrangement, but it does not appear to provide a reason as to why one of ordinary skill in the art would have combined Vandermey’s teachings of operating first and second mass filter stages in the same stable operating region (*id.* at 69) with the teachings of Douglas and Tanner to arrive at the subject matter of dependent claim 62.

In summary, based on the current record, Agilent has not demonstrated a reasonable likelihood that it would prevail on its assertion that the subject matter of dependent claim 62 would have been obvious over the teachings of Douglas, Tanner, and Vandermey.

Despite the aforementioned shortcomings in this asserted ground, the U.S. Supreme Court has held that a final written decision under 35 U.S.C. § 318(a) must decide the patentability of all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018). According to the “Guidance on the impact of SAS on AIA trial proceedings” posted to the U.S. Patent and Trademark Office’s website on April 26, 2018,⁵ a decision granting institution will institute on all of the challenged claims in the petition and on all of the grounds presented in the petition.

H. 35 U.S.C. § 325(d) Arguments

Thermo contends that we should exercise our discretion under 35 U.S.C. § 325(d) and decline to institute a trial on each of the grounds presented by Agilent in the Petition. Prelim. Resp. 32–33. Thermo provides the following reasons as to why we should exercise our discretion in this regard: (1) PCT375 is the European equivalent of a reference that is cited and discussed in the Background section of the ’553 patent; (2) Douglas was cited and relied on by the Examiner during the original prosecution of the ’553 patent; (3) Vandermey was cited by Thermo in an Information Disclosure Statement filed during the original prosecution of the ’553 patent; and (4) although Tanner was not at issue during the original prosecution of the ’553 patent, a related Tanner patent was disclosed and considered. *Id.* at 33 (citing Ex. 2007, 2). Thermo asserts that the Examiner considered each of the aforementioned prior art references during the original prosecution of

⁵ <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>

the '553 patent and again during the reissue proceeding. *Id.* (citing Ex. 2008, 7;⁶ Ex. 2019).

We recognize that we have the authority under § 325(d) to deny a petition when the same or substantially the same prior art or arguments previously were presented in another proceeding before the Office. There are, however, sufficient reasons in this proceeding to exercise our discretion to institute an *inter partes* review.

Thermo does not assert, nor are we aware, of any instance where the Office substantively considered (1) an anticipatory ground based on PCT375; (2) an anticipatory ground based on Tanner; (3) an obviousness ground based on the combined teachings of Douglas and Tanner; (4) an anticipatory ground based on Saito; or (5) an obviousness ground based on the combined teachings of Saito and Douglas. In addition, each of the grounds presented by Agilent also rely on the testimony of Dr. Yost that has not been presented previously before the Office. Taking into account the considerations set forth in 35 U.S.C. § 316(b), we decline to exercise our discretion under § 325(d) to foreclose review of any of the grounds presented by Agilent in the Petition.

I. Constitutional Challenge

Thermo contends that, pending the outcome in *Oil States Energy Servs., LLC v. Greene's Energy Grp., LLC*, 137 S. Ct 2239 (2017), it reserves the right to move for this proceeding to be terminated if the

⁶ All references to the page numbers in the prosecution history of the '553 patent refer to the page numbers inserted by Thermo in the bottom, right-hand corner of each page in Exhibit 2008.

Supreme Court decides that *inter partes* review is unconstitutional. Prelim. Resp. 52. Thermo’s reservation in this regard has been rendered moot because, on April 24, 2018, the Supreme Court held that “*inter partes* review does not violate Article III or the Seventh Amendment” of the Constitution. *Oil States Energy Servs., LLC v. Greene’s Energy Grp., LLC*, 138 S. Ct 1365, 1379 (2018).

III. CONCLUSION

For the foregoing reasons, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Agilent would prevail in challenging at least one of claims 32–35 and 62–66 of the ’553 patent as unpatentable under 35 U.S.C. §§ 102(b) or 103(a). At this stage of the proceeding, we have not made a final determination with respect to the patentability of these challenged claims or the construction of any claim term.

IV. ORDER

Accordingly, it is:

ORDERED that pursuant to 35 U.S.C. § 314(a) and 37 C.F.R. § 42.4, an *inter partes* review is hereby instituted based on the following grounds:

- A. claims 32–35, 63, and 66 as anticipated under § 102(b) by PCT375;
- B. claims 32, 35, and 63–66 as anticipated under § 102(b) by Tanner;
- C. claims 32–35 and 62–66 as unpatentable under § 103(a) over the combined teachings of Douglas and Tanner;
- D. claims 32 and 62 as anticipated under § 102(b) by Saito;

E. claims 32–35, 62, and 63 as unpatentable under § 103(a) over the combined teachings of Saito and Douglas;

F. claim 62 as unpatentable under § 103(a) over the combined teachings of Douglas, Tanner, and Vandermey; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial will commence on the entry date of this decision.

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