

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Mercedes-Benz USA, LLC,
Petitioner,

v.

Daedalus Prime LLC,
Patent Owner.

Case No. IPR2023-01343
U.S. Patent No. 8,898,494

PETITIONER'S REQUEST FOR DIRECTOR REVIEW

Filed on behalf of Petitioner:
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I. INTRODUCTION

Pursuant to 37 C.F.R. § 42.75, Petitioner Mercedes-Benz USA, LLC respectfully requests Director Review regarding the finding in the Final Written Decision (“FWD”) that claims 1-7, 13-15, and 17-18 of U.S. Patent No. 8,898,494 (the “’494 Patent”) were not shown to be unpatentable. The Board’s decision is based on two erroneous findings of material fact and conclusions of law. **First**, the Board erred in finding that Bose (EX1005) does not disclose a “comparison” of bus workload to a bus workload threshold, as recited by claim 1, by improperly narrowing this claim term in a way not supported by the claim and by misconstruing Bose’s disclosures. (FWD, 19-26.) **Second**, the Board erred by improperly construing “workload” as “amount of activity over a period of time,” in contradiction to express disclosures in the ’494 Patent, and then misinterpreting White (EX1006) in view of this unduly narrow construction. (FWD, 14-15, 27-33.) For these reasons, Petitioner respectfully requests Director Review or rehearing by a Delegated Review Panel, and that Board’s FWD be vacated, reversed, or remanded as appropriate.

II. ARGUMENT

A. Legal Standard

Under the USPTO’s procedures, the Director may review any Final Written Decision presenting “(a) an abuse of discretion, (b) important issues of law or

policy, (c) erroneous findings of material fact, or (d) erroneous conclusions of law.

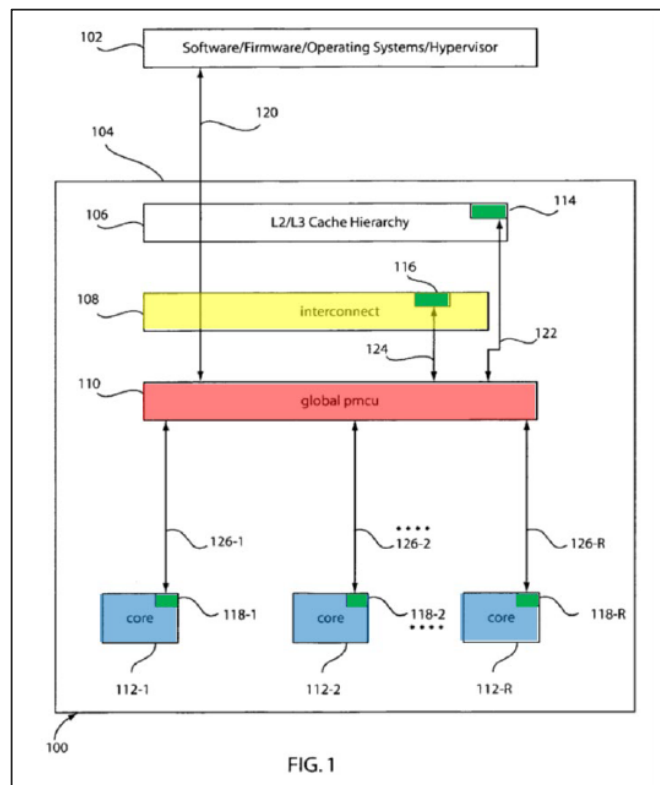
USPTO Website, Director Review Process; 37 C.F.R. §§ 42.71(d), 42.75(a).

B. The Board Erroneously Found Bose Does Not Disclose a “Comparison” Between Bus Workload and Bus Workload Threshold, as Required by Claim 1

In its FWD, the Board concluded that Petitioner failed to prove that claim 1 of the '494 Patent is unpatentable over Bose because Bose allegedly does not teach or suggest “a comparison between the bus workload and a bus workload threshold,” as recited in Claim 1[g]. (FWD, 19-26.) For the same reason, the Board concluded that Petitioner failed to prove claims 2-3 and 13-15 were unpatentable over Bose in combination with other references. (*Id.*, 26-27.) In reaching its decision, the Board erred by improperly narrowing the “comparison” recited in the claim. Bose discloses both monitored workload (real-time power and performance levels) and workload thresholds (predicted power and performance levels). (Bose, 5:61-67, 6:18-24, 6:56-7:7, 7:41-45, 8:35-43; Pet., 21-26.) The Board finds Bose does not disclose “comparing” these (FWD, 19-25), but Bose is clear that both are “considered” together (*i.e.*, compared) in determining whether to increase or decrease power level of a component. (Bose, 6:56-60, 7:4-31, 7:41-61, 8:11-12, 9:3-24, 12:30-45; Pet. 25-26, Pet. Reply, 3-4.) That Bose does not use the exact word “comparison” found in the claim does not negate that it nonetheless discloses

it. *ADASA Inc. v. Avery Dennison Corp.*, 55 F. 4th 900, 913 (Fed. Cir. 2022); *Teva Pharm. Indus. Ltd. v. AstraZeneca Pharm. LP*, 661 F.3d 1378, 1384 (Fed.Cir.2011).

Bose discloses that local power/performance monitoring and control units (“local PMCUs”) “114, 116, 118-1, 118-2, 118-R monitor performance statistics such as cache miss rates, branch misprediction rates, *instructions per cycle (IPS)*, etc.” (Bose, 6:60-62 (emphasis added); Petition, 21-23.) A local PMCU monitors the activities of each core, as well as the L2/L3 cache hierarchy and interconnect (*i.e.*, communication bus):



(Bose, Fig. 1 (annotated), 6:60-62; Petition, 21-23.) Bose further explains the “global PMCU 210 stores history information periodically supplied from units of all the local PMCUs 240 in real time in the Phase History tables 213.” (Bose 7:50-59.) In other words, Bose discloses workload monitors (*i.e.*, local PMCUs) that monitor or measure the workload of components (*i.e.*, instructions per cycle) and supply this information to the global PMCU to be stored in the Phase History Tables. (Bose 7:50-59; Pet, 21-23.)

Bose further teaches these measured workloads are “compared” to a “workload threshold” to balance the power allocated to the various components. (Pet., 23-26; Pet. Reply, 1-6.) Bose discloses the global PMCU includes a “Power/Performance Trade-off Table 206,” which “includes the predicted power and performance for each power mode” that may be assigned to a component. (Bose, 8:35-39; Pet., 23-26; Pet. Reply, 1-6.) Bose’s global PMCU assigns a power mode to a component based on a “consideration” of only: commands from the operating system; the “real-time statistics” of monitored power and performance of the component (*i.e.*, the measured workload of the component); and the predicted power and performance of each power mode stored in the Power/Performance trade-off Table (*i.e.*, a workload threshold). (Pet., 25-26; Pet. Reply, 3-4; Bose, 8:35-47, 9:3-35, 12:30-45.) As part of this, the system checks the monitored power and performance levels and assigns a new power mode, with the “amount of

change in power or performance” being based on the predicted power and performance levels for the power modes. (*Id.*) To determine this “amount of change” in performance, it is clear a comparison between the monitored levels and predicted levels is performed. (*Id.*)

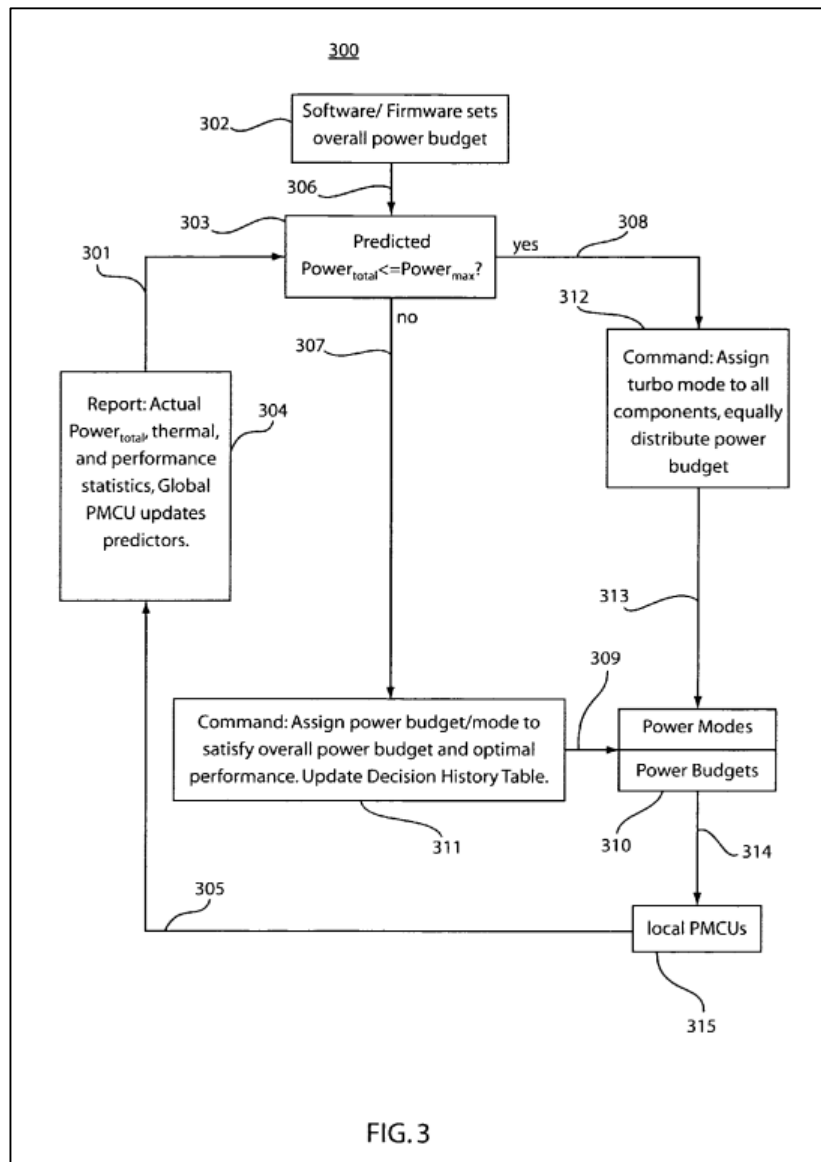
In its FWD, the Board refers to the parties’ discussion at oral argument regarding Figure 3 of Bose to urge that Bose fails to disclose the claimed “comparison.” (FWD, 21-25.) However, the Board misapprehends Petitioner’s argument in the Petition and Reply as presented at the oral argument, and fails to read Figure 3 with full consideration of its accompanying description, erroneously concluding that the “only disclosure of a comparison in Bose that we have been shown is the comparison of Power_{Total} to Power_{Max} in step 303 of Figure 3.” (*Id.*, 25.) As explained above, this is not the case. It is clear the Board’s determination that Bose does not disclose the claimed “comparison” rests on an unduly narrow interpretation of this claim term. But, claim 1 only requires “a comparison between the bus workload and a bus workload threshold”; it does not limit it to any particular type of comparison.¹ When the claim is properly read in context, Bose’s

¹ Only in Claim 3 does the ’494 Patent specifically require adjusting frequency of the communication bus based on the monitored bus workload being more or less

express disclosure that both the monitored and predicted power and performance levels are among the limited things “considered” in step 311 is an indication that the two are compared. (Pet., 25-26; Pet. Reply, 3-4.)

For example, Figure 3 of Bose “is a block/flow diagram showing a global power performance monitor and control unit (PMCU) loop for monitoring and controlling system power and performance”:

than a bus workload threshold. (Pet. Reply, 5-6.) And, as explained in Petitioner’s Reply, if the “comparison” in claim 1 is read to require a specific determination of whether the monitored workload is above or below the threshold, as it appears the Board believes the claim requires based on the FWD (FWD, 25), this is at least obvious over Bose in view of Simeral, as explained in the Petition with respect to claim 3. (Pet. Reply, 5-6.)



(Bose, Fig. 3, 3:65–67.) While step 311 of Figure 3 does not explicitly use the word “compare” (Hearing Tr., 17:2-7), it is clear when viewing Figure 3 in conjunction with its accompanying description in the specification that Bose discloses the claimed comparison (*Id.*, 17:8-15.)

Bose explains that “the state 311 assigns power budget and power mode with consideration of . . . the real time statistics (stored e.g., in the Phase History Table 213 depicted in FIG. 2) [(i.e., monitored workloads)] and the power/performance trade-off of each mode for each thread in each core (stored, e.g., in the Power/Performance Trade-off Table 206, depicted in FIG. 2) [(i.e., workload threshold)].” (Bose 9:20-24.; Pet. 25-26; Pet. Reply, 4-5.) Bose further explains that “with these considerations, the state 311 assigns a lower power mode for a core if the power budget assigned to the core is insufficient and increases to higher power modes if the cores are exceeding the power budget, such that the sum of power usage for all components fits into the overall power budget.” (Bose, 9:25-30.) Again, as explained above, a person having ordinary skill would thus understand Bose to disclose that the global PMCU determines whether the power budget assigned to the component is sufficient by comparing the monitored power and performance level (i.e., “workload”) with the predicted power and performance level (i.e., “workload threshold”) and assigning a power mode accordingly. (Petition, 25-26; Pet. Reply, 4; EX1003, ¶¶53-56; Bose, 9:25-35.)

C. The Board Erroneously Found White Does Not Teach Monitoring and Receiving Workload, as Required by Claims 1 and 4

The Board concluded that White does not teach or suggest “receiving a bus workload for a communication bus and a first processing element workload for a

first processing element,” as recited in claim 4, or the similar limitation “a core workload monitor configured to determine a core workload for the first core,” as recited in claim 1. (FWD, 31, 33.)

In coming to this conclusion, the Board erred in narrowly construing “workload” to mean “an amount of activity over a quantum or period of time.” (FWD, 14-15.) This is in direct contradiction to the ’494 Patent itself, which broadly explains that “determining a workload includes *any known method* for determining activity of hardware, a workload of software, a number of instructions executed or to execute, *or any other metric for determining use of a processing element.*” (’494, 9:47-50 (emphasis added); Pet., 72-73; Pet. Reply, 9-15.) The ’494 Patent further clarifies that “as a corollary to *the multitude of potential workload measurements*, the components to measure such workload may also vary. *To further discussion* of the potential components for workload measurement, it’s *assumed below that workload is measured as a number of active cycles over a period of time* (i.e. a total number of cycles for measurement.)” (’494 Patent, 9:57-97 (emphasis added); Pet. 50-59; Pet. Reply 9-11.) That is, the ’494 Patent confirms workload is not limited to a measurement of amounts of activity over time, but rather can be reflected by any measurement or metric related to the “use” of a component.

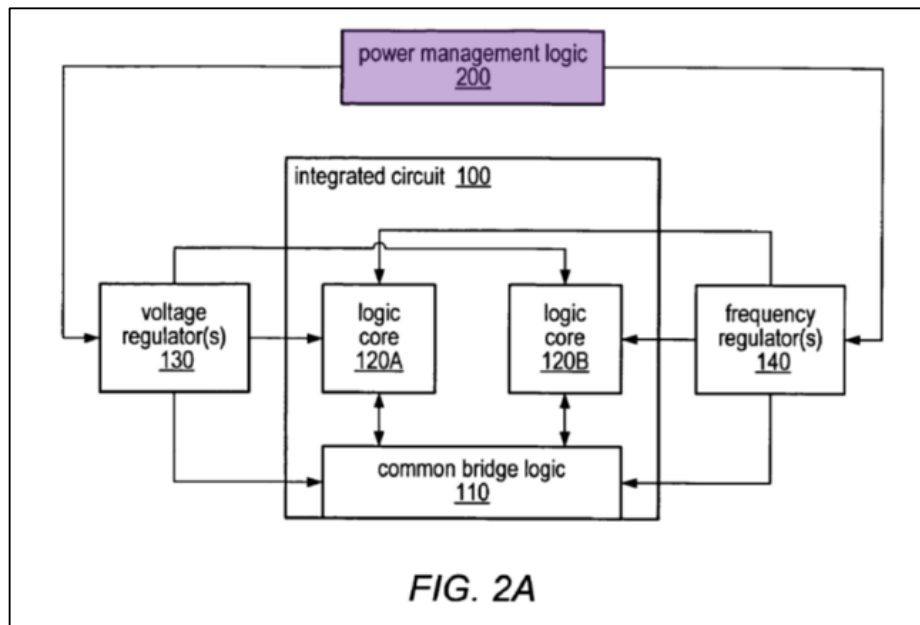
Further, the '494 Patent makes clear that the Board's construction of workload—"an amount of activity over a quantum or period of time"—is only used as an example to further discussion and is merely one of many potential workload measurements. (*Id.*) And, the '494 Patent itself indicates that frequency can be monitored as an indication of use or "workload" of a component. (*See, e.g., '494 Patent, 10:65-11:2* ("[If] workload module 520 *determines the GPU 505's frequency is below a threshold . . . then any CPU 505's frequency cap or limit is increased to cause more production, such that GPU cores 510 workload increases accordingly.*")).) Thus, the '494 Patent broadly describes what can be considered "workload" and measurements of workload.

Faced with prior art that includes monitoring frequency and voltage—measurements or metrics related to the "use" of a component and thus "workload" as defined in the '494 Patent—Patent Owner has tried to narrow the scope of the claims to avoid the prior art by arguing "workload" should be construed narrowly as only an "amount of activity over a quantum or period of time." (POR, 15-16, 42-44; Pet. Reply, 9-10.) This is improper. (*Id.*) *CUPP Computing AS v. Trend Micro Inc.*, 53 F.4th 1376, 1383 (Fed. Cir. 2022) (Precedential) ("A rule permitting a patentee to tailor its claims in an IPR through argument alone would substantially undermine the IPR process. ... If patentees could shapeshift their claims through argument in an IPR, they would frustrate the Patent Office's power to 'revisit' the

claims it granted, and require focus on claims the patentee now wishes it had secured.”). Thus, it was error for the Board to agree with Patent Owner and narrowly construe “workload.”² (FWD, 14-15.) Moreover, it was error for the Board to erroneously state that Petitioner did not dispute this construction (FWD, 15), when in fact Petitioner disputed this over multiple pages in the Petitioner Reply. (Pet. Reply, 9-13.)

When giving “workload” the proper meaning provided by the ’494 Patent itself, it is clear that White teaches the claimed monitoring and receiving of workload. White discloses that “power management logic 200 . . . is configured to monitor and adjust the operating frequency and/or voltage of various portions of integrated circuit 100 such as the logic cores 120 and common bridge logic 100 [(i.e. communication bus)]”:

² Moreover, having unduly limited the construction of “workload,” it was further error by the Board to not then consider the unpatentability of the claims over White in view of Simeral for all limitations. As explained in the Petition, it is clear that Simeral discloses monitoring and comparing “workloads” even under the Board’s narrow interpretation of this term. (Petition, 66-81.) Thus, the Board should have considered whether White in view of Simeral renders the challenged claims obvious in view of its narrow construction. Having failed to do so is another error.



(White Fig. 2A (annotated), 14:32-38; Pet., 51-54, 72-77; Pet. Reply, 9-11.) In accordance with '494 Patent's specification and as explained by Petitioner's expert, a person having ordinary skill would have "understood that operating frequency and voltage of a component reflect the activity and use, or workload, of that component." (EX1003, ¶103; '494, 10:65-11:2; Pet., 53-54; Pet. Reply, 10-11.)

That is, while frequency and voltage may not expressly be "an amount of activity over a quantum or period of time," they nonetheless reflect a metric of the "use" of a component. (Pet. 51-59.) For example, as White indicates, a high frequency and high voltage indicate a component is operating at a high workload. (White, 7:46-62, 9:25-30, 9:36-49 (discussing, for example, providing high frequency and high voltage when a component requires heavy use, so it does not

become a “bottleneck” to performance).) Therefore, White’s disclosure of monitoring frequency and voltage meet the ’494 Patent’s express definition of what constitutes a determination of “workload.” In view of the above, the Board was incorrect in determining White does not disclose “receiving a bus workload for a communication bus and a first processing element workload for a first processing element,” as recited in claim 4, and “receiving a bus workload for a communication bus and a first processing element workload for a first processing element,” as recited in claim 1. (FWD, 27-33.) For the same reasons, the Board’s conclusion that Petitioner failed to prove claims 2-7, 13-15, and 17-18 were unpatentable over White in combination with other references is incorrect. (*Id.*)

III. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests Director Review or rehearing by the Delegated Review Panel to vacate the Board’s Decision and to reverse or remand as appropriate.

Dated: February 7, 2025

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Certificate of Service

The undersigned certifies that, in accordance with 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105, the foregoing **PETITIONER'S REQUEST FOR DIRECTOR REVIEW** was served on February 7, 2025, electronically via e-mail upon the following parties:

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