UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

THETA IP, LLC,
Patent Owner.

Case IPR2024-00817
U.S. Patent No. 10,129,825

PATENT OWNER'S
PRELIMINARY RESPONSE
UNDER 37 C.F.R. §42.107

TABLE OF CONTENTS

Page

I. Introduction.....1

II. Institution should be denied because Petitioner failed to show a reasonable likelihood of success on any challenged claim. 11

A. The ’825 Patent 14

B. The ’825 Patent Specification 15

C. The ’825 Patent Prosecution History 22

D. The ’825 Patent Challenged Claims.....24

E. Claim Construction.....27

1. “signal path”.....29

F. There is no reasonable likelihood that Petitioner will prevail in their contention that the challenged claims are obvious over the *Behbahani* papers. 33

1. Petitioner failed to show that the *Behbahani* papers disclose or render obvious varying “an impedance” of a circuit in the signal path according to the challenged claims 34

a. The challenged claims require adjustment of the parameters of individual circuits. 38

b. Professor Tsividis’ 2003 article does not put *Behbahani*’s approach within the claims.....44

2. Petitioner failed to show that the *Behbahani* papers disclose or render obvious varying “a bias current” of a circuit in the signal path according to the challenged claims. 47

III. The Board should exercise its discretion to deny institution. 51

A. The Petition is cumulative and unworthy of a Board trial. 53

B. The Petition lacks evidentiary support, presenting no more than attorney argument. 63

IV. Conclusion 69

TABLE OF AUTHORITIES

Page(s)

Cases

10X Genomics, Inc. v. Bio-Rad Labs., Inc.,
IPR2020-00086, Paper 8 (P.T.A.B. Apr. 27, 2020).....31

Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GMBH,
IPR2019-01469, Paper 6 (P.T.A.B. Feb. 13, 2020)..... passim

Apple Inc. v. Zipit Wireless, Inc.,
IPR2021-01124, Paper 14 (P.T.A.B. Dec. 21, 2022) 11

Becton, Dickinson & Co. v. B. Braun Melsungen AG,
IPR2017-01586, Paper 8 (P.T.A.B. Dec. 15, 2017) 58

Biocon Pharma Ltd. v. Novartis Pharmaceuticals Corp.,
IPR2020-01263, Paper 12 (P.T.A.B. Feb. 16, 2021).....59

Circuit Check Inc. v. QXQ Inc.,
795 F.3d 1331 (Fed. Cir. 2015).....64

Dorco Co., Ltd. v. The Gillette Co., LLC,
IPR2017-00500, Paper 7 (P.T.A.B. June 21, 2017).....58

Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.,
800 F.3d 1375 (Fed. Cir. 2015).....12

Dynatemp Int'l, Inc. v. R421A LLC,
IPR2020-01660, Paper 15 (P.T.A.B. Apr. 20, 2021).....61

Ericsson Inc. v. Uniloc 2017, LLC,
IPR2019-01550, Paper 8 (P.T.A.B. Mar. 17, 2020) 55

Facebook, Inc. v. Windy City Innovations, LLC,
973 F.3d 1321 (Fed. Cir. 2020).....68

Facebook, Inc. v. Windy City Innovations, LLC,
IPR2016-01156, Paper 52 (P.T.A.B. Dec. 6, 2017) 68

Gen. Elec. Co. v. Joiner,
522 U.S. 136 (1997) 68

General Plastic Industrial Co. v. Canon Kabushiki Kaisha,
IPR2016-01357, Paper 19 (P.T.A.B. Sept. 6, 2017) 54, 57

Google LLC v. Kewazinga Corp.,
IPR2021-00524, Paper 17 (P.T.A.B. Aug. 24, 2021) 62

Google LLC v. Valtrus Innovations Ltd.,
IPR2022-01197, Paper 18 (P.T.A.B. June 13, 2023) 62

Graham v. John Deere Co.,
383 U.S. 1 (1966) 64

Harmonic Inc. v. Avid Tech., Inc.,
815 F.3d 1356 (Fed. Cir. 2016) 7, 51, 69

Hologic, Inc. v. bioMerieux, Inc.,
IPR2018-00568, Paper 9 (P.T.A.B. Aug. 7, 2018) 57

Hologic, Inc. v. Enzo Life Sciences, Inc.,
IPR2018-00019, Paper 21 (P.T.A.B. Nov. 28, 2018) 30, 32

Icon Health and Fitness, Inc. v. Strava, Inc.,
849 F.3d 1034 (Fed. Cir. 2017) 64

In re Am. Acad. of Sci. Tech Ctr.,
367 F.3d 1359 (Fed. Cir. 2004) 67

In re Kahn,
441 F.3d 977 (Fed. Cir. 2006) 68

In re Smith Int'l, Inc.,
871 F.3d 1375 (Fed. Cir. 2017) 47

Infobionic, Inc. v. Braemer Manufacturing, LLC.,
IPR2015-01704, Paper 11 (P.T.A.B. Feb. 16, 2016) 67

Ivantis, Inc. et al. v. Sight Scis., Inc.,
IPR2022-01540, Paper 14 (P.T.A.B. Mar. 22, 2023) 62

Keysight Techs., Inc. v. Centripetal Networks, Inc.,
IPR2022-01421, Paper 14 (P.T.A.B. Aug. 24, 2023) 59

Kinetic Technologies, Inc. v. Skyworks Solutions, Inc.,
IPR2014-00529, Paper 8 (P.T.A.B. Sept. 23, 2014).....67

LG Elecs. Inc. v. Core Wireless Licensing S.A.R.L.,
IPR2016-00986, Paper 12 (P.T.A.B. Aug. 22, 2016) 54

Neil Ziegman, N.P.Z., Inc. v. Stephens,
IPR2015-01860, Paper 11 (P.T.A.B. Feb. 24, 2016).....58

NXP USA, Inc. v. Impinj, Inc.,
IPR2020-00519, Paper 7 (P.T.A.B. Aug. 17, 2020).....61

Oil States Energy Servs. LLC v. Green's Energy Grp., LLC,
138 S. Ct. 1365 (2018) 51

Panduit Corp. v. Corning Optical Commc'ns LLC,
IPR2021-01562, Paper 20 (P.T.A.B. Apr. 6, 2022).....62

Phillips v. AWH Corp.,
415 F.3d 1303 (Fed. Cir. 2005).....28

Rohm and Haas Co. v. Brotech Corp.,
127 F.3d 1089 (Fed. Cir. 1997).....67

Roku, Inc. v. Universal Elecs., Inc.,
IPR2019-01619, Paper 11 (P.T.A.B. April 2, 2020) 61

Samsung Elecs. Am., Inc. v. Cobblestone Wireless, LLC,
IPR2024-00319, Paper 16 (P.T.A.B. Jun. 24, 2024) 12, 30

Samsung Electronics Co., Ltd. v. Rightquestion, LLC,
IPR2022-00251, Paper 17 (P.T.A.B. June 9, 2022).....67

Sandoz Inc. v. Abbvie Biotechnology Ltd.,
IPR2017-01987, Paper 15 (P.T.A.B. Mar. 9, 2018) 29

Stone Basket Innovations, LLC v. Cook Med. LLC,
892 F.3d 1175 (Fed. Cir. 2018).....60

Valve Corp. v. Electronic Scripting Products, Inc.,
IPR2019-00062, Paper 11 (P.T.A.B. Apr. 2, 2019).....55

Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.,
200 F.3d 795 (Fed. Cir. 1999)..... 29, 32

Volkswagen Group of Am., Inc. v. StratosAudio, Inc.,
IPR2021-00718, Paper 16 (P.T.A.B. Oct. 25, 2021) 61

Statutes

35 U.S.C. §312(a)(3).....7

35 U.S.C. §314..... passim

35 U.S.C. §316(e) 7

Other Authorities

Consolidated Trial Practice Guide (Nov. 2019) 57

M.P.E.P. §2145 64

M.P.E.P. §609.05(b).....59

M.P.E.P. §707.05 60

Regulations

37 C.F.R. §42.104(b)(3)..... 12, 30, 32

37 C.F.R. §42.108 33

37 C.F.R. §42.22(a)(2).....68

37 C.F.R. §42.53 66

37 C.F.R. §42.65(a).....67

83 Fed. Reg. 51340 (Oct. 11, 2018)..... 27, 31

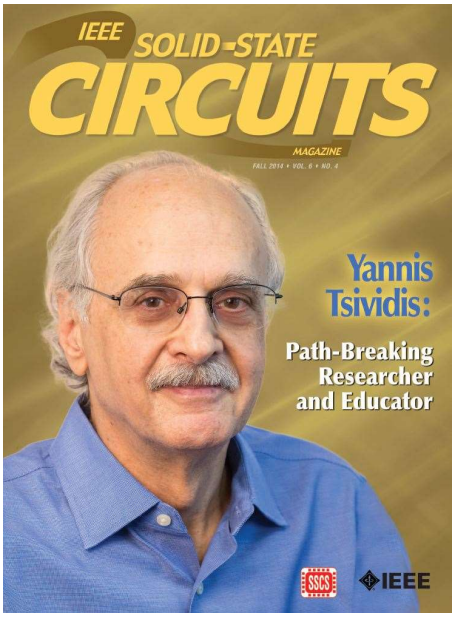
Patent Owner's Exhibit List	
EX2001	Declaration of Corey Johanningmeier in Support of Motion for *Pro Hac Vice* Admission
EX2002	"Yannis Tsividis: Path-Breaking Researcher and Educator," IEEE Solid-State Circuits Magazine, Fall 2014
EX2003	Y. Tsividis *et al.*, "Internally Varying Analog Circuits Minimize Power Dissipation," IEEE Circuits & Devices Magazine, Jan. 2003
EX2004	Y. Tsividis, "Signal-to-Noise Ratio, Dynamic Range, and Power Dissipation," IEEE Solid-State Circuits Magazine, Fall 2018
EX2005	Declaration of Lawrence E. Larson, Ph.D. under 37 C.F.R. § 1.68 In Support of Patent Owner's Preliminary Response in IPR2024-00816, -00817, -00818, -00819, and -00820.
EX2006	*Curriculum Vitae* of Professor Larson
EX2007	IPR2023-00694, Paper 10, Decision Denying Institution (P.T.A.B. Oct. 23, 2023)
EX2008	IPR2023-00694, Paper 14, Decision Denying Rehearing (P.T.A.B. Feb. 7, 2024)
EX2009	U.S. Patent No. 5,001,776 (*Clark*)
EX2010	Excerpts of Invalidity Contentions, *Theta IP, LLC v. Samsung Electronics Co., Ltd. et al*., No. 2-16-cv-00527 (E.D. Tex.)
EX2011	Excerpts of Invalidity Contentions, *Theta IP, LLC v. Lenovo (United States) Inc., et al*., 1-22-cv-03441 (N.D. Ill.)
EX2012	Excerpts of Invalidity Contentions, *Theta IP, LLC v. Apple Inc*, No. 6:23-cv-00314-ADA (W.D. Tex.)
EX2013	Second Amended Scheduling Order, *Theta IP, LLC v. Apple Inc*, No. 6:23-cv-00314-ADA (W.D. Tex. Aug. 6, 2024), ECF No. 91

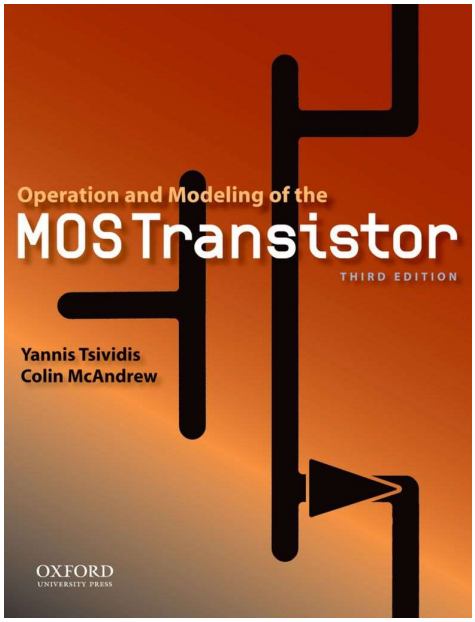
Patent Owner's Exhibit List	
EX2014	Claim Construction Order, *Theta IP, LLC v. Samsung Electronics Co., Ltd. et al*., 6:20-cv-00160-ADA (W.D. Tex. Jan. 7, 2021), ECF No. 57
EX2015	March 25, 2024 Email from Court listing Preliminary Constructions, *Theta IP, LLC v. Apple Inc*, No. 6:23-cv-00314-ADA (W.D. Tex.)
EX2016	March 25, 2024 Email from Apple to Court re: *Markman*, *Theta IP, LLC v. Apple Inc*, No. 6:23-cv-00314-ADA (W.D. Tex.)
EX2017	Transcript of *Markman* hearing, *Theta IP, LLC v. Apple Inc*, No. 6:23-cv-00314-ADA (W.D. Tex. Mar. 26, 2024)
EX2018	Minute Order setting *Markman* hearing, *Theta IP, LLC v. Lenovo (United States) Inc., et al*., 1-22-cv-03441 (N.D. Ill. July 2, 2024), ECF No. 104
EX2019	Prosecution History of U.S. Patent No. 7,010,330 B1 – Filed by Petitioner in IPR2024-00816 as EX1002

Patent Owner Theta IP, LLC ("Theta") respectfully submits this Preliminary Response to Apple Inc.'s ("Apple" or "Petitioner") above-captioned Petition for *Inter Partes* Review of United States Patent No. 7,010,330 ("the '825 Patent").

I. Introduction

The inventor of the '825 Patent, Yannis Tsividis, is the Edwin Howard Armstrong Professor of Electrical Engineering at Columbia University in New York City. He has taught circuits and devices for over 45 years, is beloved by his students, and has written or edited multiple widely-used textbooks on devices and circuits. Not only is Dr. Tsividis a prolific inventor and life fellow of the IEEE, but in 2014, the IEEE publication Solid-State Circuits devoted an entire Special Edition of its magazine to him. EX2002.





The ’825 Patent is part of a series of patents that teach and claim foundational inventions for controlling high-power analog circuits in radio frequency (RF) transceivers used in every cell phone. The patents’ chief purpose and benefit is power savings, enabling the longer battery life that smartphone consumers demand.

Intelligent circuit design for power conservation was (and remains) a vital issue in the mobile communications industry—about which Professor Tsividis has published and taught many times throughout his distinguished career, and throughout the life of the patents. *See, e.g.*, EX2003; EX2004 (Tsividis, Y., “Signal-to-Noise Ratio, Dynamic Range, and Power Dissipation,” IEEE Solid-State Circuits Magazine, Fall 2018):

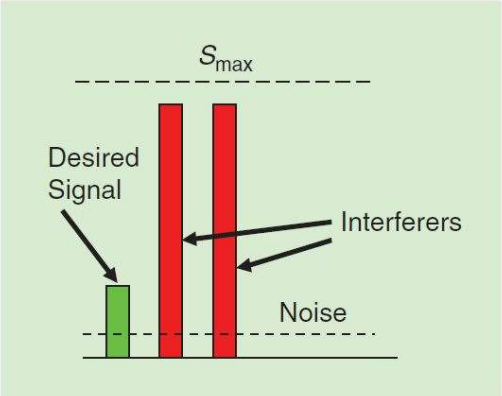


FIGURE 18: The worst-case scenario: minimum desired signal with maximum interference.

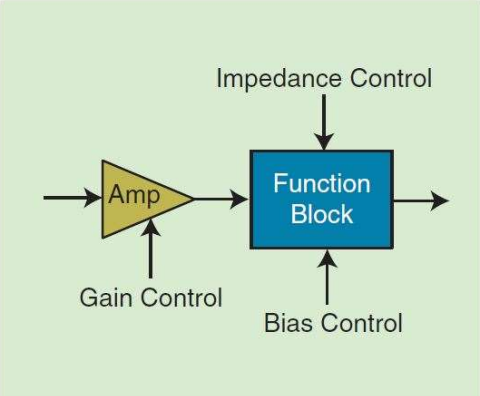
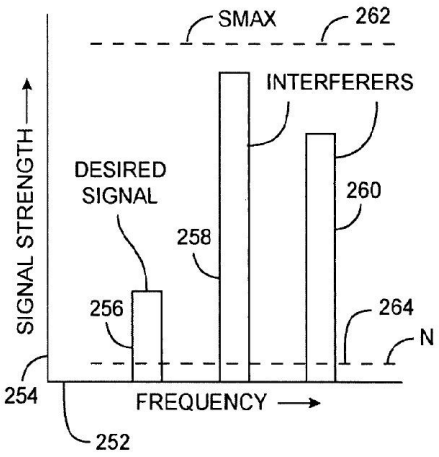


FIGURE 11: The three adaptive power strategies: adaptive gain, adaptive bias, and adaptive impedance.

The ’825 Patent’s parent application first taught and claimed these power-saving circuit design techniques more than twenty years ago—demonstrating

multiple ways that circuits could adapt to desired signal and interferer signal conditions to save power. For example, and relevant to the challenged claims of the '825 Patent, circuit designers could use impedance variation to dynamically vary drive currents in an RF receiver system. EX1001, 7:47-8:3, Fig. 6. The specification also discusses—and other claims address—separate dynamic controls for bias currents (*id.*, 7:27-46, Fig. 5), and for gain of amplifier circuits (*id.*, 8:4-19, Fig. 7). *See also id.*, Figs. 2B, 8A:



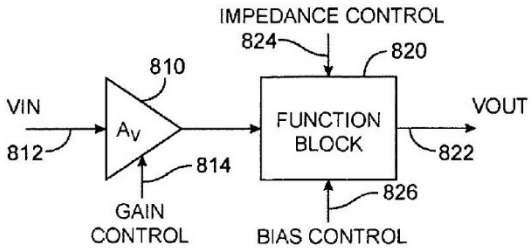


FIG. 8A

The '825 Patent taught that by dynamically adjusting one or more of these variables for a function block in response to determined signal conditions, circuit designers can "reduce power dissipation in response to better-than-worst case conditions." *Id.*, 1:58-61. And it taught many specific approaches to doing so, based on variations in possible signal conditions. *See, e.g.*, *id.*, 9:45-62, Figs. 9B & 9C (demonstrating a signal spectrum where impedance varying to raise the noise floor N can save power):

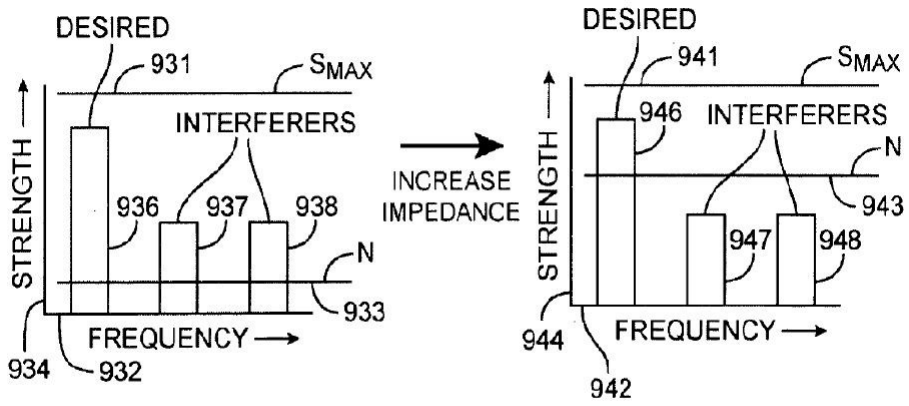


FIG. 9B

FIG. 9C

The application and specification that led to issuance of the parent of the '825 Patent also led to seven additional patents. Moreover, the Tsividis Patents have been widely cited by the industry and by Examiners during the prosecution of other patents, including those of Qualcomm, Samsung, Intel, Marvell, Ericsson, Matsushita, and others. For example, Qualcomm, itself a pioneer in RF circuits for wireless, has been forced by patent Examiners in the USPTO and Europe to cite to—and even quote—Professor Tsividis' foundational '330 Patent (parent to the '825 Patent) in its own applications. *See, e.g.*, EP2151924B1 at [0004]; EP2018705B1 at [0005]; U.S. Patent No. 8,781,426.

Patents in this family were the subject of two district court litigations against Samsung, leading to a courthouse-steps settlement within hours of the start of a jury trial. Notably, Samsung—the most prolific filer of IPRs since the proceeding was

created—never filed IPRs against the Tsividis patents.[1] Samsung's challenges to validity in district courts, which included *Behbahani*, proved unsuccessful before it settled with Theta.

The '825 Patent and others were also asserted in district court litigation against Lenovo and its Motorola subsidiary, who did file IPRs. The Board denied institution—for lack of merit—of Lenovo's Petition challenging the parent '330 Patent, and also found lack of merit with respect to claim 8 of the '825 Patent. EX2007, 20 ("Petitioner fails to demonstrate sufficiently that *Rauhala* meets the limitation in claim 1 requiring 'dynamically changing an impedance of a component in the signal path'"); *see also* EX2008, 14-15 ("for those claims that, … require changing an *impedance* of circuits in the signal path (*see* claim 8 in IPR2023-00697 and claims 7 and 19 in IPR2023-00698), we concluded, as here and in our Decision, that Petitioner's challenge based on Rauhala fails to meet the test for institution").

As industry participants, litigants, Examiners, and the Board have acknowledged, the '825 Patent and its family made important, valuable

[1] According to the Lex Machina database as queried on August 8, 2024, Samsung and related entities are a Petitioner on at least 1,012 (or 6.3%) of the 16,176 *Inter Partes* Review petitions ever filed.

contributions to the public knowledge—just as Professor Tsividis has always been known for doing in his distinguished teaching and professional career. EX2002.

In short, Professor Tsividis' foundational teaching patents here are nothing like the proverbial "bad patents" for which Congress responded to industry pressure and created the *Inter Partes* Review procedure. There are no flaws in the Tsividis patents' lengthy and continued prosecution by Office Examiners, and nothing wrong with their claim scope. The inventions therein are novel, were not obvious to persons of ordinary skill—and offer valuable contributions not previously disclosed in the art.

Against this background establishing the foundational importance and non-obviousness of the inventions in Professor Tsividis' patents here, Apple brings references that were ***first shown to the Patent Office by Professor Tsividis himself—with his original application, twenty years ago***. EX1002, 80 (citing *Behbahani* and *Tan*); EX1001, 2-3 (same); EX2019, 62. Apple adds nothing with its misguided attempt to improve upon past challenges and undo the Office's detailed examination and issuance of this patent family. Apple's Petition fails on lack of merit.

As the Examiner presumptively recognized, and as shown below, the *Behbahani* papers fail to show or suggest dynamic adjustment of circuit components as claimed in the '825 Patent. They instead employ the inferior

solution of re-routing the signal path to a different static circuit. EX1011, 8 (noting problems of "output transients" and "loss of data," and suggesting improvement to *Behbahani*'s approach "by switching individual filter elements rather than entire filters"); EX2005, ¶62. Neither of *Behbahani*'s alternative fixed filters is ever altered or dynamically changed per the claims. *Id.*, ¶68. Apple's ground fails to show a reasonable likelihood of success, failing to meet Petitioner's evidentiary burden at the outset.

Apple has the burden of proof here. 35 U.S.C. §316(e):

> In an inter partes review . . . , the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.

Harmonic Inc. v. Avid Tech., Inc., 815 F.3d 1356, 1363 (Fed. Cir. 2016) ("the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable") (citing 35 U.S.C. §312(a)(3) (2012) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")).

Apple's Petitions must contain evidence to show "that there is a reasonable likelihood that the petitioner would prevail." 35 U.S.C. §314(a). They do not. And the Board must not institute to fill gaps in Petitions, to answer questions for which Apple offers no evidence, or to construe claim terms for which Apple asserts no

construction is required. *See* Petition, 8-10. The Board routinely and properly dismisses defective Petitions like Apple's at the outset.

As shown below, Apple's obviousness Ground—based on work that Professor Tsividis himself called to the attention of the Examiner, and publicly distinguished his inventions over—fails to properly interpret, or to show any prior art teaching of, key elements common to all challenged claims. Trial on this deficient Petition would be a waste of the Board's limited resources and a prejudicial delay to Theta's ongoing enforcement of its properly granted and presumptively valid patent rights.

For example, Apple fails to relate the complete filter circuit swap that it identifies in *Behbahani* to the specific claim language requiring, e.g., varying "the bias current of" or "an impedance of" a "circuit[] in the receiver signal path." EX1001, 16:41-48 (claim 8). This is because the identified complete filter circuit swap doesn't do that. EX2005, ¶74. The *Behbahani* papers do not disclose or suggest the claimed bias or impedance variation of any component in the signal path. Instead, Apple points to Professor Tsividis' 2003 article discussing *Behbahani* as a possible solution. Petition, 36-39. But Apple omits the part of the article where Professor Tsividis notes problems with, and teaches improvements to, the *Behbahani* filter swap solution. *Id.*; EX1011, 8 ("switching individual filter

elements ***rather than entire filters***"), 9 ("***use a single filter and vary its structure dynamically***").

Behbahani's filter swap is not the solution taught or claimed in the '825 Patent, as further explained below. EX2005, ¶¶46-47, 56-57, 66-70. Apple's entire Petition fails on this point alone.

These proof flaws and *sub silentio* misinterpretations of the claim language are directly discernable from the Petition itself, and nothing further is needed to see the lack of merit in Apple's arguments. Nor does Dr. Abidi's Declaration—made up almost entirely of verbatim copying of attorney argument from the Petition that he has endorsed with his signature—add anything evidentiary to the proceedings. For these and other reasons, as explained in more detail in the arguments below, the Petition fails to meet its threshold burden of showing a reasonable likelihood of success as to any of the asserted grounds of obviousness.

As discussed further in Section II below, because the Petition on its face fails to show a reasonable likelihood of success, Petitioner's request for a trial should be denied.[2]

[2] The issues detailed herein are not the only procedural or substantive flaws in the Petition. If the Board institutes trial on any of the challenged claims notwithstanding the issues addressed herein, Patent Owner will address in detail in its §42.120

In addition, as discussed further in Section III below, the Petition can and should be dismissed in the Board's discretion—because it is merely a follow-on to failed efforts to invalidate the Tsividis Patents by Samsung (in district court litigations) and Lenovo (before the Board). Apple self-describes its challenge as trying to correct a gap in the prior art that has "plagued prior invalidity challenges." IPR2024-00816, Petition, 36. But using prior challenges as a roadmap, as Apple does here, is an inefficient and unfair use of the Board's resources.[3] And Apple brings nothing new, citing references that Professor Tsividis himself told the Office about twenty years ago. EX1002, 80 (*citing Behbahani* and *Tan*); EX1001, 2-3 (same); EX2019, 62. The Petition is cumulative of the Examiner's original review during prosecution of the Tsividis Patents.

For all of these reasons, as explained more fully below, the Board should deny institution.

Response each of the numerous substantive errors and shortcomings that underlie each of Petitioner's arguments and purported evidence.

[3] The Board has already written two opinions finding lack of merit in challenges to the parent '330 Patent and several claims of the '825 Patent and related '202 Patent. *See, e.g.*, EX2008, 14-15. The Board held a trial on the '825 and '202 Patents, with a final decision date pending just before the institution decision date here.

II. Institution should be denied because Petitioner failed to show a reasonable likelihood of success on any challenged claim.

The Board should deny institution, pursuant to 35 U.S.C. §314, because Petitioner failed in its burden to establish a reasonable likelihood of demonstrating that even a single challenged claim is unpatentable. Apple fails to establish that the *Behbahani* papers would have rendered obvious any of the challenged claims.

Behbahani, along with the papers that Apple cites to allegedly supply detail of the *Behbahani* system (e.g., *Tan*), fails to disclose, suggest, or otherwise render obvious the elements requiring, e.g., adjusting "a bias current" or "an impedance of" a circuit "in the receiver signal path"—as in each of the challenged claims of the '825 Patent. ***Behbahani instead changes the signal path***, to route signal through a different, static filter circuit. *Behbahani*'s two alternate filters each undergo ***no change in their circuit components or parameters*** via the switch. *Behbahani*'s solution simply does not match the claim language, and Apple completely ignores this distinction and fails to show otherwise.

If Apple fails its burden to provide evidence that proves invalidity, it loses, even if Theta were to offer no response beyond identifying that failure. *Apple Inc. v. Zipit Wireless, Inc.*, IPR2021-01124, Paper 14, Decision on Director Review (P.T.A.B. Dec. 21, 2022) (designated precedential: Jan. 4, 2023). Apple must do more than simply raise questions—it must show evidence to support its alleged

answer to them. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378-79 (Fed. Cir. 2015) ("if the fact trier of the issue is left uncertain, the party with the burden loses"). The burden of persuasion never shifts to Theta. *Id.*

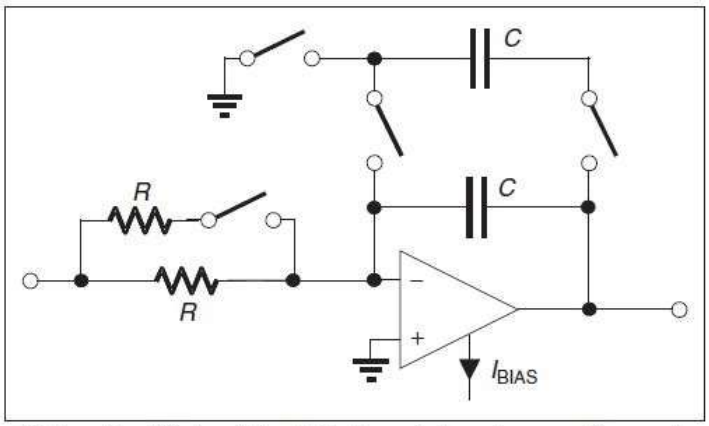
Similarly, Apple must support and justify with particularity any interpretation of claim language that it relies on in its challenge. *See, e.g.*, 37 C.F.R. §42.104(b)(3); *Samsung Elecs. Am., Inc. v. Cobblestone Wireless, LLC*, IPR2024-00319, Paper 16, at 13-23 (P.T.A.B. Jun. 24, 2024) ("Petitioner has failed to set forth a sufficient basis to support the claim construction it relies on and, consequently has failed to establish a reasonable likelihood that its unpatentability arguments, which are based on that construction, have merit").

Apple fails to do all these things here.

As further detailed below, Apple's challenge to the claims depends on ignoring the claim language of key elements, such as those requiring varying a bias or an impedance of a circuit in the signal path. Apple instead cites a disclosed switch between entire filters—in which ***neither filter's impedance nor bias changes***, but the signal path does. *See* Petition, 41 ("All proposed grounds rely on…"); EX2005, ¶¶67-68. That is a different approach than claimed. EX2005, ¶¶69-70.

Apple never ties this disclosed filter swap to the claims of the '825 Patent, and could not do so. Instead, Apple excerpts out of context and misconstrues an

academic article by Professor Tsividis. *See* Petition, 41-44. In doing so, Apple ignores his discussion in that same article of the problems with, and potential for improvement upon, *Behbahani*'s approach. *See, e.g.*, EX1011, 8 ("switching individual filter elements rather than entire filters"), 9 ("use a single filter and vary its structure dynamically"), Fig. 12 (example of variable structure circuit):



12. An active RC circuit in which dynamic impedance scaling can be performed without causing output transients.

As explained further below, Professor Tsividis' discussions of potential improvement over *Behbahani*—by dynamically varying circuit elements—are consistent with the language of the claims. *See, e.g.*, EX1001, 13:57-62 (claim 3: "causing a bias current to vary in one or more of the plurality of circuits in the receiver signal path"). Apple's challenge—relying instead on *Behbahani*'s wholesale re-routing of the signal path to use an alternative static filter circuit—is not consistent with claim language.

Apple ignores and fails to address this distinction, fails to support any position on the meaning of the dynamically varying claim elements, and never relates a complete filter swap to the specific claim language. In short, Apple's challenge is not based in the claims of the '825 Patent, but on a false premise misread from Professor Tsividis' 2003 article.

In addition, as shown above, the history of the '825 Patent contains substantial evidence of non-obviousness that Apple was well aware of, but declined to address. Petition, 11, n.5; *see also* IPR2023-00697, Paper 15, Patent Owner Response, 16-17 (P.T.A.B. Jan. 30, 2024); IPR2023-00694, Paper 9, Patent Owner Preliminary Response (P.T.A.B. July 26, 2023).

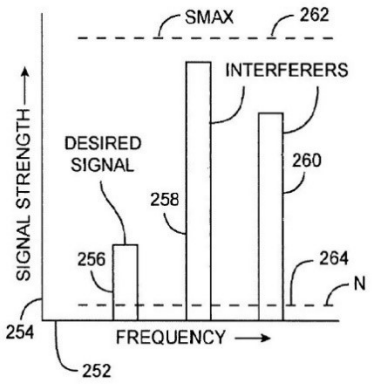
Because Petitioner's unsupported arguments fail to establish a reasonable likelihood of proving any challenged claim unpatentable, trial should not be instituted here, and the Petition should be dismissed for lack of merit.

A. The '825 Patent

The '825 Patent is part of a series of patents that disclose and claim Professor Tsividis' inventive systems and techniques for optimizing mobile wireless device power consumption—and thus battery life. *See, e.g.*, EX1001 ("'825 Patent"), Abstract, 1:55-61. In the early days of mobile communications, receivers were designed to operate in the worst-case conditions to ensure that connectivity was

available to the greatest extent possible. This meant that devices operated at a high power level all the time, quickly draining the battery. *Id.*, 1:34-40.

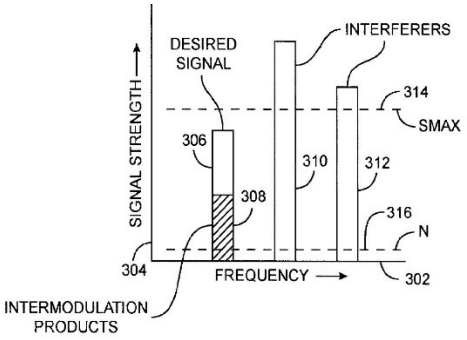
Professor Tsividis invented systems and methods that optimized battery life by making various adjustments to components in a receiver based on determining signal strength—or the relationships between the strength of desired signal (such as the signal carrying voice data) and the strength of interferer signals (originating from other wireless devices or electronic equipment, for example)—to achieve power savings. *Id.*, 2:14-18, 5:20-30, 5:54-56, Figs. 2A & 2B (showing example desired signal and interferer signal spectrum):



B. The ’825 Patent Specification

The ’825 Patent specification explained and showed examples of when to employ the various power saving circuit techniques, based on different signal spectra being determined to be better than a worst-case condition. *Id.*, 1:58-67, 8:49-10:60. A worst-case condition occurs when a low desired signal is accompanied by high interferer signals—and can result in unacceptable levels of

distortion, e.g., intermodulation products, if the maximum signal handling capability is not kept sufficiently high. *See, e.g.*, *id.*, 6:31-49, Fig 3:



The ’825 Patent describes three different adjustments, or “degrees of freedom,” that can be dynamically optimized to reduce power in response to the various ways signal conditions can improve over a worst case. Specifically, the patent discusses dynamic changes to bias currents, circuit impedances, and gain. *See, e.g.*, *id.*, Abstract (“Embodiments of the present invention use bias current reduction, impedance scaling, and gain changes either separately or in combination to reduce power dissipation.”), 1:58-67, Fig. 9A:

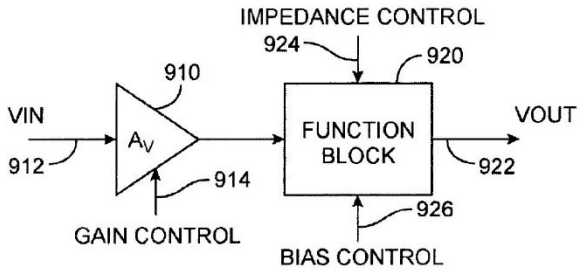
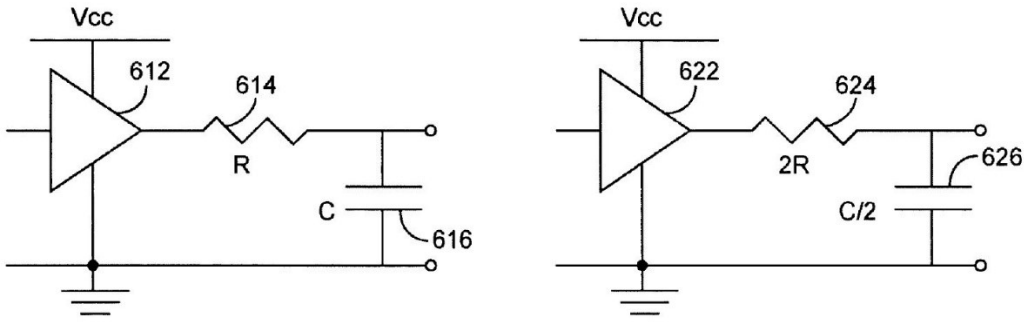


FIG. 9A

For example, the specification discusses circumstances calling for changes to bias currents, and techniques for doing so. *Id.*, 7:27-46, Fig. 5. For example, a

bias current might be changed by increasing a resistance "by opening switches across portions of the resistance." *Id.*, 7:39-44.

Alternatively, and in contrast, "a circuit's impedances may be scaled to reduce drive currents" or even associated bias currents. *Id.*, 7:47-62, Fig 6. A basic example of this, with a common RC impedance load on a driver, is shown in Figure 6:



In this figure, the driver load impedance from R and C is changed to impedance from 2R and C/2, such that: "the impedance of the load seen by driver 622 is double that seen by 612, thus the output current required by the driver 622 is reduced by one-half." *Id.*, 7:47-55.

The '825 Patent also discusses and gives examples of gain adjustment. *See, e.g.*, *id.*, 8:4-19, Fig. 7. It then goes on to discuss that: "These variables, or degrees of freedom, specifically reducing bias currents, increasing impedances, and increasing gain may be used as in the following examples." *Id.*, 8:20-22. A lengthy discussion follows, providing particular examples of signal spectra and

corresponding adjustments that can advantageously be made. *See id.*, Figs. 8A & 8B, 9A & 9B, 10A & 10B, 11A & 11B, 12, and corresponding text discussions:

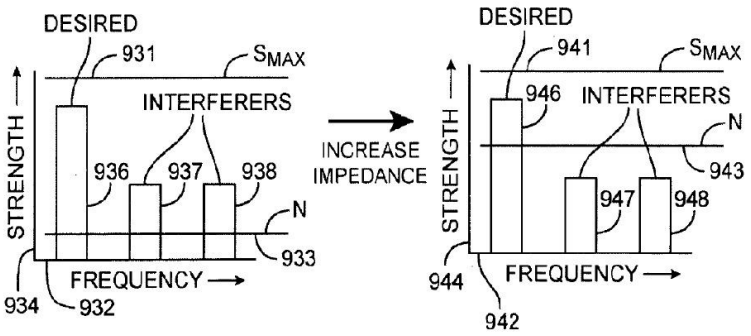


FIG. 9B FIG. 9C

See also id., 3:34-50 ("FIGS. 9A-9C illustrate one of the possible power saving techniques that may be used when a received desired signal is strong while all interfering signals are at a low power level."), Fig. 9A, 9:50-58:

> Accordingly, one or more impedance[s] in the function block 920 may be increased, such that the noise floor 943 rises as shown in FIG. 9C. In this way one or more [of] the driving currents in the function block 920 may be reduced.

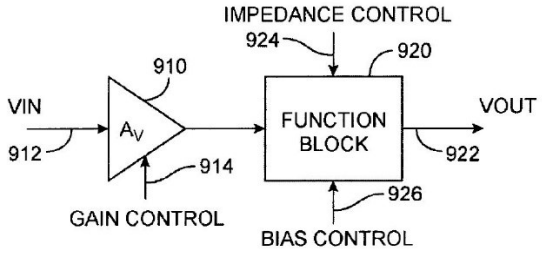


FIG. 9A

Again, the adjustments made to circuits in the claimed inventions are dynamic, based on monitoring the interferer signal levels and desired signal levels to optimize the changes in gain, bias, and impedance of the circuit components. The '825 Patent also teaches specific examples and techniques for locations within receiver circuits at which the beneficial power-saving dynamic adjustments can be performed. *See, e.g., id.*, 11:59-67 (low noise amplifier (LNA) adjustments), 12:1-5 (mixer), 12:6-18 (voltage controlled oscillator (VCO) adjustments).

In keeping with Professor Tsividis' long teaching career, the specification of the '825 Patent explains the embodiments of the disclosed and claimed inventions in clear detail and with examples much like those in his textbooks, magazine articles, and teaching slides. *See, e.g.*, EX2003; EX2004, Figs. 11, 18. As described above, the industry has shown continued interest in these techniques even decades after their invention by Professor Tsividis. For example, in Fall of 2018, he provided an article to the IEEE Solid-State Circuits magazine teaching many of these power-saving techniques. EX2004.

In Figure 18 of the 2018 article, there is an example showing a combination of both impedance scaling (multiplying RC impedance by n via nR_x combined with C/n), and also bias current scaling (dividing I_{bias} by n):

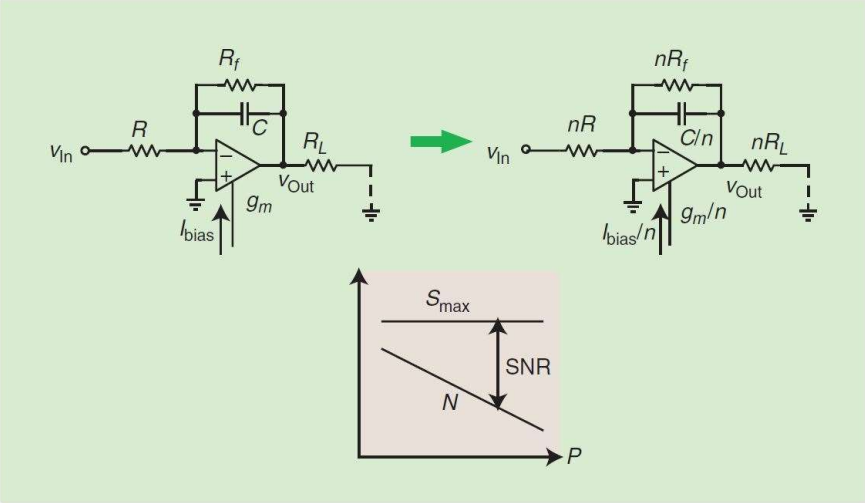
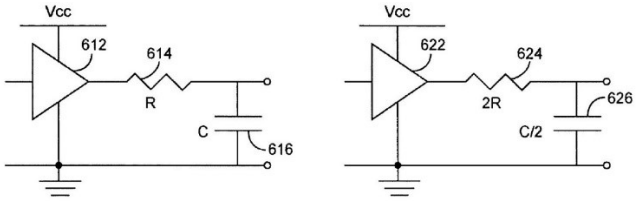


FIGURE 16: Bias-impedance scaling for an active *RC* circuit.

This example is similar to the impedance scaling described in the '825 Patent, Figure 6, where the scaling factor "n"—by which the resistor ("R") and capacitor ("C") components of the circuits are dynamically changed—is equal to 2. EX1001, Fig. 6 (circuit before and after scaling):



In Figure 23 of the 2018 article, the effect of a combination of bias and impedance adjustments is shown: lowering maximum signal handling capability and raising the noise floor, respectively, with creation of some intermodulation products. EX2004, Figure 23:

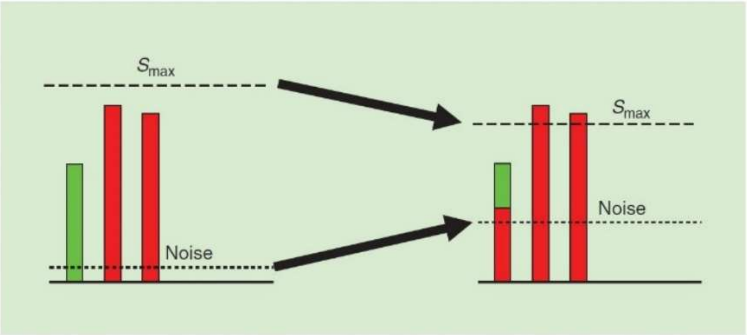
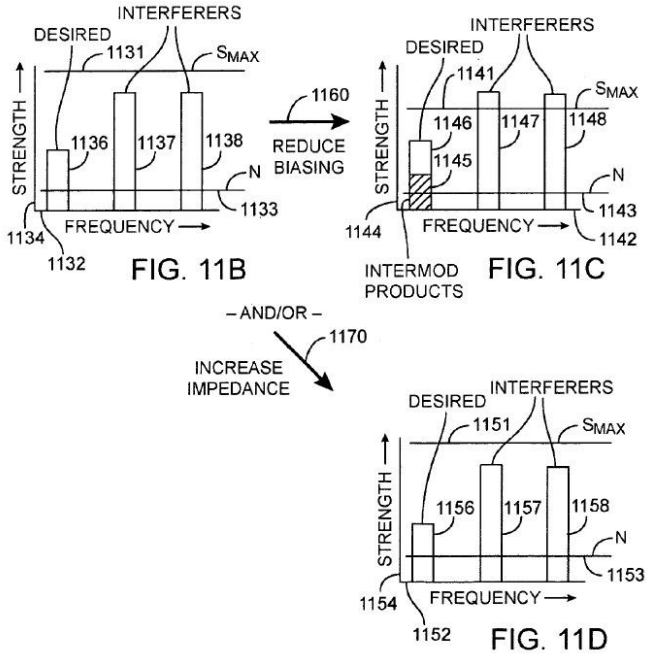


FIGURE 23: Power adaptation in the case of a medium desired signal and large interference.

The same combination of dynamic adjustments to impedance and to bias current as in Figure 23 above was also discussed by Professor Tsividis more than fifteen years prior, in the specification of the '825 Patent. EX1001, 10:30-59, Figs. 11B, 11C, & 11D:



The '825 Patent discloses that decreases in bias current can be used to lower the maximum signal handling capability. *See, e.g.*, *id.*, 9:8-10. The '825 Patent also discloses that the noise floor can be "increased by increasing impedances ***in***

the function block," which also "reduces the required drive current." *See, e.g.*, *id.*, 0:18-21.[4]

The fact that the IEEE remained interested in publishing Professor Tsividis' innovative approaches for dynamic circuit adjustments for power savings, even in the Fall of 2018, is one of the many indicators of the non-obviousness of the inventions also taught and claimed in the '825 Patent. Others are mentioned above in Section I. The '825 Patent was groundbreaking and foundational, and the inventions taught and claimed therein are still used throughout the mobile communications industry.

C. The '825 Patent Prosecution History

The application that issued as the '825 Patent was filed on March 24, 2016 and claims priority to two provisional applications filed on March 1, 2003 (App. Nos. 60/451,229 and 60/451,230). The '825 Patent is a continuation that has the '330 Patent, filed on February 23, 2004, as its ultimate parent.

As acknowledged in the Petition, the claims in their present form were added—replacing cancelled claims that had been rejected, including in view of the *Clark* reference—on March 6, 2018. Petition 7-8; EX1002, 293-303 (rejection), 332 (new claims). After this, the Examiner did not renew the earlier rejections,

[4] All ***bold italic*** emphasis herein added unless otherwise noted.

instead making only a double patenting assertion, followed by entry of a terminal disclaimer, and then notice of allowance. EX1002, 103 (Notice of Allowability).

In the earlier prosecution of the parent '330 Patent, the then-pending claims were also initially rejected as obvious over a combination that included the *Clark* reference (U.S. Patent No. 5,001,776). EX2019, 286.[5] The Examiner found that *Clark* did not explicitly or inherently disclose "dynamically changing an impedance" of a "component in the signal path." *Id.*, 286-287. Instead, the Examiner asserted obviousness based on disclosure of varying an injection voltage and "the current consumption of the mixer 110." *Id.*, 286 (citing *Clark*, 2:34-4:66); EX2009 (*Clark*), 3:62-4:3.

Applicant responded to this rejection by arguing that the identified disclosures of *Clark* only taught changing a "bias current," which was understood to be different than a switching or drive current. EX2019, 308:

> A bias current is not the same as a switching current. One skilled [in] the art understands that a bias current is a DC or quiescent current, while a switching current is a dynamic or transient current that occurs during voltage transitions. (See for example, the pending application, Figure 6 and related discussion.)

[5] The file history for the '330 Patent was filed by Petitioners as EX1002 to their parallel Petition in IPR2024-00816, and is re-filed here as Exhibit EX2019.

See also EX1001, 7:47-62 ("In this way, an impedance can be scaled in order to decrease a circuit's required drive current."), Fig. 6.

The Examiner then reversed the prior obviousness rejection and allowed the parent '330 Patent claims based on Applicant's amendments and arguments. EX2019, 331-332. In allowing these two claim sets after rejections in view of *Clark*, the Examiner necessarily recognized that modifying a DC or quiescent current, as in *Clark*, did not disclose elements involving "dynamically changing an impedance." *Id.*, 331.

D. The '825 Patent Challenged Claims

Apple challenges all eight claims of the '825 Patent here. Each of the five challenged independent claims contains elements requiring dynamically varying "a bias current" (claims 1, 3, 5)—or both "a bias current" and "an impedance" (claims 7, 8)—of a circuit in the receiver signal path. EX1001, 13:11-16 (claim 1), 13:57-62 (claim 3), 14:31-36 (claim 5), 15:25-30 (claim 7), 16:29-35 (claim 8).

For example, challenged claim 3 recites:

> 3. A method for power dissipation reduction in a receiver of a wireless transceiver of a battery powered portable wireless device, and a corresponding increase in battery life of the battery powered portable wireless device, the method comprising:

receiving a wireless signal having a desired signal and an interferer signal, by the wireless transceiver of the battery powered portable wireless device, the wireless transceiver having a receiver signal path comprising a plurality of circuits, wherein the plurality of circuits includes an amplifier, a filter, and a mixer, and wherein the wireless transceiver comprises a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal;

wherein a worst-case power dissipation condition from the battery results when the signal strength of the desired signal is low and the signal strength of the interferer signal is high; and

wherein the power dissipation reduction in the receiver is achieved by ***causing a bias current to vary in one or more of the plurality of circuits in the receiver signal path*** of the wireless transceiver as the signal strength of the interferer signal and the signal strength of the desired signal vary, according to the following:

when the signal strength of the interferer signal is high and the signal strength of the desired signal is low,

> and the desired signal has a signal strength that is larger than in the worst-case power dissipation conditions, ***causing the bias current of the one or more of the plurality of circuits in the receiver signal path of the wireless transceiver to be decreased*** compared to the worst-case power dissipation condition, causing a reduction in power dissipation.

EX1001, 13:38-14:4 (claim 3).

In addition to requiring the adjustment to "a bias current" of a circuit in the signal path as above, challenged independent system claims 7 and 8, and dependent claims 2, 4, and 6 each also require dynamically varying "an impedance" in a circuit in the receiver signal path. *Id.*, 15:25-50 (claim 7: "***the impedance of the circuit*** in the receiver signal path"), 16:29-48 (claim 8: "causing a bias current and ***an impedance to vary in one or more of the plurality of circuits*** in the receiver signal path"); *id.*, 13:32-37 (dependent claim 2: "***a change in an impedance in***"), 14:5-11 (claim 4), 14:66-15:5 (claim 6).

The Petition relies on the same static filter swap of *Behhabani* for both alleged impedance and alleged bias current changes (*see* Petition, 44, 56, 61, 62, 65, 68)—completely ignoring and vitiating the Tsividis patents' teaching of these as separate adjustments. *See, e.g.*, EX1001, Abstract, Fig. 11 ("reduce biasing" "and/or" "increase impedance"), 1:58-61, 8:20-22, Fig 9A:

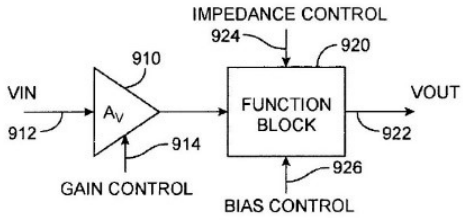


FIG. 9A

As discussed below, *Behbahani*, with or without additional disclosures of *Tan*, does not disclose or suggest these highlighted elements, which are included directly or by dependency in every challenged claim. Apple's Petition relies only on *Behbahani's* disclosure of re-routing the signal path to completely swap one static filter circuit for another static filter circuit. *See, e.g.*, Petition, 44, 56 ("switching from *Behbahani's* high-power filter to its low-power filter"). No impedance or bias of either filter, or any component therein, changes. EX2005, ¶68. That is simply ***not*** dynamically changing an impedance (or bias) in the signal path as required by the claims. EX2005, ¶¶65-74. The Petition fails to show a reasonable likelihood of success and must be dismissed pursuant to 35 U.S.C. §314.

Apple's Petition fails completely on key elements of all independent challenged claims and should be denied institution on its (lack of) merits.

E. Claim Construction

For purposes of *inter partes* review, disputed claim terms are construed to give them "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *See* 83 Fed. Reg. 51340, 51341

(Oct. 11, 2018) (adopting the standard of *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005)). The proper construction is considered in the context of, and must be consistent with, the specification—and the claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art. *See, e.g.*, *Phillips*, 415 F.3d at 1313.

According to Professor Larson, a person of ordinary skill in the art with respect to the '825 Patent would have at least a Bachelor's Degree in Electrical or Electronics Engineering, along with "approximately five years of relevant experience in the design of transceiver architecture, RF systems and components, and analog and mixed signal circuits, as well as experience in control algorithms for such system and familiarity with wireless standards." Additional education could substitute for experience and vice versa. EX2005, ¶50.

Claims of the '825 Patent and related patents have been construed multiple times by district courts. *See, e.g.*, EX2014, EX2015 (preliminary constructions). The claims will be construed in district court again.[6] This heightens the importance

[6] The district court will hold a *Markman* hearing in Theta's litigation against Lenovo and Motorola on June 30, 2025. EX2018. In Theta's litigation against Apple, the district court has not yet indicated whether it will continue the *Markman* hearing begun on March 26, 2024 (*see* EX2017), or will issue an Order adopting its

of guidance that the Board should not construe terms beyond what is necessary to make its determinations. *See, e.g.*, *Sandoz Inc. v. Abbvie Biotechnology Ltd.*, No. IPR2017-01987, Paper 15 (P.T.A.B. Mar. 9, 2018) ("[B]ecause neither of those phrases requires construction for us to resolve the instant dispute, we decline to construe them. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ('only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy').").

The challenged independent claims here have specific elements requiring dynamically varying "an impedance" or a "bias current" of a component that is in the receiver "signal path." *See* Section II.D above. It is at least those elements that Apple has failed to show disclosed or suggested in the prior art asserted here.[7]

1. "signal path"

In Theta's litigation against Apple in the Western District of Texas, the district court preliminarily found that the "signal path" elements in the '825 Patent and related patents should be given their "Plain-and-ordinary-meaning." EX2015,

preliminary constructions (EX2015).

[7] Theta reserves the right to propose or challenge constructions of terms other than those discussed herein in its §42.120 Response if any trial is instituted.

1. Apple had argued for a specific, limiting construction, which the district court's preliminary ruling correctly rejected. *Id.*

Apple adopts Theta's plain meaning construction "for purposes of this proceeding" here, even though it had disparaged it, and argued for something else, in district court. Petition, 9; EX1008, 3. Theta agrees, consistent with Theta's prior assertions and the district court's preliminary ruling, that "signal path" should be given its plain meaning, and is not properly limited to only "analog" signals.

But as a recent Board decision has pointed out in analogous circumstances, adopting a construction in an IPR that a Petitioner has disagreed with elsewhere—without the Petitioner having provided any "sufficient basis to support the claim construction it relies on," fails to meet the particularity requirements of 37 C.F.R. §42.104(b)(3) or to show a reasonable likelihood of success, and warrants dismissal of the resulting deficient Petition. *Samsung*, IPR2024-00319, Paper 16, at 13-23 ("Petitioner … consequently has failed to establish a reasonable likelihood that its unpatentability arguments, which are based on that construction, have merit."); *see also Hologic, Inc. v. Enzo Life Sciences, Inc.*, IPR2018-00019, Paper 21 at 5-7 (P.T.A.B. Nov. 28, 2018) ("Petitioner does not satisfy Rule 42.104(b)(3)" when it disagrees with its "proffered constructions").

Besides being mandated by regulation, requiring Apple to substantiate and support the construction it proposes here is fair, and is consistent with Office policy.

See, e.g., 83 Fed. Reg. 51340, 51350 (Oct. 11, 2018) ("prevent parties from taking inconsistent positions" and "patent challengers will have less flexibility to advance inconsistent arguments about claim scope, and will instead be required to choose a single claim construction"). The alternative—allowing Apple to adopt a broad construction "for purposes of this [invalidity] proceeding" while retaining its inconsistent argument for a narrow construction for non-infringement purposes in district court or on appeal to the Federal Circuit—would be manifestly unfair.

Apple has not abandoned its incorrect district court claim construction position. It has not provided support for either its original—or Theta's and the district court's—proposed interpretation here, despite having the burden to do so. Nor has Apple alleged that the claims would be invalid under either construction in the alternative, as was the case in *10X Genomics, Inc. v. Bio-Rad Labs., Inc*., IPR2020-00086, Paper 8 at 21-22 (P.T.A.B. Apr. 27, 2020). Apple does not discuss or suggest invalidity under its (preliminarily rejected and incorrect) district court proposal.

Here, as in *Hologic* and *Samsung v. Cobblestone*, Apple is trying to rely on a construction "for purposes of this proceeding" that it disagrees with in district court—and therefore is unwilling to commit to providing evidence in support of that construction here. Petition, 9; EX2016, 3. The Board should not countenance Apple's inconsistent positions, nor construe the claims to resolve them. Apple had

the burden to support the construction it proposed in this proceeding, and it did not do so. For these additional reasons, the Board should dismiss the Petition, as in those cases.

Again, if the Board does not dismiss, and finds that construing the "signal path" terms is indeed "necessary to resolve the controversy" (*see, e.g.*, *Vivid Techs.*, 200 F.3d at 803), it should interpret "signal path" according to its plain and ordinary meaning—without any spurious limitations suggested by Apple elsewhere. This is the only interpretation consistent with Theta's arguments in its litigations against Lenovo and Apple, and with the court's preliminary construction in *Theta IP, LLC v. Apple Inc*, No. 6:23-cv-00314-ADA (W.D. Tex.) (EX2015).

But because Apple had and failed to meet its burden to support any construction here, and proposed only a construction that it disagrees with in Texas district court, the fair and efficient course for the Board would be to decline to opine on claim construction and to dismiss the Petition. Indeed, this is the only result that would not reward Apple's taking of inconsistent positions, and its disregard for the specificity requirements of the rules for its Petition. 37 C.F.R. §42.104(b)(3); *Hologic*, IPR2018-00019, Paper 21 at 5-7.

F. There is no reasonable likelihood that Petitioner will prevail in their contention that the challenged claims are obvious over the *Behbahani* papers.

Behbahani—with or without *Tan,* the only references cited to or relied on for several important elements of each independent challenged claim—does not disclose or render obvious those elements as claimed. For example, the Petition does not properly interpret, or show teaching or suggestion in the *Behbahani* papers of, dynamically adjusting "an impedance"—or "a bias current"—of a circuit "in the receiver signal path" as required by each independent challenged claim. This gap in Apple's required proof is fatal to the Petition at the outset. Apple has no likelihood of success, and a trial would unduly waste the Board's time and resources.

Further, there are numerous additional substantive deficiencies in the Petition, including with respect to dependent claims. But the fatal flaws concerning each independent claim discussed herein are sufficient to warrant denial of institution without even needing to reach those issues. The Petition fails to show, as required by §314 and 37 C.F.R. §42.108, that there is a reasonable likelihood that Petitioner would prevail with respect to any one of the claims challenged. Accordingly, institution must be denied.

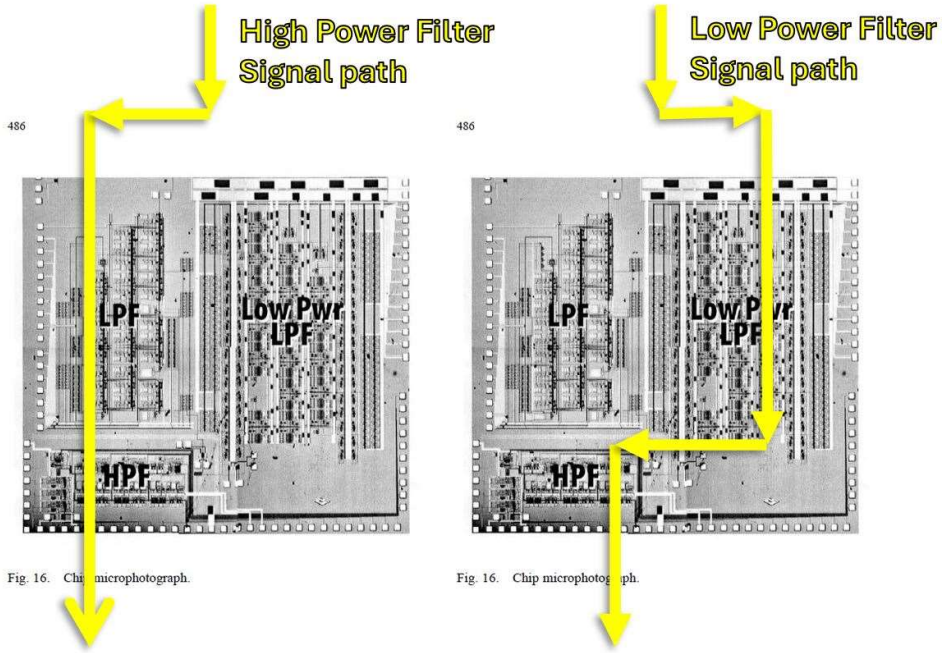
1. Petitioner failed to show that the *Behbahani* papers disclose or render obvious varying "an impedance" of a circuit in the signal path according to the challenged claims

Apple failed to show that *Behbahani*, including in alleged combination with *Tan*, discloses or suggests to a person of ordinary skill in the art dynamically adjusting an impedance, of a circuit in the signal path—as taught and claimed in the '825 Patent. *See, e.g.*, EX1001, 15:25-30 (claim 7: "causing ***an impedance and a bias current of*** one or more of the plurality of circuits in the receiver signal path to vary"), 16:29-35 (claim 8: "causing ***a bias current and an impedance to vary in*** one or more of the plurality of circuits in the receiver signal path"); 13:32-37 (dependent claim 2: "a change in an impedance in"). The alleged filter swap of *Behbahani* does not disclose or suggest these elements.

No impedance in the signal path is dynamically adjusted via the *Behbahani* filter swap—which instead takes one fixed filter out of operation, and puts another fixed filter into operation. Petition, 44 ("switches between two scaled filters"); EX1004, 1207 ("the high-power scaled filter is switched in"); *see also* EX2005, ¶¶54-58. The parameters—including impedance and current—of each filter are static, in that they do not change before and after the switch. EX1004, 1207-08 ("filter input capacitance [] is, respectively, 0.4 and 4 pF for the low-power and the high-power versions"); EX1006, 488 ("low-power and high-power versions of the

LPF drain 5.4 and 56 mA … respectively"); *see also* EX2005, ¶¶67-68. Apple does not allege otherwise.

Switching from one filter to another instead changes the signal path, and so also causes discontinuity and bit errors. EX1004, 1208 ("abrupt switch from the low-power to the high-power filter causes the BER to increase"); *see also* EX2005, ¶67 (annotating *Tan*, Figure 16 to showing the signal path alternatively going through the low-power low pass filter "Low Pwr LPF," or the high-power low pass filter "LPF"):



Each low pass filter "LPF" in the *Behbahani* device sits idle while the signal path is re-routed such that the other LPF is put in operation. *Id.* Neither is changed by being switched on or off. *Id.*, ¶68. Switching operation from one static filter to another is a different, and inferior, approach—versus dynamically changing the

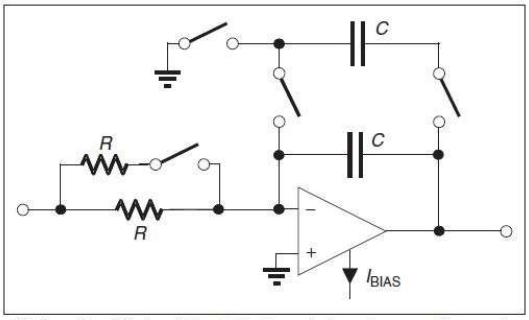
components or structure of a single filter block in operation. *See, e.g.*, *id.*, ¶¶63, 65-66, 69-70 (drawing analogy to difference between swapping 25W and 100W light bulbs, vs. using a single variable bulb on a dimmer control); EX1011, 8-9.

Apple never applies the claim language to explain how re-routing the signal path to put a different fixed filter into operation could fit within the meaning of, e.g., dynamically adjusting circuit components within the signal path as claimed. Petition, 41-49. *Behbahani*'s filter swap approach does not fit with the claim language, so Apple ignores the claim language—failing to meet its evidentiary burden in the process.

Apple's reliance instead on Professor Tsividis' 2003 article—which is, of course, ***not*** a determiner of the scope of the '825 Patent's challenged claims—completely misconstrues, and ignores contrary portions of, the discussion in the article, as explained further below. Petition, 41-44.

The article notes problems with *Behbahani*'s approach. EX1011, 8 ("output transients" and "loss of data"); *see also* EX1004, 1208 ("bit error rate "BER" increases"). And then the article ***teaches improvements on*** *Behbahani*'s approach—specifically ***dynamic*** scaling of a ***single filter's structure via individual elements***. EX1011, 8 ("switching individual filter elements rather than entire filters"), 9 ("use a single filter and vary its structure dynamically"); EX2005, ¶¶61-62. Professor Tsividis' article refers to ***dynamic*** impedance scaling only with

reference to its own Figure 12—which shows a single RC circuit, adjusted via switching individual elements. EX1011, 9 ("dynamic impedance scaling (Figure 12)"), Fig. 12 ("An active RC circuit in which dynamic impedance scaling can be performed"):



12. An active RC circuit in which dynamic impedance scaling can be performed without causing output transients.

Professor Tsividis' article simply ***does not*** point to *Behbahani* as "an exemplary means" for dynamic impedance scaling—Apple's statement to the contrary and out-of-context treatment of the article is misleading and wrong. *See* Petition, 42. Reading on from Apple's excerpts reveals that Professor Tsividis' article instead teaches ***away*** from *Behbahani*'s error-prone approach, and towards "vary[ing] structure dynamically" in a single filter and using "individual filter elements rather than entire filters." EX1011, 8, 9, Fig. 12; EX2005, ¶¶62-64. In other words, Professor Tsividis' article teaches away from *Behbahani* and towards the language of the claims. *See, e.g.*, EX1001, 16:29-35 (claim 8: "causing ***a bias current and an impedance to vary in*** one or more of the plurality of circuits in the receiver signal path").

a. The challenged claims require adjustment of the parameters of individual circuits.

As explained, challenged '825 Patent claims 1, 3, 5, 7 and 8, and their dependents, require dynamically adjusting (or varying) a bias current, or a bias current and an impedance of at least one circuit in the signal path. The plain language requires adjusting the bias, or bias and impedance, in or of a circuit or component thereof—rather than switching out one circuit for another without changing the impedance of either. *See, e.g.*, EX1001, 13:57-62 (claim 3: "causing a bias current to vary in one or more of the plurality of circuits in the receiver signal path"), 15:25-50 (claim 7: "an impedance and a bias current of" and "the impedance of the circuit in the receiver signal path"), 16:29-35 (claim 8: "a bias current and an impedance to vary in"), 13:32-37 (dependent claim 2: "a change in an impedance in").

The other disclosures of the '825 Patent confirm this plain reading of the claims. For example, impedance (or bias) variation is uniformly depicted as an adjustment within a single "Function Block." *See, e.g.*, *id.*, Fig. 8A:

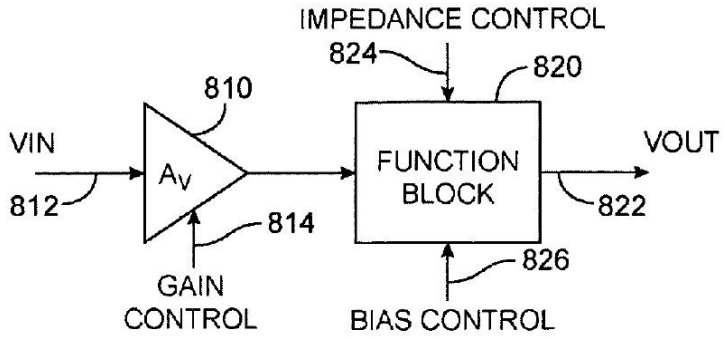


FIG. 8A

See also id., 8:23-28 ("Functional block 820, like the functional blocks in the following diagrams, may be ***a filter***, mixer, amplifier, or other circuit or circuits in a wireless transceiver").

The dynamically adjusted impedances (or bias currents) are taught in the patent specification as being ***within*** the function block. *See, e.g.*, *id.*, 8:39-42:

> One or more impedances are under control of signals on impedance control lines 824. Similarly, one or more bias currents ***in the function block*** are under control of one or more signals on bias control lines 826.

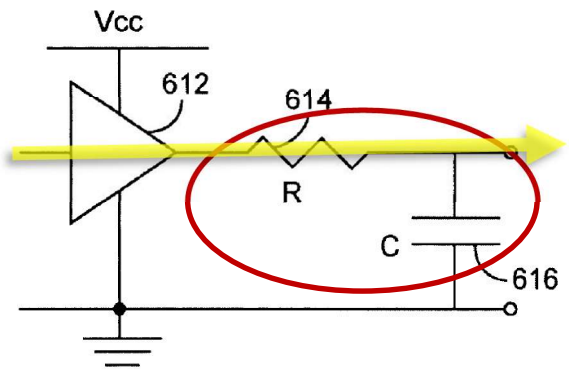
See also, *id.*, 9:39-62 ("Accordingly, one or more impedance ***in the function block*** 920 may be increased"), 10:3-21 ("Again, the noise floor is increased by increasing impedances ***in the function block*** 1020").

Apple fails to discuss the claim language, and also ignores these embodiments showing dynamic adjustment of an impedance or bias within a function—e.g., filter—block. In fact, Apple goes beyond ignoring, to instead

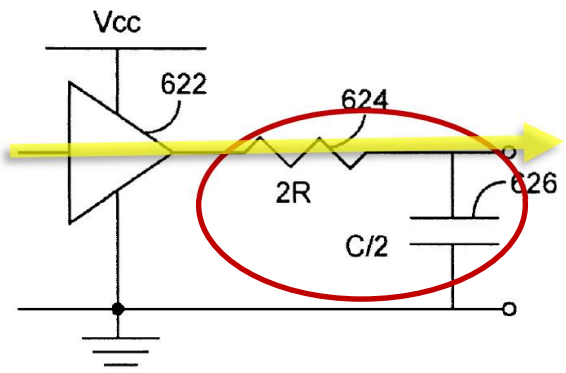
falsely claim that these embodiments do not exist. *See* Petition, 43 (incorrectly stating that Figure 6 is the "only specific example").

The only citation to the '825 Patent that Apple provides in its analysis of these elements is to Figure 6 and its accompanying disclosure. *Id.* Figure 6 ***does not*** depict a circuit swap like *Behbahani*'s, but rather a single RC circuit before and after its impedance is dynamically scaled. EX1001, 7:47-49 ("FIG. 6 is an example of how ***a circuit's*** impedances may be scaled to reduce drive currents, and, depending on ***the circuit*** configuration used, associated bias currents as well."), Fig. 6 (annotated below to show signal path load impedance in red, and signal path in yellow):

Impedance before scaling:

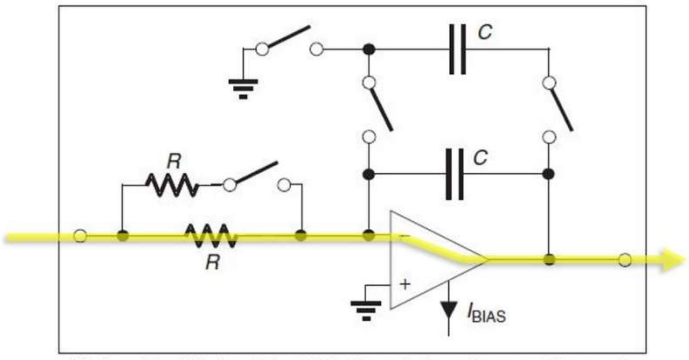


Impedance after scaling:



See also id., 7:60-62 ("In this way, an impedance can be scaled in order to decrease ***a circuit's*** required drive current.").

Figure 6 of the ’825 Patent is similar to, and depicts the same concept as, Figure 12 of Professor Tsividis’ 2003 article. EX1011, Fig. 12 (“An active RC circuit in which dynamic impedance scaling can be performed”). Depicted with switches open, Figure 12 has a signal path impedance consisting of R and C, like the left diagram of ’825 Patent Figure 6. With switches closed, Figure 12 would have a signal path impedance consisting of R/2 and 2C—each scaled by a factor of two as in the right diagram of ’825 Patent Figure 6. EX2005, ¶62; EX1011, Fig. 12 (annotated to show signal path in yellow below):



12. An active RC circuit in which dynamic impedance scaling can be performed without causing output transients.

The challenged claim language, and the specification disclosures teaching in support of it, require dynamically adjusting a bias current, or an impedance and a bias current, of or in a circuit in the signal path. As shown above, a person of ordinary skill in the art would understand from the claim language and ’825 Patent disclosures that this is not *Behbahani*’s static filter swap. EX2005, ¶¶46-47, 63,

66, 69-70, 74. No impedance or bias—not of a component of either filter, nor of either filter as a whole—changes or is adjusted by that swap. *Id.*, ¶¶67-68.

Apple argues that *Behbahani* changes "Signal Path Impedance" by changing the signal path. *See* Petition, 44-45. But the claims require adjusting "an impedance" of or in at least one circuit or component ***within*** the signal path—plainly not the same thing, and not what *Behbahani*'s filter swap does.

The impedance and bias parameters of each filter are not changed by virtue of being included in or excluded from the signal path. EX2005, ¶¶68, 71-72. Apple failed to show disclosure or suggestion of these claimed elements in the *Behbahani* papers, and thus failed to establish any reasonable likelihood of success as to any claim here.

On page 49 of the Petition, Apple states, entirely without support, that *Behbahani*'s filter swap allegedly meets the elements requiring adjusting "an impedance" in the signal path. As explained further below in Section III.B, this is attorney argument, not evidence, and the Board should not credit it. Apple cites paragraph 135 of Dr. Abidi's declaration. Petition, 49. But notably, here Dr. Abidi's declaration departs from verbatim copying and ***does not*** repeat the argument by Apple's counsel. EX1003, ¶135. Dr. Abidi only opines that *Behbahani*'s swap of filters increases "signal path impedance"—he ***does not*** say

that this is the dynamic adjustment of a component in the signal path, as claimed. *Id.*:

Petition, pg. 49	**Declaration of Dr. Abidi ¶135**
A POSITA would have understood that, consistent with the '825 Patent and its inventors own publications, switching from *Behbahani's* high-power filter to its low-power filter changes ***(increases) an impedance*** and changes (reduces) the bias current of a component (i.e., the filter) in the signal path. *Dec.*, ¶135.	135. A POSITA would have understood, consistent with the '825 Patent and Dr. Tsividis's 2003 paper, that Tan's teachings confirm switching from *Behbahani's* high-power filter to its low-power filter ***increases signal path impedance*** and reduces the bias current of a component (i.e., the filter) in the signal path.

One can increase the total "signal path impedance" without "causing an impedance" of a circuit "in the receiver signal path … to vary"—for example by re-routing the signal path through a different filter, changing neither filter. If Dr. Abidi would not even sign on to Apple's assertion that *Behbahani*'s filter swap meets the elements as claimed, then the Board should not find the argument reasonably likely to succeed either.

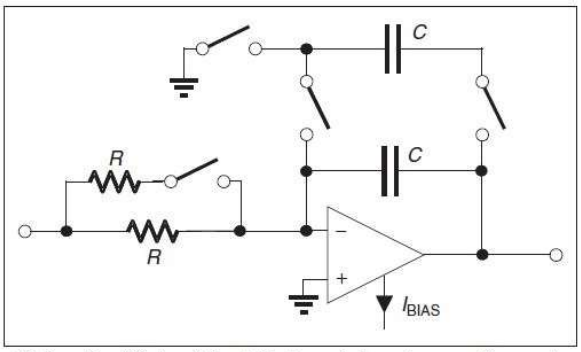
Apple had the burden of proof and failed to provide evidence to relate the *Behbahani* approach to the key claim language discussed above, or to the construction Apple proposes for purposes of this proceeding. The Petition should be denied institution on its (lack of) merits.

b. Professor Tsividis' 2003 article does not put *Behbahani*'s approach within the claims.

As explained, Apple relies for these elements primarily on its incorrect assertion that Professor Tsividis' 2003 article somehow endorsed *Behbahani*'s filter swap as "an exemplary means" for "dynamic impedance scaling." *See, e.g.*, Petition, 42-44. As an initial matter, as mentioned above, the article does not discuss or define the claims of the '825 Patent. The fact that Professor Tsividis discusses and cites to—and then discusses downsides of and improvements to—the *Behbahani* filter swap approach, does not place that approach within the scope of the specific claim language.

Reading the relevant sections of the article in context, and beyond the point Apple excerpts from, it becomes clear that Professor Tsividis is identifying problems with, and then suggesting improvements over the *Behbahani* approach. EX1011, 8 (*Behbahani* filter swap "causes transients at the output," and "the result may be loss of data"), 8 ("delay" from attempt to mitigate transients with hand-off), 8-9, Fig 12, 9-10:

> **Individual element switching**: One can diminish the delay involved above by ***switching individual filter elements rather than entire filters***. An example is shown in Figure 12. …



12. An active RC circuit in which dynamic impedance scaling can be performed without causing output transients.

> … It may also be possible to ***use a single filter and vary its structure dynamically***, using techniques related to the ones discussed. This approach has not been investigated to any extent yet.

And as shown above, the individual element switching improvements described—unlike the filter swap—fit with the teaching and claims of the '825 Patent. *See, e.g.*, EX1001, Fig. 9A, 9:39-62 ("Accordingly, one or more impedance ***in the function block*** 920 may be increased"), 15:25-30 (claim 7: "causing an impedance and a bias current ***of one or more of the plurality of circuits*** in the receiver signal path to vary").

The article was published in IEEE Circuits & Devices Magazine in January of 2003. EX1011, footer. In the meantime, and separately, Theta and Professor Tsividis were in fact investigating and developing techniques for dynamically varying circuit structure via adjusting internal components. They filed provisional patent applications, and then parent '330 Patent on February 23, 2004. EX1001, 2.

When Theta and Professor Tsividis filed the original non-provisional application that became the '330 Patent, and again for the application that became the '825 Patent, they cited to *Behbahani* and *Tan*. EX1002, 80. They also cited Professor Tsividis' 2003 article—guaranteeing that the Examiner would understand the distinction from, and improvement of the '825 Patent over, the approach of the *Behbahani* papers. *Id.*, at 81. These references have been on the face of the Tsividis Patents for twenty years, through seven continuation prosecutions, and multiple invalidity challenges—before Apple, in its desperation to get around shortcomings in the art that "plagued prior invalidity challenges," brought them out for its cumulative follow-on Petitions here.

Apple fails to raise a reasonable likelihood of success on the merits. The Petition merely asserts—completely without support—that *Behbahani*'s filter swap is within the elements as claimed. It is not, and a person of skill in the art would not understand it to be in the context of the teaching and claims of the '825 Patent, for all the reasons given above. *See, e.g.*, EX2005, ¶¶65-74.

In sum, Petitioner's arguments are facially deficient, and do not show a reasonable likelihood that the *Behbahani* papers could render obvious any challenged claim. There is simply no teaching or suggestion in the references of the claimed dynamic adjustment of "an impedance" in the signal path as required by challenged claims 2, 4, 6, 7, or 8. Petitioner's Grounds, each of which cite to

and rely only on *Behbahani* and *Tan* for alleged disclosure of these elements, must fail. *See, e.g.*, *In re Smith Int'l, Inc.*, 871 F.3d 1375, 1381 (Fed. Cir. 2017) (all claim elements must be shown).

2. Petitioner failed to show that the *Behbahani* papers disclose or render obvious varying "a bias current" of a circuit in the signal path according to the challenged claims.

Challenged independent claims 1, 3, and 5, and their dependents, require dynamically adjusting ***a*** bias current ***in the signal path***. EX1001, 13:11-16 (claim 1: "causing ***a bias current to vary in*** one or more of the plurality of circuits in the receiver signal path"), 13:57-62 (claim 3: same), 14:31-36 (claim 5: same). For all of the reasons given above for the "an impedance" claims, Apple's challenge to these claims—relying on the same filter swap of *Behbahani*—also fails.

As was the case for Apple's identification of the alleged dynamically adjusted impedance—discussed in sub-section 1 above—here Apple relies only on the filter swap of the *Behbahani* papers. Petition, 41 (*Behbahani's* filter swap allegedly "satisfies both the limitations requiring increased signal path impedance and limitations requiring a reduced DC bias current"), 44-49, 61-62. While the two filters may draw different supply currents when turned on—*see* EX1006, 488 ("drain 5.4 and 56 mA … respectively")—for the reasons discussed above the bias of each filter is not taught to be dynamically ***varied*** by virtue of the signal path

being re-routed to pass through it, or thereafter. EX2005, ¶¶68, 72. *Behbahani* re-routes the signal path without adjusting the bias current of either swapped filter.

As discussed above, the plain claim language and the specification of the '825 Patent—which Apple never applies or discusses for these elements—do not support including *Behbahani*'s wholesale filter swap in the scope of the challenged claims. Apple fails to identify any single bias current for any filter circuit that is caused to vary by the swap. *See, e.g.*, EX1001, 13:11-16 (claim 1: "causing ***a bias current to vary in*** one or more of the plurality of circuits in the receiver signal path"); *see also id.*, 8:39-42 ("one or more bias currents ***in the function block*** are under control of one or more signals on bias control lines 826"), Fig. 8A:

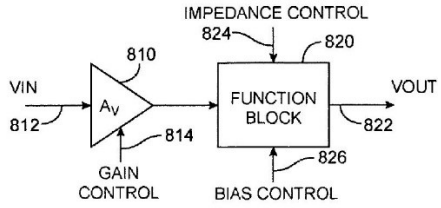
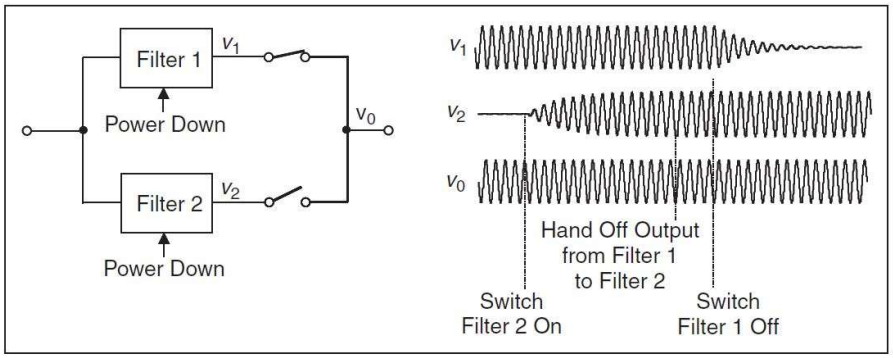


FIG. 8A

And as discussed above, Professor Tsividis' 2003 article confirms problems with the *Behbahani* filter swap and illustrates improvements. EX1011, 8 ("causes transients at the output," and "the result may be loss of data"), Fig. 11 (showing use of handoff to mitigate transients from hard switch between two filter function blocks):

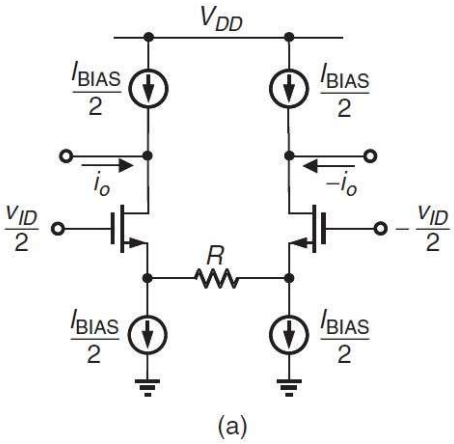


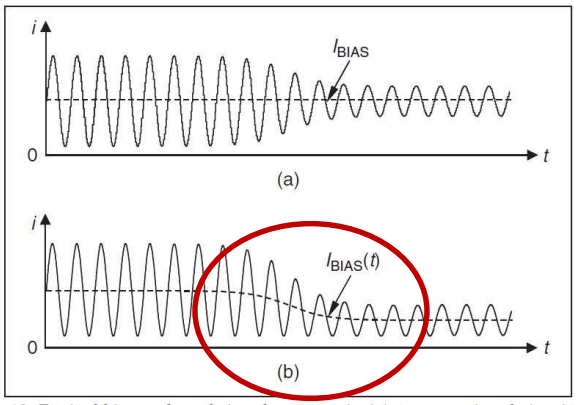
11. Method to switch between two signal processors with the same input-output behavior, without causing output transients.

Reading further in the article reveals a different, alternative solution to *Behbahani*'s—that of "dynamic biasing" of a single circuit by changing component parameters. *Id.*, 8-9:

> In many cases it is desirable to do this ***dynamically, without interrupting the filter operation***. For example, in the transconductor of Figure 3 all four bias currents can be scaled down together, without causing major output disturbances…

An example circuit utilizing this dynamic, in-operation, bias adjustment is shown in Figure 3(a). And the resulting adjustment to bias current of such a circuit is shown in Figure 13(b). EX1011, Fig. 3 (detail below), Figure 13 (annotated below):





13. Typical bias and total signal currents in (a) a conventional circuit and (b) a dynamically biased circuit.

A person of skill in the art would have understood from the discussion of the 2003 article that this dynamic biasing solution was different from the hard filter swap disclosed in the cited *Behbahani* papers. EX2005, ¶74.

Dynamically adjusting a bias current of a single amplifier or filter function block in the signal path—unlike the signal path re-routing and hard filter swap of *Behbahani*—fits with the teaching and claims of the '825 Patent, as discussed above. *See, e.g.*, EX1001, 13:11-16 (claim 1: "causing a bias current to vary ***in one or more*** of the plurality of ***circuits in the receiver signal path***").

In sum, Petitioner's arguments are facially deficient, and do not show a reasonable likelihood that the *Behbahani* papers could render obvious any challenged claim. There is simply no teaching or suggestion in the references of the dynamic adjustment of "a bias current" in the signal path as required by each challenged claim. Petitioner's Grounds, each of which cite to and rely only on *Behbahani* and *Tan* for these elements, must fail, and institution should be denied.

III. The Board should exercise its discretion to deny institution.

The Board is granted the discretion to decline to institute *inter partes* review whenever it deems the circumstances warrant doing so. *Harmonic*, 815 F.3d at 1367 ("the PTO is permitted, but never compelled, to institute an IPR proceeding"); *see also* 35 U.S.C. §314(a); *Oil States Energy Servs. LLC v. Green's Energy Grp., LLC*, 138 S. Ct. 1365, 1371 (2018) ("The decision whether to institute *inter partes* review is committed to the Director's discretion.").

Here, the Board should decline to institute proceedings, because Apple has failed to show a reasonable likelihood of success at proving invalidity, as it must to meet its burden as Petitioner. *See* Section II above. In addition, Apple's weak, follow-on arguments—road-mapped from prior challenges and relying on references that Professor Tsividis put before the Examiner twenty years ago—do not warrant the use of the limited resources of the Board on a trial.

The Petition can and should be dismissed in the Board's discretion because it is merely a follow-on to failed efforts to invalidate the Tsividis Patents by Samsung (in district court litigations) and Lenovo (before the Board). Apple self-describes its challenges as trying to correct a gap in the prior art that has "plagued prior invalidity challenges." IPR2024-00816, Petition, 36. But using prior challenges as a roadmap, as Apple does here, is an inefficient use of the Board's resources and unfair to Theta.

Apple brings nothing new, but instead chooses references that Professor Tsividis himself told the Office about twenty years ago—and that neither Samsung nor Lenovo thought worth the Board's attention. EX1002, 80 (*citing Behbahani* and *Tan*); EX1001, 2-3 (same). This proceeding is cumulative of the Examiner's original review during multiple prosecutions and is unnecessary. Apple fails to show or even suggest that the Examiner erred or failed to understand how the *Behbahani* papers differ from the claims.

Samsung, Lenovo, and Apple each included *Behbahani* in their respective district court invalidity contentions. *See, e.g.*, EX2010; EX2011; EX2012. Apple could take its arguments about the *Behbahani* papers to jury trial in the Western District of Texas in less than a year. EX2013 (scheduling trial as early as July 14, 2025). In addition to the lack of merit explained above, there is no reason—under the *General Plastic* factors or otherwise—that Apple needs or is entitled to use the Board's limited trial resources here.

In short, the Board needn't institute a trial to reestablish how Professor Tsividis' claimed inventions differ from art that he cited to the Office more than two decades ago. EX2019, 62. Professor Tsividis already taught this distinction, explained suggested improvements over *Behbahani* in his 2003 article, and claimed improved techniques in the '825 Patent. EX1011, 8-9. For these additional reasons

and as further explained below, institution here would be a waste of the Board's limited resources and should not be granted in the Board's discretion.

A. The Petition is cumulative and unworthy of a Board trial.

Apple's Petition is a follow-on to prior invalidity challenges—and Apple admittedly uses those prior efforts as a roadmap. IPR2024-00816, Petition, 36:

> Accordingly, for the dynamic impedance ***limitations that have plagued prior invalidity challenges***, the Proposed Grounds here rely on *Behbahani's* scaled filter approach …

Apple waited as long as possible to file its challenges—363 days after service of Theta's Complaint in district Court. This let Apple see and adapt to Theta's preliminary response and the Board's institution denial and rehearing denial in Lenovo's IPR2023-00694 challenge to the '330 Patent (EX2007, EX2008)—as well as to Theta's Responses in related IPR2023-00697 and IPR2023-00698, which were filed January 30, 2024. As admitted in the Petitions, Apple learned and adapted its challenge to address what it thought had "plagued"—or to put it another way, "proven meritless"—Samsung's and Lenovo's past challenges.

And compounding the follow-on nature of its challenge, Apple chose cumulative prior art references long ago cited to the Examiner—and known to Samsung, Lenovo, Apple, and the rest of the world from the '825 Patent itself. EX1001, 2-3 (citing *Behbahani*, *Tan*, and Professor Tsividis' 2003 article); s*ee*

also, EX2010, 2; EX2011, 2-3; EX2012, 3 (invalidity contentions, citing *Behbahani*). Indeed, even the article by Professor Tsividis that Apple relies on in its challenge was cited to the original Examiner in 2004, and with subsequent continuations, by Theta. EX1002, 81; EX2019, 62; *Id.*, EX1001, 3 (*citing* EX1011).

In summary, Apple's round of challenges to the Tsividis Patents comes near the end of the Board's consideration and rejection of the first round of challenges, explicitly uses decisions and papers from the first round as a roadmap, but then adds nothing other than papers that Theta gave to the Office in 2004. This is a Petition that should be discretionarily denied, under multiple rationales that the Board uses to ensure that its resources are being used efficiently—and used fairly *vis-à-vis* the reliance of Patent Owners like Theta on prior decisions of Examiners and the Board.

"Multiple, staggered petitions challenging the same patent and same claims raise the potential for abuse." *General Plastic Industrial Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19, 2017 WL 3917706, at *12 (P.T.A.B. Sept. 6, 2017) (precedential as to §II.B.4.i). The Board has repeatedly found subsequent Petitions that roadmap from prior challenges to be "unfair to patent owners" and "an inefficient use of the *inter partes* review process." *Id.*; *see also LG Elecs. Inc. v. Core Wireless Licensing S.A.R.L.*, IPR2016-00986, Paper 12, 2016 WL 5219840 (P.T.A.B. Aug. 22, 2016) ("The Board's resources would be more fairly expended

on first petitions rather than on a follow-on petition like the Petition in this case."). Here, the *General Plastics* factors strongly weigh toward denial of institution.

"[A]pplication of the *General Plastic* factors is not limited solely to instances when multiple petitions are filed by the same petitioner." *Valve Corp. v. Electronic Scripting Products, Inc.*, IPR2019-00062, Paper 11, 2019 WL 1490575, at *4 (P.T.A.B. Apr. 2, 2019) (precedential). Here in particular, Apple's use of prior petitions as a roadmap, "implicitly create[s] such a relationship" as satisfies *General Plastic* factor 1. *Ericsson Inc. v. Uniloc 2017, LLC*, IPR2019-01550, Paper 8 at 11-12, 2020 WL 1285387, at *5 (P.T.A.B. Mar. 17, 2020) ("The instant Petitioner's decision to use the prior petitions as a roadmap for its own petition ties the interests of all of the petitioners together").

Accordingly, Apple's admitted attempt to improve over issues "that have plagued prior invalidity challenges" ties its interests to the prior Petitioner's aims, and satisfies *General Plastic* factor 1. *Id.* Factor 1 weighs against institution.

Factor 2 concerns whether the first petitioner knew about, and thus could have relied on, the second petition art in its first petition. In other words, was the art that Apple now puts before the Board passed over as unsuitable for inclusion in the first Petition? There is no dispute that Lenovo knew of, and asserted invalidity based on, *Behbahani* in its district court invalidity contentions—but filed IPR2023-

00694 on March 7, 2023 ***without*** including the *Behbahani* papers. EX2011, 2, 3.[8] Factor 2 weighs against institution.

Factor 3 also weighs against institution. As discussed above, before filing this Petition, Apple benefitted from Theta's preliminary response, the Board's denial, and its denial of rehearing, in IPR2023-00694, as well as from Theta's responses in related instituted IPR2023-00697 and IPR2023-00698.

Apple learned of the *Behbahani* papers at least as early as the first time it looked at the '825 Patent (*see* EX1001, 2)—which was no later than when it received Theta's Complaint on May 3, 2023. Apple offers no explanation for its delay of one year (minus a few days) in filing this Petition. Apple could have joined Lenovo's Petitions, or filed its own much sooner, but instead chose to delay as much as the statute allows in order to observe and learn from those proceedings. Factors 4 and 5 also weigh against institution.

With respect to Factor 6, as the Board has repeatedly noted, its limited resources are "more fairly expended on initial petitions, rather than follow-on

[8] Theta produced Samsung's earlier district court invalidity contentions and claim charts including *Behbahani* (*see, e.g.*, EX2010, 2) to Lenovo on Feb. 13, 2023. Again, Samsung never brought an IPR against the Tsividis Patents on any reference, including *Behbahani*.

petitions." *See, e.g.*, *General Plastic*, IPR2016-01357, Paper 19. Apple focuses its argument on the fact that different references are cited here than by Lenovo. *See* Petition, 72. But Apple ignores and fails to mention that its references here were cited during, and are cumulative of prior Examination by the Office. Here, *General Plastic* Factor 6, like Factors 1-5, also weighs against institution, and the Board should dismiss the Petition in its discretion under §314.

Further, the *General Plastic* factors "are not dispositive, but part of a balanced assessment of ***all relevant circumstances in the case, including the merits***." Consolidated Trial Practice Guide, 58 (Nov. 2019). As explained herein, the merits of Apple's challenges are particularly weak. And Apple's reliance on cited art also warrants dismissal of the Petition under §325(d) and the *Advanced Bionics* framework.

The Board can and should deny institution under Section 325(d) here, because "the same or substantially the same prior art or arguments previously were presented to the Office." 35 U.S.C. §325(d); *see also Hologic, Inc. v. bioMerieux, Inc.*, IPR2018-00568, Paper 9 at 11 (P.T.A.B. Aug. 7, 2018). When considering whether to deny institution under §325(d), the Board uses a two-part framework: "(1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of first part of the framework is

satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims." *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GMBH*, IPR2019-01469, Paper 6 at 8 (P.T.A.B. Feb. 13, 2020) (precedential) (citing *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (P.T.A.B. Dec. 15, 2017) (precedential as to §III.C.5, first paragraph)).

The core rationale for exercising discretion to deny institution under Section 325(d) is straightforward: the Office has limited resources, and there is an interest in granting patent owners "repose" on issues already adjudicated. *See Dorco Co., Ltd. v. The Gillette Co., LLC*, IPR2017-00500, Paper 7 at 14 (P.T.A.B. June 21, 2017). Deciding whether to exercise discretion under Section 325(d) to deny review, "the [Office] weighs Petitioner's desires to be heard against the interests of patent owners, who seek to avoid harassment and enjoy quiet title to their rights." *Neil Ziegman, N.P.Z., Inc. v. Stephens*, IPR2015-01860, Paper 11 at 12-13 (P.T.A.B. Feb. 24, 2016) (citing H.R. Rep. No. 112-98, pt. 1, at 48 (2011)).

Here, Theta submitted *Behbahani*, *Tan*, and Professor Tsividis' 2003 article to the Examiner (EX1002, 80-81), they were reviewed and considered (*id.*, 117-118), and the claims were allowed (*id.*, 380). Theta has relied on the Examiner's consideration and determination throughout the term of the '825 Patent to, for example, obtain additional continuation patents—which were also deemed valid

and issued over Examiner consideration of the *Behbahani* papers. And Theta has relied on the Examiners' consideration and determination in seeking to license the inventions—that it disclosed to the world and obtained patents for from the Office.

Apple admits, as it must, that *Behbahani* and *Tan* were previously presented to the Office. *See* Petition, 69 ("cited on the face of the '825 Patent"). Apple argues that *Leete* was referenced in, and intended to be used "conjunctively" with, *Behbahani*—and so does not argue that *Leete* is not "the same or substantially the same art." *Id.*, 24-27, 68-70. The first prong of the *Advanced Bionics* framework is satisfied here.[9]

The second *Advanced Bionics* prong: "whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims," puts the burden on Apple to explain the alleged error and its materiality. *Advanced Bionics*, IPR2019-01469, Paper 6 at 8. Apple fails to do so.

[9] An Examiner's initials on an IDS (EX1002, 117) are sufficient to satisfy this prong. *Keysight Techs., Inc. v. Centripetal Networks, Inc.*, IPR2022-01421, Paper 14 at 5 (P.T.A.B. Aug. 24, 2023) ("does not require that an Examiner provide a 'discussion analysis, or other findings on the applicability' of the relevant material contained in an IDS."); *Biocon Pharma Ltd. v. Novartis Pharmaceuticals Corp.*, IPR2020-01263, Paper 12 at 9 (P.T.A.B. Feb. 16, 2021); M.P.E.P. §609.05(b).

The requirement that Petitioner show material error by the Examiner to meet the second prong of the *Advanced Bionics* framework exists to provide deference to prior evaluation by Examiners, and to protect Theta's reliance on it. *See, e.g.*, *Advanced Bionics*, IPR2019-01469, Paper 6 at 9 ("At bottom, this framework reflects a commitment to defer to previous Office evaluations of the evidence of record unless material error is shown."). Apple has a heightened burden to show material error by an Examiner who is presumed to have examined and competently interpreted the references:

> We have explained that, where a party only relies on prior art considered by an examiner in its invalidity contentions, ***that party has the burden to "overcome[e] the deference that is due to a qualified government agency presumed to have properly done its job***, which includes one or more examiners who are assumed to have some expertise in interpreting the references and ... whose duty it is to issue only valid patents."

Stone Basket Innovations, LLC v. Cook Med. LLC, 892 F.3d 1175, 1179-80 (Fed. Cir. 2018). The Examiner's presumptively "properly done" job includes considering all references cited, and whether any should be combined. *See* M.P.E.P. §707.05:

> The examiner ***must consider all the prior art references (alone and in combination)*** cited in the application or reexamination, including those

cited by the applicant in a properly submitted Information Disclosure Statement.

Apple must do more than simply disagree with the Examiner. Arguments that "amount essentially to a disagreement with the Examiner as to the sufficiency of the evidence" are not evidence of material error. *See, e.g.*, *Dynatemp Int'l, Inc. v. R421A LLC*, IPR2020-01660, Paper 15 at 10-26 (P.T.A.B. Apr. 20, 2021) (denying institution where petitioner failed to sufficiently explain how the Office erred in a manner material to patentability). "If reasonable minds can disagree regarding the purported treatment of the art or arguments, it cannot be said that the Office erred in a manner material to patentability." *Id.* at 12 (citing *Advanced Bionics*, IPR2019-01469, Paper 6 at 9). Institution should be denied when, as here, Petitioner fails to sufficiently explain how the Office erred in a manner material to patentability. *Id.* at 10-26; *Roku, Inc. v. Universal Elecs., Inc.*, IPR2019-01619, Paper 11 at 17-20 (P.T.A.B. April 2, 2020); *NXP USA, Inc. v. Impinj, Inc.*, IPR2020-00519, Paper 7 at 13 (P.T.A.B. Aug. 17, 2020); *Volkswagen Group of Am., Inc. v. StratosAudio, Inc.*, IPR2021-00718, Paper 16 at 20-24 (P.T.A.B. Oct. 25, 2021).

Apple does not even attempt to show material error, instead arguing based only on a general and conclusory reference to "the strength of the Proposed Grounds" that the Examiner must not have appreciated something. Petition, 69-70.

But that is mere disagreement with the Examiner. And it improperly shifts the burden to show error and vitiates "the express language of our §325(d) precedent requiring that Petitioner make a 'showing of material error' and 'point[] out sufficiently how' the Examiner erred." *Google LLC v. Valtrus Innovations Ltd.*, IPR2022-01197, Paper 18 at 20-23 (P.T.A.B. June 13, 2023). Even if the prosecution history is silent as to the details of the Examiner's consideration of the reference, *Advanced Bionics* still requires petitioner to "show the Office erred by overlooking something persuasive" and identify "specific teachings" misunderstood or overlooked. *Advanced Bionics*, IPR2019-01469, Paper 6 at 8-10.

As Apple notes, a handful of Board panels have found that a strong showing of patentability "may itself be evidence of material error." Petition, 70. But this is inconsistent with the express precedential language of *Advanced Bionics*—and other Board panels have followed that language and refused to consider non-specific assertions about the merits such as Apple's here. *Valtrus*, IPR2022-01197, Paper 18 at 23-23 (citing cases); *Ivantis, Inc. et al. v. Sight Scis., Inc.*, IPR2022-01540, Paper 14 at 13-14 (P.T.A.B. Mar. 22, 2023); *Panduit Corp. v. Corning Optical Commc'ns LLC*, IPR2021-01562, Paper 20 at 16-18 (P.T.A.B. Apr. 6, 2022); *Google LLC v. Kewazinga Corp.*, IPR2021-00524, Paper 17 at 17-18 (P.T.A.B. Aug. 24, 2021).

And in any event, Apple's merits showing here is not strong, for reasons already explained and discussed above. Apple failed to show a reasonable likelihood of success, and its expert declaration, which merely parrots the Petition arguments, adds nothing to the record.[10]

The Board needn't expend its resources on a trial of this Petition, and can deny institution in its discretion—both under §325(d) and *Advanced Bionics* as cumulative of the Examiner's consideration and allowance over the cited *Behhabani* papers, and/or under §314 and *General Plastics* as an inefficient and unfair serial Petition using Lenovo's prior failed challenges as a roadmap. The Board can and should deny institution here. 35 U.S.C. §314(a).

B. The Petition lacks evidentiary support, presenting no more than attorney argument.

Apple's Petition shows no reasonable likelihood of success because it provides nothing but conclusory say-so and attorney argument on the central questions of what would be obvious to a POSITA and whether they would be motivated to seek combinations. What a POSITA would or wouldn't have found obvious—*i.e.*, their knowledge and skill level—is a ***fact question*** to be determined

[10] Apple does not rely on Dr. Abidi to show any specific error in the Examiner's consideration of the *Behbahani* papers, but merely makes a generalized reference to the Petition's Ground. Petition, 70.

based on ***evidence***. *See, e.g.*, *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966); *see also Circuit Check Inc. v. QXQ Inc.*, 795 F.3d 1331, 1335 (Fed. Cir. 2015) (fact question whether art is analogous). "Attorney argument is not evidence." *Icon Health and Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017) (reversing Board for relying on argument); M.P.E.P. §2145 ("arguments of counsel cannot take the place of factually supported objective evidence").

Here Apple alleges only obviousness and only in combination. Petition, 11. Accordingly, Apple must prove, *inter alia*: the level of ordinary skill in the art; that a person of ordinary skill in the art would be motivated to and would combine those references; and that the references disclose or render obvious to a person of ordinary skill in the art each and every element.

Each of Apple's core arguments that it must prove depends on what a person of ordinary skill—according to Apple someone with at least a Master's degree in Electrical Engineering and two years of experience working with wireless communications devices, see Petition, 10—would understand or find obvious in 2003. On each of Apple's core arguments, Apple offers only the Declaration of Dr. Asad Abidi as "evidence." *See, e.g.*, Petition at 43, 45, 48-49 (what would be understood by POSITA), 24-27, 36-37, 46-47 (POSITA reasons to combine). Dr. Abidi relies only on his (or Apple counsel's) say-so. *See, e.g.*, EX1003, ¶¶115, 144 ("Accordingly, …").

The Declaration of Dr. Abidi is not properly evidence here, because the opinions of Dr. Abidi are merely attorney argument from the Petition affixed with the signature and CV of Dr. Abidi. *See, e.g.*, Petition, 43, 45, 56; EX1003, ¶¶114-115, 118, 144: (reproduced in part below, verbatim material highlighted):

Petition, pg. 43	**Declaration of Dr. Abidi ¶¶114-115**
Increasing the resistance and decreasing capacitance in a filter circuit is the only specific example of dynamically adjusting signal path impedance discussed in the '825 Patent. … *Dec.*, ¶¶110-115.	114. Increasing the resistance and decreasing capacitance in an RC filter circuit is the only specific example of dynamically adjusting signal path impedance discussed in the '825 Patent.
Petition, pg. 45	**Declaration of Dr. Abidi ¶118**
Fig. 4(b) below illustrates switching from the low-power filter to high-power filter to expand the DR when worst-case conditions are encountered: … A POSITA would understand that switching back—from the high-power filter to the low-power filter—when conditions improve is one means through which *Behbahani's* system saves power during periods of better than worst-case conditions. *Dec.*, ¶¶117-120.	118. Fig. 4(b) below illustrates switching from the low-power filter to high-power filter to expand the DR when worst-case conditions are encountered: … *Behbahani* teaches that switching back—from the high-power filter to the low-power filter—when conditions improve is one means through which *Behbahani's* system saves power during periods of better than worst-case conditions.

This is far from the only example of verbatim copying. Indeed, most of the Petition's analysis and conclusion is copied word for word into the declaration for Dr. Abidi's signature—including nearly all of the various sections discussing what

a POSITA would understand or their alleged motivations for combinations of references. *See, e.g.*, Petition, 20:

> As an initial matter, the two references describe the same research, focusing on different aspects of the same receiver circuit, and were intended to be used in conjunction. Dec., ¶74.

EX1003, ¶74:

> *Behbahani* and *Leete* describe the same research focusing on different aspects of the same receiver circuit, and were intended to be used in conjunction.

See also Petition, 46, EX1003, ¶116; Petition, 36-37, EX1003, ¶¶101-102.

IPR expert declarations are meant to be independent ***testimony***—see 37 C.F.R. §42.53. Here, in place of independent and supported testimony on key issues it bears the burden to prove with evidence, Apple only offered attorney argument, copied in large part verbatim from the Petition.[11]

Attorney argument is not evidence, even if copied into a declaration. *See, e.g.*, *Kinetic Technologies, Inc. v. Skyworks Solutions, Inc.*, IPR2014-00529, Paper

[11] While it may be common in practice for counsel to assist experts in drafting their declarations, wholesale verbatim copying prevents the Board from determining what, if any, part of the declaration is independent testimony, and what is argument of counsel. It can also highlight lack of evidentiary support.

8 at 15, 2014 WL 4787238 (P.T.A.B. Sept. 23, 2014) ("merely repeating an argument from the Petition in the declaration of a proposed expert does not give that argument enhanced probative value"); *Infobionic, Inc. v. Braemer Manufacturing, LLC.*, IPR2015-01704, Paper 11 at 6, 2016 WL 1081571 (P.T.A.B. Feb. 16, 2016).

Dr. Abidi's signature—endorsing attorney argument—is not evidence, and declarations like his are frequently and properly ignored. *See, e.g.*, *Samsung Electronics Co., Ltd. v. Rightquestion, LLC*, IPR2022-00251, Paper 17 at 25 (P.T.A.B. June 9, 2022) (declining to credit testimony where "declarant makes these same statements verbatim, without more, and with no additional citations to evidence"). The Board gives such conclusory, unsupported assertions by experts little or no weight. *Id.*; *see also In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004) ("[T]he Board is entitled to weigh the declarations and conclude that the lack of factual corroboration warrants discounting the opinions expressed in the declarations."); *Rohm and Haas Co. v. Brotech Corp.*, 127 F.3d 1089, 1092 (Fed. Cir. 1997) (noting that a fact finder is not required to "credit the unsupported assertions of an expert witness"); 37 C.F.R. §42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

The Board should reject this manufactured "testimony" and not credit the obviousness and level of skill opinions in the declaration. *See, e.g.*, *Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321 (Fed. Cir. 2020) (upholding finding that copied testimony "did not 'add materially to Petitioner's unpersuasive attorney argument'"); *Facebook, Inc. v. Windy City Innovations, LLC*, IPR2016-01156, Paper 52 at 30, 2017 WL 6210806 at *12 (P.T.A.B. Dec. 6, 2017) ("merely repeats Petitioner's argument, nearly verbatim, without citation to the basis for his testimony").

Regardless of their CV or qualifications, experts cannot offer opinions based solely on their say-so, as Apple and Dr. Abidi repeatedly do here. *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997) (courts not required to "admit opinion evidence that is connected to existing data only by the ipse dixit of the expert."). "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). This is even more true when substantial portions of that unsupported say-so offered as evidence appears to be drafted by counsel, as discussed above.

Apple was required to bring its evidence in its Petition—not wait for institution hoping to fill it in later. 37 C.F.R. §42.22(a)(2) ("A full statement of the

reasons for the relief requested, including a detailed explanation of the significance of the evidence including material facts"); *Harmonic*, 815 F.3d at 1363 ("the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable"). The Board can and should decide lack of likelihood of success and dismiss the Petition on the deficient record here.

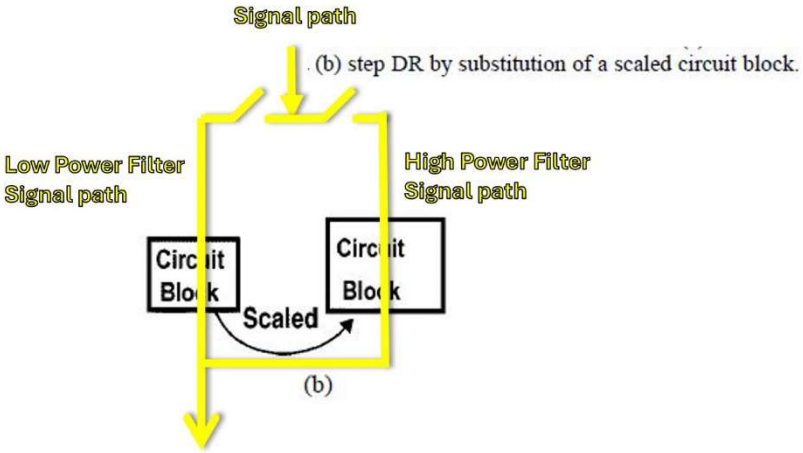
For all these reasons, in addition to the lack of merit in the arguments themselves, the Board should give no weight to Dr. Abidi's obviousness opinions and unsupported statements about the knowledge of a person of ordinary skill in the art. Because Dr. Abidi's say-so is the only evidence offered in support of Apple's core obviousness arguments and combinations, the Petition has no reasonable likelihood of succeeding—and should be dismissed.

IV. Conclusion

As detailed above, with the '825 Patent, Professor Tsividis made foundational inventive and teaching contributions to the field. The techniques taught and claimed in his patents have been recognized for their importance and cited across the industry, and have remained interesting and worthy of publication to this day. EX2004. In contrast, Apple's challenges to these patents are so weak as to be unworthy of the time and expense of a Board trial.

The Board needn't look any further than *Behbahani*'s Figure 4—depicting the "substitution of a scaled [filter] circuit block" that is alleged to disclose the

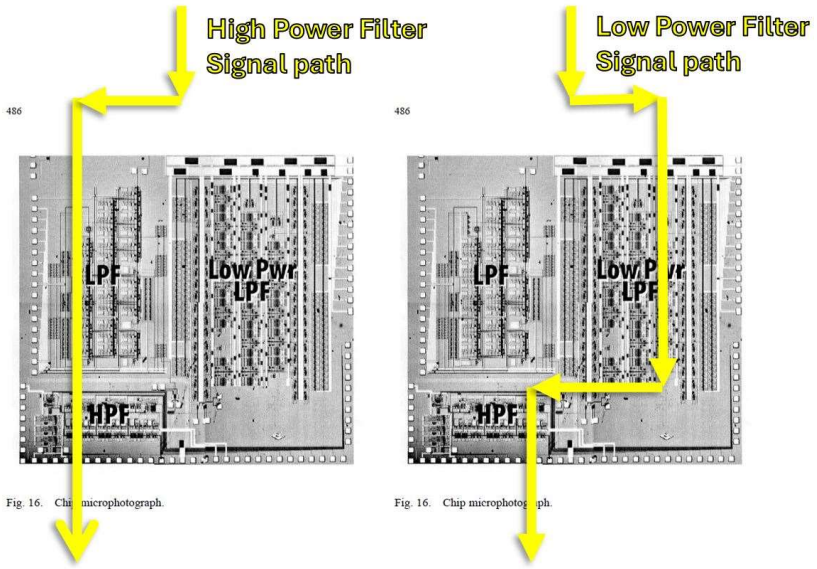
dynamic variation elements discussed above—to determine that the Petition must fail and should not be instituted. EX1004, Fig. 4 (excerpts annotated below):



This substitution of one fixed block for another does not modify either circuit block, and does not teach or suggest any adjustment to an impedance or bias in the signal path—instead changing the entire signal path. The '825 Patent, in contrast, teaches and claims modifications to components within the circuit function block itself. *See, e.g.*, EX1001, 8:20-48, Figure 8A, 13:11-31 (claim 1).

The *Behbahani* filter swap—alleged to be the claimed dynamic variation of an impedance in the signal path—instead only changes the signal path, and does not affect the impedance or bias of any component. EX2005, ¶¶67-68, 70-72. The impedance and bias of the first filter is the same before and after being switched in or out of operation. The impedance and bias of the second filter is the same before and after being switched in or out of operation. *Id.* Again, taking one entire filter circuit out of operation to be replaced by another is not the dynamic adjustment to

an impedance or bias in the signal path required by the claims. *See also* EX1006, Fig. 16 (annotated below):



For all the reasons detailed above, including because the Petition fails to establish a reasonable likelihood of success as to any challenged claim, institution should be denied.

Dated: August 28, 2024

Respectfully submitted,

/s/ Aaron R. Hand

Aaron R. Hand, Lead Counsel
Reg. No. 80,694
Corey Johanningmeier, Back-Up Counsel (*pro hac vice*)
BUNSOW DE MORY LLP
701 El Camino Real
Redwood City, CA 94063
Telephone: 650-351-7248
Facsimile: 415-426-4744
ahand@bdiplaw.com
cjohanningmeier@bdiplaw.com

Counsel for Patent Owner

37 C.F.R. §42.24(d) CERTIFICATION

The undersigned hereby certifies that this submission, excluding the tables of contents, certificate of word count, exhibit list, and certificate of service, contains **13,928** words, as determined using the standard word counting feature of the Microsoft Word program.

Dated: August 28, 2024

/s/ Aaron R. Hand

Aaron R. Hand
Reg. No. 80,694
BUNSOW DE MORY LLP
701 El Camino Real
Redwood City, CA 94063
Telephone: 650-351-7248
Facsimile: 415-426-4744
ahand@bdiplaw.com

Lead Counsel for Patent Owner

CERTIFICATE OF SERVICE

Petitioner consented to e-mail service in this proceeding. Pursuant to 37 C.F.R. §42.6, the undersigned certifies that on August 28, 2024, a copy of the foregoing document was served by email upon the following counsel at the below email addresses:

Paul R. Hart, (Reg. No. 59,646)
Paul.Hart@eriseip.com
ERISE IP, P.A.
717 17th St., Suite 1400
Denver, Colorado 80202
Telephone: (913) 777-5600
Fax: (913) 777-5601

Adam P. Seitz (Reg. No. 52,206)
Adam.Seitz@eriseip.com
ERISE IP, P.A.
7015 College Blvd., Suite 700
Overland Park, Kansas 66211
Telephone: (913) 777-5600
Fax: (913) 777-5601

Dated: August 28, 2024

/s/ Aaron R. Hand

Aaron R. Hand
Reg. No. 80,694
BUNSOW DE MORY LLP
701 El Camino Real
Redwood City, CA 94063
Telephone: 650-351-7248
Facsimile: 415-426-4744
ahand@bdiplaw.com

Lead Counsel for Patent Owner