

**United States Court of Appeals  
for the Federal Circuit**

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**BROADCOM CORPORATION,**  
*Appellant*

v.

**INTERNATIONAL TRADE COMMISSION,**  
*Appellee*

**RENESAS ELECTRONICS CORPORATION,  
RENESAS ELECTRONICS AMERICA, INC.,  
PIONEER CORPORATION, PIONEER  
AUTOMOTIVE TECHNOLOGIES, INC., TOYOTA  
MOTOR CORPORATION, TOYOTA MOTOR NORTH  
AMERICA, INC., TOYOTA MOTOR SALES, U.S.A.,  
INC., TOYOTA MOTOR ENGINEERING &  
MANUFACTURING NORTH AMERICA, INC.,  
TOYOTA MOTOR MANUFACTURING, INDIANA,  
INC., TOYOTA MOTOR MANUFACTURING  
KENTUCKY, INC., TOYOTA MOTOR  
MANUFACTURING, MISSISSIPPI, INC., TOYOTA  
MOTOR MANUFACTURING TEXAS, INC.,  
PANASONIC CORPORATION, PANASONIC  
CORPORATION OF NORTH AMERICA, DENSO  
TEN LIMITED, DENSO TEN AMERICA LIMITED,  
DENSO CORPORATION, DENSO INTERNATIONAL  
AMERICA, INC., DENSO MANUFACTURING  
TENNESSEE, INC., DENSO WIRELESS SYSTEMS  
AMERICA, INC.,**  
*Intervenors*

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2020-2008

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Appeal from the United States International Trade Commission in Investigation No. 337-TA-1119.

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**RENESAS ELECTRONICS CORPORATION,**  
*Appellant*

v.

**BROADCOM CORPORATION,**  
*Cross-Appellant*

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2021-1260, 2021-1362

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Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2019-01039.

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**BROADCOM CORPORATION,**  
*Appellant*

v.

**RENESAS ELECTRONICS CORPORATION,**  
*Appellee*

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2021-1511

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BROADCOM CORPORATION v. ITC

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Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2019-01041.

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Decided: March 8, 2022

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BRIAN JOHNSON, Steptoe & Johnson LLP, Washington, DC, argued for Broadcom Corporation in Appeal Nos. 2020-2008 and 2021-1260. Also argued by THOMAS CRAIG YEBEMETSKY in Appeal No. 2021-1511. Also represented by JOHN CARACAPPA. Also represented by MATTHEW BATHON, KATHERINE DOROTHY CAPPAERT, CHRISTOPHER ALAN SUAREZ in Appeal Nos. 2020-2008 and 2021-1260.

LYNDE FAUN HERZBACH, Office of the General Counsel, United States International Trade Commission, Washington, DC, argued for appellee. Also represented by DOMINIC L. BIANCHI, WAYNE W. HERRINGTON, SIDNEY A. ROSENZWEIG.

BRIAN ROBERT MATSUI, Morrison & Foerster LLP, Washington, DC, argued for Renesas Electronics Corporation in Appeal Nos. 2020-2008 and 2021-1511, Renesas Electronics America, Inc. and all intervenors. Renesas Electronics America, Inc. also represented by GEORGE BRIAN BUSEY, SETH W. LLOYD, DANIEL P. MUINO, FAHD H. PATEL, MARY PRENDERGAST, MARK L. WHITAKER.

SETH W. LLOYD, Morrison & Foerster LLP, Washington, DC, also argued for Renesas Electronics Corporation, in Appeal No. 2021-1260. Also represented by JONATHAN BOCKMAN in Appeal No. 21-1260; GEORGE BRIAN BUSEY, MARK L. WHITAKER in Appeal Nos. 2020-2008; FAHD H. PATEL, in Appeal Nos. 2020-2008, 2021-1260; MARY PRENDERGAST, in Appeal Nos. 2020-2008, 2021-1511;

DANIEL P. MUINO.

LORA A. BRZEZYNSKI, Faegre Drinker Biddle & Reath LLP, Washington, DC, for intervenors Pioneer Corporation, Pioneer Automotive Technologies, Inc. Also represented by NIKOLA COLIC, BRIANNA LYNN SILVERSTEIN, JOHN GERARD SMITH.

AARON GABRIEL FOUNTAIN, DLA Piper LLP (US), Austin, TX, for intervenors Toyota Motor Corporation, Toyota Motor North America, Inc., Toyota Motor Sales, U.S.A., Inc., Toyota Motor Engineering & Manufacturing North America, Inc., Toyota Motor Manufacturing, Indiana, Inc., Toyota Motor Manufacturing Kentucky, Inc., Toyota Motor Manufacturing, Mississippi, Inc., Toyota Motor Manufacturing Texas, Inc., Panasonic Corporation, Panasonic Corporation of North America, DENSO TEN Limited, DENSO TEN America Limited, Denso Corporation, DENSO International America, Inc., DENSO Manufacturing Tennessee, Inc., DENSO Wireless Systems America, Inc. Also represented by MATTHEW D. SATCHWELL, PAUL RICHARD STEADMAN, Chicago, IL.

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Before LOURIE, HUGHES, and STOLL, *Circuit Judges*.

LOURIE, *Circuit Judge*.

Broadcom Corporation (“Broadcom”) filed a complaint at the International Trade Commission (“the Commission”) alleging a violation of 19 U.S.C. § 1337 (“Section 337”) based on the importation of products by Renesas Electronics Corporation (“Renesas”) and other companies that are asserted to infringe U.S. Patents 7,437,583 (the “’583 patent”) and 7,512,752 (the “’752 patent”). In a final initial determination, the administrative law judge (“the ALJ”) held that Broadcom failed to demonstrate a violation of Section 337 with respect to the ’583 patent because it failed to satisfy the technical prong of the domestic industry

requirement and because there was no infringement of claim 5. For the '752 patent, the ALJ held that claim 5 would have been unpatentable as obvious over certain prior art. The parties then filed petitions seeking Commission review, and the Commission affirmed the relevant portions of the final initial determination. *Certain Infotainment Sys., Components Thereof, and Auto. Containing the Same*, Inv. No. 337-TA-1119 (May 28, 2020) (Final) (“*Decision I*”).

Broadcom appeals (in the 20-2008 appeal) the Commission’s holding that there was no violation of Section 337 with respect to the '583 patent, and that claim 5 of the '752 patent would have been unpatentable as obvious at the time of the alleged invention.

Renesas also petitioned for *inter partes* review of the '583 and '752 patents. In two decisions, the United States Patent and Trademark Office Patent Trial and Appeal Board (“the Board”) held that claims 25 and 26 of the '583 patent and claims 1, 2, 5, 7, and 8 of the '752 patent would have been obvious over the prior art<sup>1</sup> but that Renesas failed to demonstrate by a preponderance of the evidence that claims 17 and 18 and 20–24 of the '583 patent would have been obvious.<sup>2</sup> See *Renesas Elecs. Corp. v. Broadcom Corp.*, No. IPR2019-01039, 2020 WL 6380139 (P.T.A.B. Oct. 30, 2020) (“*Decision II*”); *Renesas Elecs. Corp. v.*

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<sup>1</sup> Because the challenged claims of the '583 and '752 patents have an effective filing date before March 16, 2013, we apply the version of 35 U.S.C. § 103 in effect before the adoption of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011).

<sup>2</sup> The Board and Commission decisions refer to what “is” obvious. Because § 103 addresses what “would have been” obvious, we recommend usage of the statutory language that looks back to the past in order to avoid the appearance of hindsight bias.

*Broadcom Corp.*, No. IPR2019-01041, 2020 WL 6389949 (P.T.A.B. Oct. 30, 2020) (“*Decision III*”).

Renesas appeals (in the 21-1260 appeal) the Board’s holding that it failed to demonstrate unpatentability of claims 17 and 18 and 20–24 of the ’583 patent. Broadcom cross-appeals the Board’s holding that claims 25 and 26 of the ’583 patent would have been obvious. In addition, Broadcom appeals (in the 21-1511 appeal) the Board’s holding that claims 1, 2, 5, 7, and 8 of the ’752 patent would have been obvious.

We have consolidated these appeals because of the overlap in subject matter and legal arguments. For the reasons detailed below, we affirm *Decision II* and *Decision III* in their entirety, affirm the portion of *Decision I* holding that there was no Section 337 violation because Broadcom failed to show the existence of a domestic industry, and find the remainder of *Decision I* moot in light of our affirmance of the Commission’s holding of lack of a Section 337 violation and our affirmance of the Board’s determination of obviousness of claim 5 of the ’752 patent.

#### BACKGROUND

Broadcom owns the ’583 and ’752 patents. The ’583 patent is directed to reducing power consumption in computer systems by “gating” clock signals with circuit elements to turn the signals ON and OFF for downstream parts of the circuit. The ’752 patent is directed to a memory access unit that improves upon conventional methods of requesting data located at different addresses within a shared memory.

A chart showing the claims that the Board and Commission addressed in each decision is shown below.

| <b>Decision</b>   | <b>Source</b> | <b>Patent</b> | <b>Claim(s)</b> |
|-------------------|---------------|---------------|-----------------|
| <i>Decision I</i> | ITC           | ’583          | 17–18, 25–26    |

|                     |      |      |                        |
|---------------------|------|------|------------------------|
|                     |      | '752 | 1, 2, 5, 7, 8          |
| <i>Decision II</i>  | PTAB | '583 | 17–18, 20–24,<br>25–26 |
| <i>Decision III</i> | PTAB | '752 | 1, 2, 5, 7, 8          |

In this consolidated opinion we will review the underlying decisions by patent and claim rather than by decision number.

### I. The '583 Patent

Claims 17 and 25 of the '583 patent are the two independent claims in this patent at issue. Claims 18 and 20–24 depend directly from claim 17, and claim 26 depends directly from claim 25. Claim 17 requires software control of a clock gate. Claim 25 requires a hybrid of hardware and software control in which the software overwrites the status of a gate set by the hardware. Claims 17 and 25 are reproduced below.

17. A system for distributing clock signals within an electronic device, the system comprising:

[a] at least one processor that determines a status of at least one gate that controls flow of a clock signal to at least one device coupled to said at least one gate; and

[b] said at least one processor controls said at least one gate based on said determined status.

'583 patent at col. 7 l. 38–col. 8 l. 2.

25. A system for distributing clock signals within an electronic device, the system comprising:

[a] a clock tree having a plurality of gates;

[b] a hardware control logic block coupled to said clock tree that controls at least a portion of said plurality of gates;

[c] at least one register that is controlled by a clock tree driver; and

[d] at least one processor that overwrites a status of at least a portion of said plurality of gates which is controlled by said hardware control logic block.

*Id.* at col. 8 ll. 27–37.

At the Commission, Broadcom alleged a violation of Section 337 based on the importation of products by Renesas and other companies that it asserts infringe claims 17 and 18 and 25 and 26. Each of the accused infringers was a respondent in the Commission investigation and most have intervened in support of the Commission in this appeal.

In the final initial determination, the ALJ held that Broadcom failed to demonstrate that its system-on-a-chip (“SoC”) satisfied the technical prong of the domestic industry requirement in Section 337 because the SoC did not include a “clock tree driver,” which is a limitation of the asserted claims. J.A. 46. The ALJ also held that Broadcom failed to demonstrate infringement of claims 25 and 26 because it “could not identify any specific source code in the accused product where [the claimed] sequence of events ‘actually happened.’” J.A. 96. The Commission affirmed both holdings.

At the Board, Renesas alleged (1) that claims 17 and 18 and 20–24 would have been obvious over Kiuchi,<sup>3</sup> and Van

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<sup>3</sup> Kiuchi et al., J.P. Patent Pub. H8-255034.



Hook;<sup>4</sup> and (2) that claims 25 and 26 would have been obvious over Alben,<sup>5</sup> Fallah,<sup>6</sup> and Benini.<sup>7</sup>

Kiuchi describes a system that controls clock gates and discloses a device with multiple clock gate circuits used to control the flow of clock signals. Van Hook is directed to a high-performance, low-cost video game system and discloses a system with a main processor that halts a signal processor via a status register. Alben discloses a technique for hardware-controlled clock gating and includes hardware logic capable of turning clock gates ON and OFF. Fallah is a textbook chapter that discusses system-level distributed power management, which relates to high-level workload prediction algorithms, and circuit-level power management, such as clock gating that can be used to manage individual devices. Lastly, Benini is a scientific article that teaches system-level power management and hardware-controlled clock gating.

The Board found that Kiuchi discloses all structural elements of claim 17 and that Van Hook discloses a main processor that halts a signal processor. However, because Van Hook does not teach conditionally controlling clock gates, the Board held that claims 17 and 18 and 20–24 would not have been obvious. The Board then found claims 25 and 26 obvious over the combination of Alben and Fallah. It stated that Alben could be modified, in view of Fallah's teaching, to use software to directly control a gate to override the power management decisions made by a control unit. This would directly overwrite a status of OFF or

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<sup>4</sup> Van Hook et al., U.S. Patent 6,593,929.

<sup>5</sup> Alben et al., U.S. Patent 6,938,176.

<sup>6</sup> Fallah et al., *Chapter 13: Circuit and System Level Power Management*, Kluwer Academic Publishers (2002).

<sup>7</sup> Benini et al., *A Survey of Design Techniques for System-Level Dynamic Power Management*, 8 IEEE Transactions on Very Large Scale Integration Systems 3 (2000).

ON that was previously written by the control unit. The Board added that Benini provides a motivation to combine the references by discussing the advantages in power management from migrating the power manager software.

Broadcom appealed the Commission's decision to this court. Renesas appealed and Broadcom cross-appealed the Board's decision. We have jurisdiction pursuant to 28 U.S.C. §§ 1295(a)(4)(A) and 1295(a)(6).

## II. The '752 Patent

Independent claim 1, and dependent claims 2, 5, 7, and 8 of the '752 patent, are at issue in these appeals. Claims 1, 2, and 5 are reproduced below.

1. A memory access unit for accessing data for a module, said memory access unit comprising:

an output port for providing access requests for lists of addresses in a memory over a link to a memory controller; and

a queue for queuing the access requests for the lists of addresses.

'752 patent at col. 8 ll. 61–67.

2. The memory access unit of claim 1, further comprising:

an input port for receiving requests for blocks of pixels from a motion prediction processing unit; and

logic for generating the lists of addresses from the requests for blocks of pixels, wherein the lists of addresses correspond to addresses in a memory that store pixels in the blocks of pixels.

*Id.* at col. 9 ll. 1–7.

5. The memory access unit of claim 2, wherein the logic generates the access requests based on the list

of addresses and based on sizes of each of the requests for blocks of pixels from the motion prediction processing unit.

*Id.* at col. 9 ll. 17–20.

At the Commission, Broadcom alleged a violation of Section 337 based on the importation of products by Renesas and other companies that, in relevant part, infringed claim 5. Respondents contended that claim 5 was either anticipated by Foster<sup>8</sup> or would have been obvious over Foster and Sih.<sup>9</sup>

Foster describes a system for maximizing memory access efficiency. Foster's system receives requests for memory access from various system components, determines where the corresponding data are located, and processes and reorders the requests efficiently. Sih is directed to a memory access unit's controller suited for video applications. The controller receives access commands for specifying blocks of video data and may copy at least one block of video data from the video memory.

In the final initial determination, the ALJ held that claim 5 was unpatentable as obvious over Sih in combination with Foster. Specifically, the ALJ held that Sih's disclosure of video block width and length in combination with Foster's disclosure of a memory access unit that receives requests from a motion prediction processing unit rendered the claim obvious. The Commission affirmed the final initial determination.

At the Board, Renesas alleged, in relevant part, that claims 1, 2, 5, 7, and 8 would have been obvious based on Foster alone, or in combination with Sih.

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<sup>8</sup> Foster et al., U.S. Patent 6,240,492.

<sup>9</sup> Sih et al., U.S. Patent Pub. 2003/0106053 A1.

Regarding claim 1, the Board found that Foster disclosed an output port and a queue as part of a memory access unit. The Board went on to find that these two elements could be combined to render claim 1 obvious.

For claim 2, the parties' arguments largely focused on the requirement for "an input port for receiving requests for blocks of pixels." The Board found that Foster disclosed a memory interface that received requests for "blocks of data" that a motion compensation unit needed. *Decision III* at \*7. It then found that a block of data was equivalent to a block of pixels. In the alternative, the Board found that Foster disclosed an input port for receiving requests for blocks of pixels based on its disclosure of requesting multiple lines of pixel data. The Board concluded that combining Foster's disclosures rendered claim 2 obvious.

Finally, the Board found claim 5 obvious over Foster alone. The Board found that Foster disclosed claim 5's functional limitation that logic within the access unit "generates the access requests based on the list of addresses and based on sizes of each of the requests for blocks of pixels." The Board next found claim 5 obvious over Foster in combination with Sih. It found that Sih disclosed a memory access unit that received commands requesting blocks of pixels and that those commands included a set of block parameters including video block width and length. The Board then found that a person of ordinary skill would have been motivated to combine Foster and Sih because both disclosures relate to memory access for a motion compensation function required for video encoding and decoding.

Broadcom appealed both decisions to this court. We have jurisdiction pursuant to 28 U.S.C. §§ 1295(a)(4)(A) and 1295(a)(6).

## DISCUSSION

Broadcom asserts that the Commission erred in finding no domestic industry for the '583 patent, in holding no infringement of claim 25 of the '583 patent, and in holding that claim 5 of the '752 patent would have been obvious. Renesas asserts that the Board erred in holding that claims 17 and 18 and 20–24 of the '583 patent would not have been obvious. Broadcom asserts, in its cross-appeal, that the Board erred in holding that claims 25 and 26 of the '583 patent would have been obvious. Lastly, Broadcom asserts that the Board erred in holding that claims 1, 2, and 5 of the '752 patent would have been obvious. Claims 7 and 8 are not addressed. We address the parties' arguments in turn.

Commission final determinations are reviewed under the Administrative Procedure Act. 5 U.S.C. § 706. The Commission's factual findings are reviewed for substantial evidence, and legal determinations are reviewed *de novo*. *Honeywell Int'l, Inc. v. ITC*, 341 F.3d 1332, 1338 (Fed. Cir. 2003). "Substantial evidence has been defined as more than a mere scintilla and as such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Id.* (internal quotation marks omitted). The court "must affirm a Commission determination if it is reasonable and supported by the record as a whole, even if some evidence detracts from the Commission's conclusion." *Spanion, Inc. v. ITC*, 629 F.3d 1331, 1344 (Fed. Cir. 2010).

We review the Board's legal determinations *de novo*, *In re Elsner*, 381 F.3d 1125, 1127 (Fed. Cir. 2004), and the Board's factual findings underlying those determinations for substantial evidence, *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). Obviousness is a question of law that "lends itself to several basic factual inquiries," including the scope and content of the prior art, the level of ordinary skill in the art, and differences between the prior art and

the claimed invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

I. Broadcom’s and Renesas’s Appeals Concerning the ’583 Patent

A. The Commission Decision

The Commission determined that there was no Section 337 violation because Broadcom failed to satisfy the technical prong of the domestic industry requirement. On appeal, Broadcom asserts error in the Commission’s findings of fact. Reviewing these findings for substantial evidence, we affirm the Commission’s decision.

To establish a violation of Section 337 a complainant must show both infringement and that an industry “relating to the articles protected by the patent . . . exists or is in the process of being established” in the United States. 19 U.S.C. § 1337(a)(2), (3). Under Commission precedent, the domestic industry requirement consists of an “economic prong” and a “technical prong.” *See, e.g., Alloc, Inc. v. ITC*, 342 F.3d 1361, 1375 (Fed. Cir. 2003). To meet the technical prong, the complainant must establish that it practices at least one claim of the asserted patent. This requires a complainant to identify “actual ‘articles protected by the patent.’” *Microsoft Corp. v. ITC*, 731 F.3d 1354, 1361–62 (Fed. Cir. 2013) (citing 19 U.S.C. § 1337(a)(2)–(a)(3)). To meet the economic prong, the complainant must demonstrate that its investment in the protected article is “significant” or “substantial.” 19 U.S.C. § 1337(a)(3). The economic prong is not at issue in this appeal.

The ALJ determined that Broadcom identified only its SoC as a domestic industry article. However, the ALJ found, and Broadcom did not dispute, that the SoC did not contain the “clock tree driver” that is required by claim 25; it found that the driver must be stored on an external memory, separate from the SoC. But Broadcom instead argued that it satisfies the technical prong of the domestic

industry requirement because it collaborates with its customers to integrate its SoC with external memory to enable retrieval and execution of the “clock tree driver” firmware. However, the ALJ faulted Broadcom for failing to identify any specific external memory that contained the “clock tree driver,” and noted that an actual article protected by the patent is needed to meet the industry requirement.

The Commission similarly found that Broadcom failed to identify any specific integration of the purported domestic industry SoC and the “clock tree driver” firmware, or a specific location where the firmware was stored. The Commission reasoned that without identifying an actual integration of the SoC and “clock tree driver,” Broadcom posited only a hypothetical device that did not meet claim 25’s limitations and therefore did not satisfy the technical prong of the domestic industry requirement. The Commission added that Broadcom’s new argument, *i.e.*, that it manufactured and tested a “system” that included an SoC and firmware that contained the clock tree driver, was waived because Broadcom did not raise this theory in the ALJ proceedings.

We agree with the Commission that Broadcom failed to satisfy the technical requirement. We have previously found that, in order to meet the technical requirement of Section 337, a complainant must “show that there is a domestic industry product that actually practices” at least one claim of the asserted patent. *Microsoft*, 731 F.3d at 1361. In *Microsoft*, the patentee Microsoft supplied a mobile operating system to its customers. *Id.* at 1358, 1361. Microsoft’s asserted patent dealt with server-client communications, in which the client application was run on a mobile phone manufactured by Microsoft’s customers. *Id.* at 1360–61. Microsoft failed to show, however, that any such client applications were actually implemented on any third-party mobile device. *Id.* We therefore found that Microsoft did not satisfy the domestic industry requirement.

Broadcom suffers from substantially the same failure of proof here. As in *Microsoft*, Broadcom failed to identify any specific integration of the domestic industry SoC and the “clock tree driver” firmware, or a specific location where the firmware was stored. Broadcom does not challenge this finding, and instead introduces new theories that the Commission properly deemed waived. Because Broadcom failed to identify an actual article that practices claim 25, the Commission’s finding that Broadcom failed to satisfy the domestic industry requirement of Section 337 was supported by substantial evidence.

In light of our affirmance of the Commission’s finding of no domestic industry, the portion of the Commission’s decision addressing infringement of claim 25 is moot. We thus do not address Broadcom’s appeal from that portion of the Commission’s decision.

## B. The Board Decision

### 1. Claim 17

Renesas argues that the Board improperly relied on Broadcom’s expert’s opinion regarding whether software instructions halt a processor when it was undisputed that Van Hook describes using hardware registers to halt a processor. Renesas adds that Kiuchi discloses all the structural limitations of claim 17—a system with a processor that controls clock gates connected to devices. Further, Van Hook discloses conditionally halting a circuit component by conditionally gating its clock signal. Renesas claims that a skilled artisan would have applied Van Hook to implement the functionality in Kiuchi to render claim 17 obvious.

In addition, Renesas argues that the Board improperly truncated its obviousness analysis solely because it found a difference between claim 17 and Van Hook. It asserts that an obviousness analysis, unlike an anticipation



analysis, recognizes that there may be differences between the claims and prior art.

Broadcom responds that the Board correctly found that the combined teachings of Kiuchi and Van Hook would not have rendered obvious a “processor that determines a status of at least one [clock] gate.” In addition, Broadcom argues that the Board did not truncate its obviousness analysis and properly rejected Van Hook as non-analogous prior art because it is unrelated to clock gating and power management in hardware devices.

We agree with Broadcom. Neither party disputes that Kiuchi does not teach a “processor that determines a status of at least one [clock] gate.” For this claim limitation, the parties agreed that the term “determines a status of at least one gate” should be construed as “determines for at least one gate whether said gate is ON or OFF.” J.A. 70. Because this limitation is not taught by Kiuchi, it must be taught by Van Hook or the combination of Kiuchi and Van Hook for there to be obviousness.

The Board began its analysis by determining that a skilled artisan’s field of endeavor is “power management and processor clock control.” *Decision II* at \*2–3. When the Board analyzed Van Hook, it found that the halting discussed in this reference did not mean stopping the clock gate as required by claim 17. Instead, halting had to do with checking or setting a processor’s operational status. We agree with the Board’s reasoning that Van Hook does not disclose stopping a clock gate. Moreover, even if Van Hook did disclose this limitation, Van Hook relates to processor performance, not power management and processor clock control, so a skilled artisan would not have been motivated to combine Van Hook and Kiuchi. Because the Board properly analyzed Van Hook, we do not find that it improperly truncated its obviousness analysis and affirm its holding of nonobviousness of claim 17 and its dependent claims.

## 2. Claims 25 and 26

Broadcom argues that the Board found claim 25 and 26 obvious based on impermissible hindsight. Specifically, it asserts that the Board improperly reconstructed claim limitation 25[d] by modifying Alben to achieve a specific, undisclosed clock-gating feature based on a generic motivation to combine software power management disclosed in Fallah and Benini. Broadcom adds that the Board never addressed why a skilled artisan would have reasonably expected to succeed in combining Alben and Fallah. Broadcom also asserts that the Board abused its discretion in analyzing Renesas's waived argument that claim 26 would have been obvious in view of Alben.

Renesas counters that the Board was thorough in its analysis of a motivation to combine Alben and Fallah and that claims 25 and 26 were properly found not to be patentable. It adds that the Board properly found that Fallah used software to control clock gates directly and discussed the tradeoffs between using a power management algorithm in software versus a power management system in hardware. Renesas contends that it did argue that there would be a reasonable expectation of success in combining the prior art, and, because Broadcom never contested that, the Board did not address that issue. In response to Broadcom's claim 26 waiver argument, Renesas points out that it asserted that claim 26 would have been obvious in view of Alben in its petition and that this argument was never abandoned.

We agree with Renesas. The Board found that Alben discloses a system for distributing clock signals that includes a "clock tree," a "hardware control logic block" connected to the clock tree for controlling clock gates, and a "register" controlled by a clock tree driver. *Decision II* at \*8–11. Regarding whether Alben combined with Fallah discloses programming a processor with software to "overwrite[] a status of OFF or ON" for a previously hardware-

controlled clock gate, the Board found, and substantial evidence showed that: (1) Alben discloses a hybrid approach to power management in which a hardware control unit directly controls clock gates and software running on a processor and at least indirectly overwrites clock gates' status to OFF or ON; (2) Fallah teaches that it was well known that hardware and software could directly control power management, including through clock gating, and describes well-known tradeoffs of hardware and software approaches; and (3) Fallah and Benini confirm that persons of ordinary skill would have seen multiple benefits to adding direct software control of clock gates to Alben's hybrid system. *Id.* at \*14. The Board's findings are supported by the plain text of these references which discuss clock gating for power management and each of the elements of claims 25 and 26. We therefore find that these findings were supported by substantial evidence.

Alben and Fallah are directed to the same field of art, and a skilled artisan would have been motivated to combine these references. Furthermore, with Fallah discussing the tradeoffs in power management between software and hardware, a skilled artisan would have had additional motivation in combining the references. Benini further teaches "several reasons for migrating [a] power manager to software." *Decision II* at \*12 (quoting J.A. 826).

Although Broadcom now argues that the Board erred in not discussing a reasonable expectation of success, Broadcom never raised that issue before the Board. Given Broadcom's silence, it cannot show that the Board erred on that issue. The Board's scheduling order specifically informed Broadcom that "any arguments not raised in the response may be deemed waived," referring to Broadcom's post-institution response. J.A. 203. Furthermore, as we do, the Board relies on parties to identify disputed issues and treats other issues as undisputed. *See, e.g., Affinity Lab'ys of Tex., LLC v. DIRECTV LLC*, 838 F.3d 1253, 1264 n.4 (Fed. Cir. 2016).

We also find that the Board did not abuse its discretion in addressing Renesas's argument that claim 26 would have been obvious in view of Alben. Renesas made that argument in its petition, and there is no indication in subsequent filings that it later abandoned that argument.

For these reasons, we affirm the Board's holding that claims 25 and 26 would have been obvious over the references.

## II. Broadcom's Appeals Regarding the '752 Patent

Turning to the '752 patent, the Board held that all of the challenged claims would have been obvious based on Foster alone and that claim 5 was additionally unpatentable as obvious based on Foster and Sih. The Commission similarly held that claim 5 was unpatentable as obvious based on Foster and Sih. We affirm the Board's holdings. In light of that affirmance, the portion of the Commission's decision addressing invalidity is moot. We thus do not address Broadcom's appeal from this portion of the Commission's decision.

Broadcom argues that for claim 1, the Board improperly combined Foster's embodiments and also wrongly applied a combination of obviousness and anticipation legal standards instead of conducting a proper obviousness analysis. Regarding claim 2, Broadcom argues that the claim requires a one-to-one ratio of requests to blocks of pixels and that Foster instead discloses a combination of eight requests for lines of pixels that add up to a single request for a block of pixels. For claim 5, Broadcom argues that the Board conflated Foster's input and output requests. It contends that the Board referred to Foster's disclosing a request as being an output request to the destination memory instead of an input request as described by the claim.

Renesas counters that for claim 1, the Board expressly analyzed obviousness, and that even if the Board did apply

a more rigorous anticipation standard, that did not undermine its obviousness holding. With respect to claim 2, Renesas argues that Broadcom fails to challenge the Board's primary finding that Foster discloses requests for blocks of data including pixels. Regarding claim 5, Renesas argues that the Board did not confuse input and output requests.

We agree with Renesas. With respect to claim 1, Broadcom does not challenge the Board's finding that Foster discloses "an output port" and "a queue" as part of a memory access unit. Instead Broadcom argues that the Board improperly combined Foster's embodiments disclosing an external memory controller with those disclosing an internal memory controller. However, the Board stated that Foster's disclosure of "an output port" and "a queue" are directed to the same invention. *Decision III* at \*5–6. We agree with the Board that Foster's disclosures contained in Figures 2, 4, and the corresponding text relate to a single invention. *Id.* The Board therefore did not improperly combine embodiments as Broadcom claims.

In addition, the Board expressly analyzed obviousness with respect to claim 1 and did not apply an improper analysis combining obviousness and anticipation as Broadcom asserts. Satisfying a more stringent standard does not undermine satisfaction of a lesser standard. The Board discussed the proper obviousness standard and determined the level of ordinary skill in the pertinent art, the scope and content of the prior art, and any differences between the prior art and the claims. *See id.* at \*2–6. We therefore affirm the Board's holding with respect to claim 1.

Regarding claim 2, the Board found that Foster discloses a memory access unit with an input port that receives requests from a motion prediction processing unit and that "the requests are for 'blocks of data.'" *See id.* at \*7. It further found that a person of ordinary skill in the art would know that a "block of data" in Foster refers to a

block of pixels. These findings were supported by substantial evidence, and Broadcom does not dispute that. Foster expressly states that its motion compensation unit “may be generating requests for a block of data it is processing,” J.A. 694, and multiple experts stated that a person of ordinary skill would understand that a block of data in Foster refers to a block of pixels. Broadcom instead attacks the Board’s alternative finding stating that “*even if* Foster discloses requests for lines of data . . . there would simply be multiple requests for a block of data,” which would still render claim 2 obvious. *Decision III* at \*7. Because we find that the Board’s primary factual findings were supported by substantial evidence, we affirm the Board’s holding and do not address its alternative finding.

Regarding claim 5, the Board’s finding that Foster discloses a memory access system that reorders and optimizes received requests based on characteristics of the requests, including the requested data size, was supported by substantial evidence. Foster describes a system for receiving requests for data and sorting and optimizing those requests based on certain characteristics, including size, as explained by Renesas’s expert’s un rebutted testimony. In addition, the Board did not confuse Foster’s input and output requests. The Board found that “Foster discloses generating access requests based on the sizes of the requests for blocks of pixels.” *Id.* at \*9. There is no dispute that “requests for blocks of pixels” means input requests because these requests are received at the input port. *Id.* at \*6–7, \*8–9. Because we find that the Board’s factual findings were supported by substantial evidence, we affirm the Board’s holding.

Because of our affirmance of the Board’s holding that claim 5 would have been obvious, the portion of the Commission’s decision addressing claim 5 is moot. We thus do not address that portion of Broadcom’s appeal.

CONCLUSION

We have considered the parties' remaining arguments but find them unpersuasive. In sum, with respect to the '583 patent, we affirm the entirety of the Board's holding (Appeal No. 21-1260), affirm the Commission's holding of lack of Section 337 violation because there was no domestic industry (Appeal No. 20-2008), and do not address the infringement portion of the Commission opinion as it is moot in light of our domestic industry affirmance. With respect to the '752 patent, we affirm the entirety of the Board's holding (Appeal No. 21-1511) and do not address the portion of the Commission's opinion addressing claim 5, as it is moot in light of our affirmance of the Board's determination of obviousness of claim 5 of the '752 patent.

**AFFIRMED**

COSTS

No costs.