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

PATENT OWNER'S SUR-REPLY

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I. SUMMARY

Petitioner's Reply falls short. MB USA continues to assert that, "Bose's predicted power and performance in the Power/Performance Trade-off Table 206 represents a workload threshold," without persuasively saying why this must be so. The table that MB USA relies on stores power optimizations for various operating conditions. These optimizations do not represent limits or boundaries—that is, thresholds—for component workloads. They are, if anything, what the table's name indicates: trade-offs between power to be provided and an expected performance at that power. Performance is not the same as workload. Ex. 1010 at 34:5-13. Moreover, Dr. Brogioli's testimony that Bose has no need for any comparisons of workload to workload threshold because direct information concerning actual power levels is available from various tables stands unrebutted by any responsive testimony from Mr. Wyatt. This, together with the unaccounted for differences between Bose and the '494 patent, mean that the challenged claims are not unpatentable in view of Bose.

As to the challenges that rely on White, alone and/or in combination with Simeral, the portions of the '494 patent that MB USA relies on in its Reply actually demonstrate the challenged claims are not unpatentable. First, the '494 patent makes clear that a component running at "full performance," i.e., maximum frequency, may still have a workload below its threshold. That is, the two are not

the same. In other words, monitoring frequency, as in White, is not determining workload, as required by the claim 1. Second, inasmuch as claim 4 requires "receiving workload," MB USA's attempt to rewrite the claim to specify receiving something else should not be tolerated. White, is clear that operating voltages and operating frequencies are received, but neither is workload. Nor is temperature workload. Hence, when White's temperature control logic provides temperature information, it is not providing workload, so there can be no *receiving* workload. Accordingly, the challenges in view of White and White and Simeral fail.

II. CLAIM 1 IS NOT UNPATENTABLE IN VIEW OF BOSE

A. Bose Fails to Anticipate Claim 1.

Petitioner's Reply still fails to convincingly describe *why* Bose should be understood as teaching "balancing control adapted to . . . dynamically tune power allocation between the first core and the communication bus based on . . . a comparison between the bus workload and a bus workload threshold," as recited in claim 1. Ex. 1001 at 21:28-33. Notably, Petitioner fails to provide any rebuttal testimony of Mr. Wyatt, or anyone else, in response to Dr. Brogioli's testimony that Bose fails to teach such an element. Ex. 2001 at ¶¶ 39-55. Instead, the Reply simply repeats the conclusory statement that, "Bose's predicted power and performance in the Power/Performance Trade-off Table 206 represents a workload

threshold." Pet. Reply at 2.

The Reply admits, "The Petition says nothing about using the Phase Prediction Table as a threshold." Pet Reply at 2. Instead, according to Petitioner, "the predicted power and performance represents a workload threshold for a given component, which is used by the global PMCU to select and adjust the power mode of a component." *Id*. This is simply not the case. In Bose, the "predicted power and performance" represents certain optimizations which take into account the amount of power required for different core operating conditions. Ex. 1005 at 7:8-17, 8:35-39; Ex. 2001 at ¶ 40. Dr. Brogioli explained that, "a POSITA would recognize that the term threshold, as it is being used in the '494 patent, is specifying a limit or boundary." Ex. 2001 at ¶ 44. The Reply does not contest this conclusion, yet offers no rationale as to why the predicted power and performance data in Bose is such a limit or boundary. Instead, the Reply argues that such limits need not be static. Pet. Reply at 2. Even if true, it still does not explain why the predicted power and performance data of Bose represents any sort of limit or boundary.

This is not surprising because the predicted power and performance data of Bose does not represent a limit or boundary on workload. As Bose makes clear, this data is a series of optimizations. Ex. 1005 at 7:11-13. The work of the global PMCU controller involves continually assigning power modes, which are

characterized by different ones of these optimizations, for different operating circumstances. *Id*. at 9:14-35; Ex. 2001 at ¶¶ 41-43. Thus, rather than specifying a limit or boundary on workload, the predicted power and performance data of Bose represent compromises—trade-offs—between power to be provided to a core and the expected performance of that core at the specified power, and Dr. Brogioli has explained that performance is not the same as workload. Ex. 1010 at 34:5-13.

The Reply also fails to convincingly rebut Dr. Brogioli's testimony that in Bose it is not necessary, when considering power vs. performance tradeoffs, for there to be any *comparison* of bus workload to a bus workload threshold because direct information concerning actual power level decreases or increases for different power modes is available from the power-performance tradeoff table. Ex. 2001 at ¶ 50. The Reply instead merely alleges that because Bose's global PMCU uses information from the power performance trade-off table it must be making a comparison. Pet. Reply at 4. But Dr. Brogioli already explained why this is not true:

> Bose explicitly states that [direct] information concerning actual power level increases and decreases for Bose's various power modes are available from Bose's PPT, among other Tables in Bose. Since such information used by Bose's logic is available in these tables, a POSITA would not look to a means of comparison of bus workload to bus workload thresholds elsewhere in the system. Instead, by referencing the actual

> power level increases and decreases associated with a power mode, Bose's system is able to readily determine whether or not a switch to a given power mode can be accommodated within a given power budget (which is stored in a control register).

Ex. 2001 at 50 (citing Bose at 2:62-65; 8:6-10; 12:49-54). This testimony stands unrebutted and Petitioner's attorney argument in the Reply is not evidence that contradicts these conclusions. *Wasica Fin. GmbH v. Cont'l Auto. Sys*., 853 F.3d 1272, 1284-85 (Fed. Cir. 2017) (citing *Gemtron Corp. v. Saint-Gobain Corp.* , 572 F.3d 1371, 1380 (Fed. Cir. 2009)).

Further, the Reply's insistence that because Bose's system includes components that monitor performance statistics such as instructions per cycle (IPCs) means Bose must be making workload comparisons, Pet. Reply at 5, is misdirected. In the petition, MB USA argued that it was the global PMCU's use of power-performance trade-off data from Power Performance Tradeoff Table that represented the comparison of bus workload to a bus workload threshold. Pet. 25-26; Pet. Reply at 2-3. It is *not* the global PMCU that monitors instructions per cycle. Rather it is the local PMCUs that do so. Ex. 1005 at 6:60-62. Bose does not indicate that this information is reported to the global PMCU, only that monitored temperature and power are reported. *Id*. at 6:67 – 7:3. Hence, there is no indication that the global PMCU compares bus workloads to any bus workload thresholds, as required by the challenged claims.

B. Claim 1 is not Obvious in View of Bose.

The Reply argues that differences between Bose and the '494 patent are nothing but a red herring. Pet. Reply at 7. Not so. As noted in Patent Owner's Response, a POSITA would recognize that the distributed and heterogeneous nature of power control in Bose, with local monitors able to make local decisions and perform functions that upper layers cannot means that a POSITA would recognize there is no need for a global PMCU that compares bus workload to a bus workload threshold as Petitioner alleges. POR at 29-32. As noted above, it is lower layers of the hierarchy, specifically the local PMCUs, that monitor instructions per cycle. Ex. 1005 at 6:60-62. The global PMCU does not monitor this information, nor does it rely on it. Indeed, because the power-performance tradeoff table provides direct information concerning the amount of change in power or performance measures for different power modes, the global PMCU can directly determine whether a power level associated with a prospective power mode will 'fit' within a total power budget" Ex. 2001 at ¶ 55. Accordingly, claim 1 is not obvious in view of Bose.

III. CLAIM 1 IS NOT UNPATENTABLE IN VIEW OF WHITE AND SIMERAL

The Reply alleges that "nothing in the '494 Patent indicates that determining

a ‘workload’ cannot be done by monitoring operating frequencies and voltages.” Pet. Reply at 10. But this is not true. Dr. Brogioli’s unrebutted testimony is that “performance metrics such as frequency can be altered independently of workload.” Ex. 2001 at ¶ 66. Yes, the ’494 patent states that many methods can be employed to monitor workload, Ex. 1001 at 9:47-57, and yes, the ’494 patent states that if a GPU’s frequency is below a threshold that frequency can be increased. *Id*. at 10:65 – 11:2. But this is not an indication that monitoring frequency is determining workload.

As noted in the ’494 patent, “[I]f a power limit is reached, then GPU 605’s performance metric, such as frequency, may be reduced, since it doesn’t need full performance to complete its workload that was below an activity threshold.” *Id*. at 12:61-65. This is an indication that a GPU that was running at “full performance,” i.e., maximum frequency, may have been overworking since its workload was below an activity threshold, i.e., not a maximum. Frequency is decoupled from workload. Simply because one was at a maximum does not mean the other was. *See* Ex. 2001 at ¶ 66; *and see* Ex. 1010 at 34:5-11, 53:16-23. Petitioner offers no evidence in the form of rebuttal testimony to dispute this fact and a POSITA would not confuse or equate monitoring of operating characteristics, such as voltage or frequency as in White, with monitoring of workload, as is called for in claim 1 of the ’494 patent. Ex. 2001 at ¶ 66.

IV. CLAIM 4 IS NOT UNPATENTABLE IN VIEW OF WHITE

The Reply attempts to rewrite claim 4 and alleges that "receiving workload" can really be understood as receiving something else. Pet. Reply at 12. To support this argument the Reply conflates *determining* workload, which the reply alleges can be done using any of a number of metrics, with *receiving* workload. *Id*. The Board should not permit this ruse to succeed.

As explained in the Response, claim 4 does not use claim 1's "monitoring" of a workload. Instead, claim 4 recites "receiving" a bus workload and a processing element workload. Ex. 1001 at 21:63-65; Ex. 2002 at 31:12-23. White, on the other hand, teaches receiving operating voltages and operating frequencies. Ex. 1006 at 10:43-46. The Reply admits as much. Reply at 13. But, neither voltage nor frequency is workload. Ex. 2001 at ¶ 68.

The Reply seeks to confuse this distinction by alleging activity level is only one of many workload measures. Reply at 12. But claim 4 does not recite *measuring* workload. Claim 4 recites *receiving* workload. That is, workload, not some metric that might be used to infer workload, must be received. Voltage is not workload, nor is frequency, so White cannot be read as teaching *receiving* workload.

As to the Reply's argument that White discloses receiving workload based

on an integrated circuit reaching a power limit, Reply at 13-14, this argument suffers the same failings as the previous one. At the heart of this argument is Petitioner's allegation that, "A POSITA would have understood that battery power indicates a power supply limit, and when the system is on battery power, it is reaching a power limit. . . . [A] POSITA would have understood White discloses that the power management logic 200 receives workload information based on the integrated circuit reaching a thermal design power limit." *Id*. at 14. The "workload information" the Reply refers to is operating temperature. Ex. 1006 at 2:34-44, 12:38-58. Operating temperature is not workload. Ex. 1010 at 62:11-19. Therefore, receiving an operating temperature is not receiving workload, as recited in claim 4.

Finally, the Reply fails to rebut Patent Owner's observation that "The petition does not allege any modifications to White that would result in a system that *receives* a bus workload and a processing element workload, as recited in claim 4." POR at 49. Not surprising because, of course, the petition made no such argument. Hence, the petition failed to make out a prima facie case of obviousness and the Reply fails to cure this deficiency.

V. CONCLUSION

For at least the foregoing reasons and those in the Patent Owner's Response, the Board should find that Petition has failed to prove the unpatentability of any of

the challenged claims.

Respectfully submitted,

Dated: September 25, 2024

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WORD-COUNT CERTIFICATE

I certify that the foregoing document complies with the type-volume limitation of 37 C.F.R. § 42.24(a) and (b) and contains 2,120 words (including words in drawings created by the Patent Owner or as annotations added by the Patent Owner to images reproduced in this document) based on the word count indicated by Microsoft® Word for Mac v. 16.84, excluding those portions exempted by the rule.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing:

PATENT OWNER'S SUR-REPLY

and its accompanying exhibits were served on September 25, 2024, by filing this document though the P-TACTS System as well as by delivering a copy via email directed to the attorneys of record for the Petitioner at the following addresses:

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The parties have agreed to electronic service in this proceeding.

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