IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

WECREVENTION, INC.,	§	Case No. [INSERT]
Plaintiff,	§	**JURY TRIAL DEMANDED**
v.	§	
DELL INC. and DELL TECHNOLOGIES, INC.,	§	
Defendants.	§	

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff WeCrevention Inc. ("WeCrevention" or "Plaintiff") for its Complaint against Defendants Dell Inc. and Dell Technologies, Inc. (collectively, "Dell" or "Defendants") alleges as follows:

THE PARTIES

1. WeCrevention is incorporated under the laws of the State of Texas, with a place of business located at 5851 Legacy Circle, 6th Floor, Plano, Texas 75024.

2. Upon information and belief, Defendant Dell, Inc. is a Delaware corporation with a principal place of business at One Dell Way, Round Rock, Texas 78682. Dell Inc. is registered to do business in the State of Texas. Dell Inc. can be served with process through its registered agent, Corporation Service Company, 211 East 7th Street, Suite 620, Austin, Texas 78701.

3. Upon information and belief, Defendant Dell Technologies, Inc. ("Dell Technologies") is a Delaware corporation, with its principal place of business at One Dell Way, Round Rock, Texas 78682. Dell Technologies is registered to do business in the State of Texas.

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IPR2026-00243

Dell Technologies can be served with process through its registered agent, Corporation Service Company, 211 East 7th Street, Suite 620, Austin, Texas 78701.

JURISDICTION AND VENUE

4. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. §§ 1, *et seq*. This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1332, 1338, and 1367.

5. This Court has specific and personal jurisdiction over Defendants, consistent with the requirements of the Due Process Clause of the United States Constitution and the Texas Long Arm Statute. Upon information and belief, Defendants have sufficient minimum contacts with the forum because Defendants have physical locations and regularly transact substantial business in the State of Texas and in this Judicial District. Further, Defendants have, directly or through subsidiaries or intermediaries, committed acts of patent infringement in the State of Texas and in this Judicial District as alleged more particularly below.

6. Venue is proper in this Judicial District pursuant to 28 U.S.C. §§ 1391 and 1400(b). Defendants are registered to do business in Texas and, upon information and belief, Defendants have transacted business in this Judicial District, have committed acts of direct and indirect infringement in this Judicial District, and have regular and established places of business in this Judicial District. Defendants are subject to personal jurisdiction in this Judicial District and have committed acts of patent infringement in this Judicial District. On information and belief, Defendants through their own acts and/or through the acts of others, make, use, sell, offer to sell, and/or import infringing products within this Judicial District, regularly do and solicit business in this Judicial District, and have the requisite minimum contacts with this Judicial District, such that this venue is fair and reasonable.

7. For example, on information and belief, Dell maintains and operates a secured physical area as part of its extensive use of a Communications Test Design Inc. ("CTDI") facility in Flower Mound, Texas (the "Dell Secure Area"). *See Cloud Byte LLC v. Dell Inc. et al.,* No. 2:24-cv-00637, Dkt. 72 at 4. Specifically, the Dell Secured Area is located at 501 Lakeside Parkway, Flower Mound, Texas 75028 (the "Flower Mound" location), which is in this Judicial District.

8. On information and belief, the Dell Secured Area is a physical place of Dell. The scale of Dell's operations through CTDI is substantial, and Dell has made substantial financial investment through those operations, which further demonstrates Dell's commitment to maintaining operations and presence in this District. *Id*. at 5. On information and belief, CTDI and Dell agreed to the location of the facility at 501 Lakeside Parkway in Flower Mound, and CTDI allocated physical space for the Dell Secured Area. *Id*. Dell therefore controls a physical location of its operations within this District. *Id*. On information and belief, the Dell Secured Area is regular and established because: (1) Dell's employees have a regular and established physical presence at the Dell Secured Area, and (2) CTDI is Dell's agent. *Id*. at 6-7. Further, on information and belief, the Dell Secured Area is a place of Dell at least because Dell exercises control over CTDI's conduct within the Dell Secured Area. *Id*. at 12. On information and belief, Dell has deliberately structured its relationship with CTDI to ensure that customers perceive the work performed at the CTDI facility as Dell's own work and, as such, Dell essentially subsumes CTDI. *Id*. at 13.

9. Separately, venue is proper in this Judicial District because, on information and belief, Dell implements a comprehensive work-from-home policy under which Dell has adopted or ratified one or more additional places of business in this Judicial District including, but not limited to, the homes of employees, such that the collection of these locations constitutes an aggregate network of regular and established places of business in this Judicial District, in and

from which the business of Dell is operated. On information and belief, Dell specifically advertises for and solicits employees to reside and work remotely in this Judicial District, including to support their customers in this Judicial District, and provide and/or store literature, equipment, and/or inventory at those locations for the purpose of enabling these employees to conduct their jobs and use such literature, equipment, and/or inventory specifically in this Judicial District.

10. For example, Dell's field employees are largely in sales, IT, or customer support roles and are expected to be out in the field with customers in this Judicial District. *Id*. at 14. The residences of Dell's field employees are physical places in this Judicial District. Dell's field employees' responsibilities include, for example, developing, establishing, and maintaining on-going Dell relationships with strategic partners and customers, pre-sales technical support to field sales teams during the sales process, and managing the personnel responsible for the delivery of contracted services to Dell's customers and meeting financial commitments, among other tasks critical to Dell's business. *Id*. at 14. On information and belief, these field employees are required to be in the "field" supporting customers in this Judicial District. *Id*. On information and belief, these field employees are not required to work from a physical Dell office, but instead travel from their homes to customer sites within this Judicial District to perform their job responsibilities. *Id*. In addition, certain Dell field employees who reside in this Judicial District are assigned to specific geographical territories within this Judicial District for which they are responsible. *Id*. On information and belief, Dell's territorial assignment system demonstrates that Dell's business model depends on having employees physically present in this Judicial District. *Id*.

11. Additionally, on information and belief, the residences of Dell's field employees are regular and established. Dell has hundreds of customers in this Judicial District. *Id.* at 16. Dell's field employees, many of whom are assigned accounts as part of their territory, routinely perform

activities that are core to Dell's business—such as meeting with customers to sell or support Dell products and services from within their homes or on-site within the District, which Dell explicitly authorizes them to do. *Id*. Additionally, Dell's targeted hiring practices and its assignment of territories to its employees further establish that Dell's presence in this District is regular and established. *Id*. at 17. Dell specifically advertises jobs identifying specific locations to fill a certain geographic need in this Judicial District. For example, Dell explicitly hires field employees to cover "East Texas" or the Dallas-Fort Worth area and expects them to live within those areas. *Id*. Dell's business model depends on maintaining a regular and established workforce in this District. *Id*. at 18.

12. Further, the residences of Dell's field employees are Dell's place of business. Dell's explicit acknowledgment that it strategically places employees in specific geographical areas for business reasons and assigns employees to particular markets demonstrates the importance of those markets to Dell. *Id*. at 19. Likewise, Dell's hiring and assignment of territories for numerous field employees confirms this Judicial District's importance to Dell's business. *Id*. Dell has established permanent operations in this District through its deliberate placement of employees within this Judicial District to serve customers in this District, the provision of Dell equipment (standard and specialized) to those employees' homes, and Dell's strategic business decision to maintain employees near their assigned accounts. *Id*. at 20.

13. Separately, venue is proper in this Judicial District, on information and belief, based on the Dell Partner Program, which Dell offers to incentivize partners to sell Dell products or provide services on behalf of Dell. *Id*. at 20. The Dell Partners may sell Dell's products as resellers, provide services to customers, or provide cloud hosting solutions to customers. *Id*. Dell offers four main types of partnerships: solution providers or resellers, distributors, cloud service providers,

and OEM providers. *Id*. at 21. Dell offers numerous "metal tiers" of partnership, with each tier providing increasing rebates, incentives, and marketing development funds. *Id*. This extensive network of partners demonstrates Dell's substantial business presence in this District. Two such partners stand out as particularly significant examples of Dell's established business presence. *Id*. One is VC, which is a Dell Gold Partner Solution Provider that provides IT solutions for individual and enterprise clients and has a "Dell Endpoint Security" competency certification. *Id*. The other is Unicom, which is a Dell Titanium Partner that has partnered with Dell for approximately 20 years. *Id*. Unicom is authorized to sell directly to end-users as a representative of Dell. *Id*. at 20-21.

14. The Dell Partners have physical places of business in this Judicial District where they perform Dell services. VC has a primary place of business at 1550 Rocky Ridge Rd, Athens, Texas 75751. *Id*. Unicom is located at 3501 E. Plano Parkway in Plano, Texas. *Id*. Further, the locations of Dell Partners in this Judicial District are regular and established. *Id*. at 22-23. On information and belief, the scale of Dell's operations through these partners is substantial, and Dell maintains inventory at least at Unicorn's Plano facility. *Id*. at 23. Dell also has the right to direct and control Dell Partners, establishing them as Dell's agents. Dell even describes its Partners as "an extension of [Dell's] team." *Id*. at 23.

15. Further, on information and belief, Dell Partners must agree to terms set by Dell in the Dell Technologies Partner Program Agreement, Dell Code of Conduct, and an agreement pertaining to the specific type of partnership, *e.g.*, a Dell OEM Partner Reseller Agreement. *Id*. at 23. Those agreements show that Dell exercises at least interim control over Dell Partners:

- "Dell Technologies may deny any claim that it believes, ***in its sole discretion***, does not conform to this agreement, the Program, or subprogram terms." *Id*. at 23; *Id*, Ex. J at § 6.2;

- "Dell Technologies, ***in its sole discretion***, may terminate the Agreement or Program in whole or in part, for all participants, or for you alone, without cause ...." *Id.*, Ex. PP at § 12.1;

- "Dell Technologies has ***the right to terminate or discontinue*** your or any of your personnel's access to the Information or Partner Portal, ***at its convenience***." *Id*. at § 12.3; and

- Dell Partners are "expected to ***mirror*** Dell's high ethical standards," and its Code of Conduct, which is "how [Dell] would expect [its Partners] to behave when they are out quoting, positioning Dell and selling Dell products." *Id*. at Ex. QQ at 390-91; Ex. J at 92:23-93:3.

16. Dell's restrictions and guidelines on the use of the "Dell" logo and branding demonstrates that Dell heavily curates which entities can advertise their association with Dell to the public and in what manner. For example, on information and belief, Dell Partners, such as VC and Unicom, must adhere to the following Dell logo and branding requirements:

- "Your use of Program logos is ***determined by, and must be in compliance with***, the terms and conditions in the Dell Technologies Partner Logo and Trademark Usage Terms ... " *Id*., Ex. PP at § 8.2; *see also* Ex. RR;

- "Licensee may only use the Logo in ***strict accordance with the standards and requirements in the Dell Technologies Partner Brand Guide***." *Id*. at Ex. RR at 652; *see also* Ex. J at 65:4-15;

- Dell designates the ***"[m]inimum clear space" and "minimum size"*** that may be used with Dell Technologies Partner logos. *Id*. Ex. TT at 659; and

- "Dell Inc. and Dell Affiliate ***may immediately suspend or terminate*** Licensee's right to use the Logo for violation of any of these terms and conditions, or any terms and conditions governing Licensee's participation in the Dell Technologies Partner Program or provision of Dell products or services, or ***for any reason that Dell Inc. or Dell Affiliate deems appropriate***." *Id*., Ex. RR at -652.

17. Further, the locations of Dell's Partners are Dell's place of business in this Judicial District. Dell exercises interim control over the locations of the Dell Partners in this Judicial District. On information and belief, Unicorn's warehousing of Dell inventory firmly establishes that Unicorn's Plano facility is Dell's place of business. Further, Dell has ratified and held out Dell

Partners as places "of" Dell by advertising on its website which Dell Partners are in this Judicial District and what Dell products or services they provide.

18. Separately, on information and belief, venue is proper in this Judicial District based on Dell's Managed Services at Boeing's Plano office. *Id*. at 26. Dell's provision of IT services to its customer, Boeing, at Boeing's Plano office is another, separate example of Dell's established presence in this Judicial District. *Id*. Boeing's Plano office is a physical place in this Judicial District, located at 5905 Legacy Drive, Suite 325, Plano, Texas 75024. *Id*. at 27. Boeing's Plano office is also regular and established. *Id*. at 28. Further, Dell exercises extensive interim control over the Dell IT Personnel, who are agents of Dell. *Id*. Boeing's Plano office is also Dell's place of business because Dell has established exclusive spaces in Boeing's Plano office to be Dell's place related to the provision of IT services by Dell to Boeing. *Id*. at 30. The public announcement that Boeing has outsourced its IT jobs to Dell suggests that Dell has also ratified Boeing's Plano office as its place of business. *Id*.

19. Venue is proper in Judicial District based on Dell's authorized sellers and sales representatives that offer for sale and sell infringing products to consumers at various locations throughout the State of Texas and this Judicial District including, but not limited to: Best Buy, 422 West TX-281 Loop Suite 100, Longview, Texas 75605; Best Buy, 2800 North Central Expressway, Plano, Texas 75074; Best Buy, 5514 S Broadway Avenue., Tyler, Texas 75703; Staples, 812 West McDermott Drive, Allen, Texas 75013; Walmart Supercenter, 730 West Exchange Parkway, Allen, Texas 75013; and Walmart Supercenter, 1701 East End Boulevard North, Marshall, Texas 75670.

20. Further, Dell has admitted or not contested personal jurisdiction in this Judicial District previously. *See*, *e.g.*, *AX Wireless LLC v. Dell Inc. and Dell Technologies Inc.*, No. 2:22-

cv-277-JRG-RSP, Dkt. 30 (E.D. Tex. Nov. 17, 2022); *AGIS Software Development LLC v. Dell Inc. et al.*, No. 2:24-cv-00662-JRG-RSP.

PATENTS-IN-SUIT

21. On December 1, 2015, the United States Patent and Trademark Office ("USPTO") duly and legally issued U.S. Patent No. 9,201,834 (the "'834 Patent") entitled "Reconfigurable high speed memory chip module and electronic device with a reconfigurable high speed memory chip module." A true and correct copy of the '834 Patent is attached hereto as Exhibit A.

22. On May 4, 2021, the USPTO duly and legally issued U.S. Patent No. 10,998,017 (the "'017 Patent") entitled "Dynamic random access memory applied to an embedded display port." A true and correct copy of the '017 Patent is attached hereto as Exhibit B.

23. On February 6, 2024, the USPTO duly and legally issued U.S. Patent No. 11,894,098 (the "'098 Patent") entitled "Dynamic random access memory applied to an embedded display port." A true and correct copy of the '098 Patent is attached hereto as Exhibit C.

24. On November 26, 2024, the USPTO duly and legally issued U.S. Patent No. 12,154,652 (the "'652 Patent") entitled "Dynamic random access memory applied to an embedded display port." A true and correct copy of the '652 Patent is attached hereto as Exhibit D.

25. On October 20, 2015, the USPTO duly and legally issued U.S. Patent No. 9,164,942 (the "'942 Patent") entitled "High speed memory chip module and electronics system device with a high speed memory chip module." A true and correct copy of the '942 Patent is attached hereto as Exhibit E. The '834 Patent, the '017 Patent, the '098 Patent, the '652 Patent, and the '942 Patent are referred to herein collectively as the "Patents-in-Suit."

26. WeCrevention is the sole and exclusive owner of all right, title, and interest in and to the Patents-in-Suit, and holds the exclusive right to take all actions necessary to enforce its rights

to the Patents-in-Suit, including the filing of this patent infringement lawsuit. WeCrevention also has the right to recover all damages for infringement of the Patents-in-Suit as appropriate under the law.

27. WeCrevention has at all times complied with the marking provisions of 35 U.S.C. § 287 with respect to the Patents-in-Suit. On information and belief, any and all prior assignees and licensees have also complied with the marking provisions of 35 U.S.C. § 287.

INFRINGEMENT ALLEGATIONS

28. The inventions claimed in the Patents-in-Suit are generally directed to electronics devices that comprise memory chips, as well as memory chip modules. The ’834 Patent was developed by Weng-Dah Ken, Chao-Chun Lu, and Jan-Mye Sung. The ’017 Patent, the ’098 Patent, and the ’652 Patent were developed by Der-Min Yuan, Yen.-An Chang, and Wei-Ming Huang. The ’942 Patent was developed by Weng-Dah Ken and Nicky Lu. Dell has manufactured, used, marketed, distributed, sold, offered for sale, and imported into the United States, products that infringe the Patents-in-Suit. These products include at least all versions and variants of Dell products that include LPDDR5 DRAM and LPDDR5x DRAM since September of 2019, including without limitations, the XPS (*e.g.*, XPS13, XPS13 Plus, XPS 13 Plus, XPS Pro 14 Plus, and XPS 16 Pro), the Dell Plus (*e.g.*, Dell 14 Plus, Dell 16 Plus), the Latitude (*e.g.*, Latitude 9430 and Latitude 7430), and the Precision (*e.g.*, Precision 5690 and Precision 5680) (“the Accused Products”).

29. Upon information and belief, Dell has had knowledge and notice of the Patents-in-Suit, and its infringement thereof, since the patents issued. Dell, as a technology company, regularly monitors memory technology advances, and it monitored or was otherwise aware of Plaintiff’s patented inventions, generally due to their impact on Dell’s own technology and

consumer electronics business. Alternatively, to the extent that Dell avoided or otherwise lacked actual knowledge of the Patents-in-Suit, and its infringement thereof, it was willfully blind. Upon information and belief, to the extent it lacked actual knowledge of infringement, prior to the filling of this action, Dell deliberately avoided learning of infringement, despite subjectively believing that there was a high probability that it infringed Plaintiff's patents, and specifically the Patents-in-Suit, and was therefore willfully blind. Upon information and belief, Dell has adopted a policy or practice of not reviewing the patents of others, including those related to Dell's specific industry and of Plaintiff in particular, thereby remaining willfully blind to its infringement of the Patents-in-Suit. Upon information and belief, Dell lacks written policies disseminated to employees regarding monitoring or avoidance of patent infringement by Dell and lacks mechanisms for employees to report patents which they believe Dell may infringe. Upon information and belief, Dell and its employees understood that there was a high likelihood that patents filed on innovations by Plaintiff read on the Accused Products.

30. At least as of the commencement of this action, Dell has both actual knowledge and notice of the Patents-in-Suit, and continues to willfully infringe the Patents-in-Suit.

COUNT I
(Infringement of the '834 Patent)

31. Paragraphs 1 through 30 are incorporated by reference as if fully set forth herein.

32. WeCrevention has not licensed or otherwise authorized Dell to make, use, offer for sale, sell, or import any products that embody the inventions of the '834 Patent.

33. Dell has and continues to directly infringe the '834 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '834 Patent.

34. Dell directly infringes at least claim 21 of the ’834 Patent by making, using, offering to sell, selling, and/or importing into the United States products that comprise an electronics device with a reconfigurable high speed memory chip module, the electronics system device comprising: an application-specific integrated circuit (ASIC) processor; a type of memory cell array group, wherein the type of memory cell array group comprises multiple memory cell array ICs; a first transmission bus coupled to the type of memory cell array group having a first programmable transmitting or receiving data rate, a first programmable transmitting or receiving signal swing corresponding to firmware or software comprised in the ASIC processor; a logic unit coupled to the first transmission bus for accessing the type of memory cell array group through the first transmission bus; and a second transmission bus coupled between the logic unit and the ASIC processor having a second programmable transmitting or receiving data rate, a second programmable transmitting or receiving signal swing associated to the firmware or the software comprised in the ASIC processor.

35. The Accused Products include an electronics device with a reconfigurable high speed memory chip module. For example, the Dell XPS 13 Plus 9320, which is believed to be representative of all accused products for purposes of Plaintiff’s infringement allegations, is a laptop, which is an electronics device. The Dell XPS 13 Plus 9320 includes a 16 GB LPDDR5 DRAM module, which is a reconfigurable high speed memory chip module.

Product information

Technical Details

Collapse all

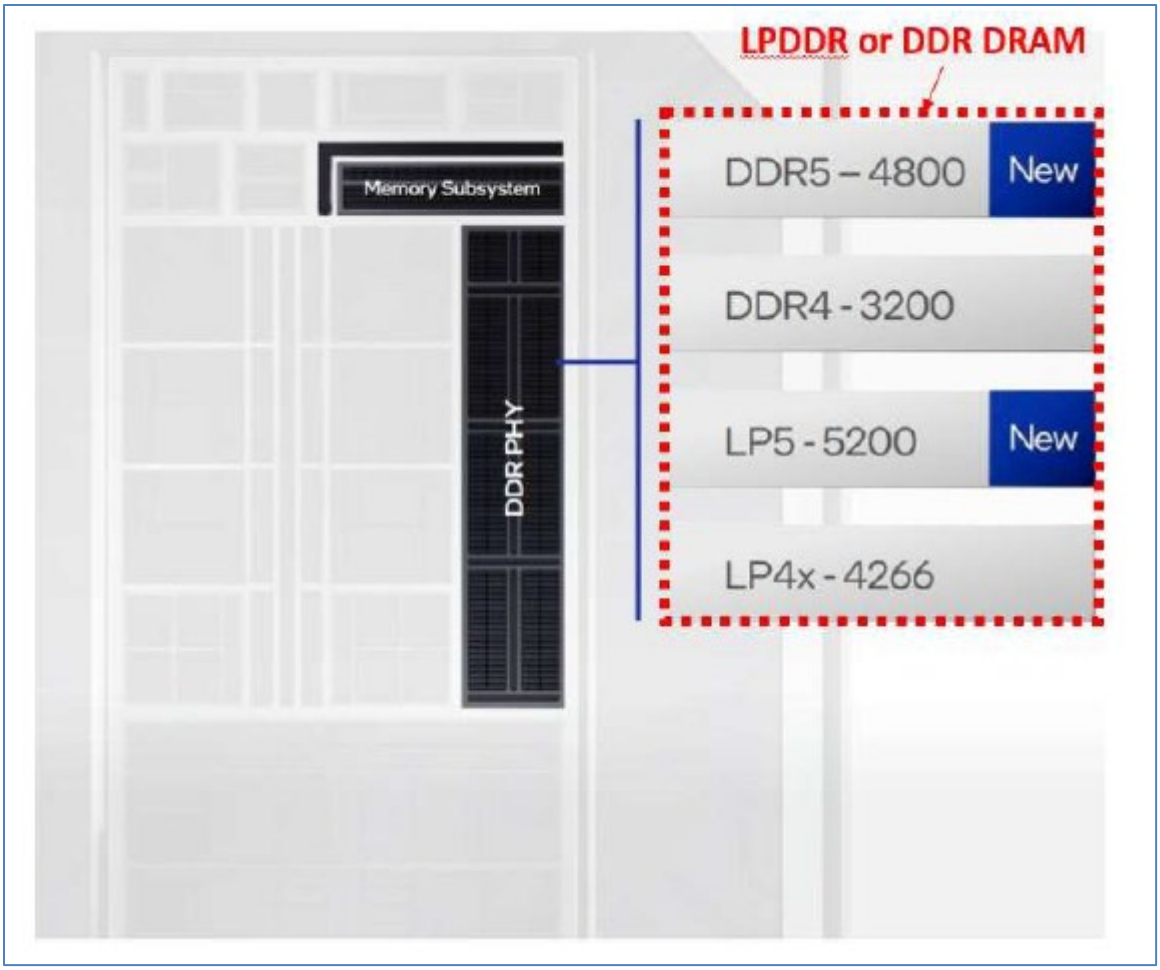
Summary

Standing screen display size	13.4 Inches
Screen Resolution	1920 x 1200 pixels
Max Screen Resolution	1920x1200 Pixels
Processor	4.7 GHz core_i7
RAM	16 GB LPDDR5
Hard Drive	512 GB SSD
Graphics Coprocessor	Intel Iris Xe Graphics
Chipset Brand	Intel
Card Description	Integrated
Graphics Card Ram Size	16 GB
Wireless Type	802.11ax, Bluetooth
Average Battery Life (in hours)	7 Hours

See https://www.amazon.com/Dell-XPS-9320-Touchscreen -Thunderbolt/dp/B0C7KQRTML/.

36. The Accused Products further include an application-specific integrated circuit ("ASIC") processor. For example, Dell's Dell XPS 13 Plus 9320 includes a Core i7 Processor (also known as "Alder Lake") comprising an ASIC processor that includes the Intel Performance Hybrid architecture, P-Cores for performance, E-Cores for Efficiency, and a graphics core. *See* https://www.intel.com/content/www/us/en/content-details/655258/12th-generation-intel-core-processors-datasheet-volume-1-of-2.html ("Datasheet") at 13-16.

37. The Accused Products further include a type of memory cell array group, wherein the type of memory cell array group comprises multiple memory cell array ICs. For example, Dell's Dell XPS 13 Plus 9320 includes a 16GB LPDDR DRAM module, which is coupled to the Alder Lake as shown below:



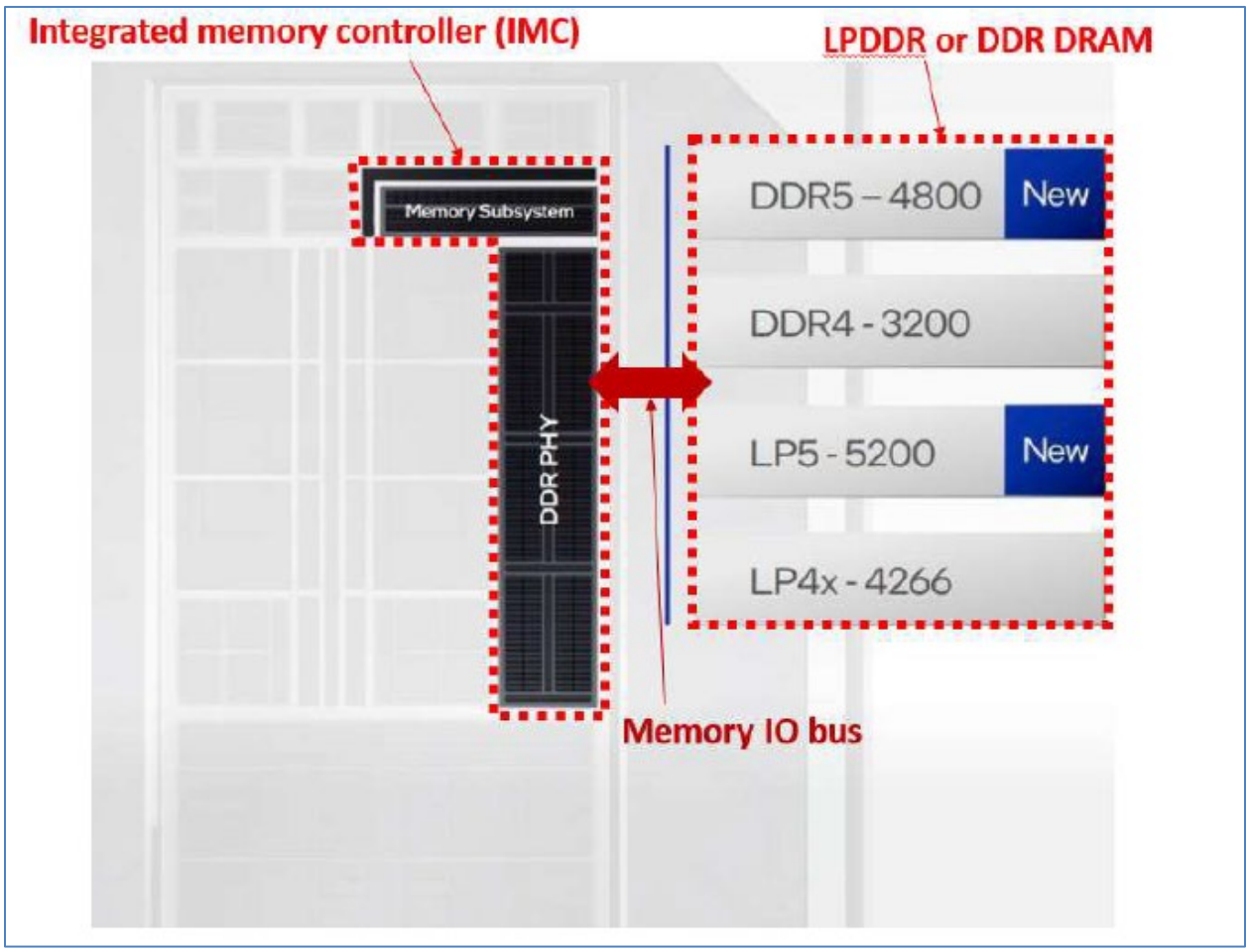
See https://medium.com/intel-tech/alder-lake-introduces-a-new-client-soc-architecture-that-scales-from-powerful-desktops-to-baf2533c6326.

38. On information and belief, the Accused Products comprise a first transmission bus coupled to the type of memory cell array group having a first programmable transmitting or receiving data rate, a first programmable transmitting or receiving signal swing corresponding to firmware or software comprised in the ASIC processor. For example, on information and belief, Dell's XPS 13 Plus 9320 includes a memory bus (*i.e.*, first transmission bus) coupled to the memory cell array group of the LPDDR5 DRAM module. For example, the Alder Lake includes an integrated memory controller ("IMC"), which supports access to the LPDDR5 DRAM module. The IMC further supports dynamic frequency and voltage scaling on the memory bus.

Furthermore, on information and belief, this dynamic frequency and voltage scaling feature, based on typical processor operations and instructions, is controlled by firmware or software in the Alder Lake processor.

> "The SoC supports the latest DDR5 memory and retains compatibility with DDR4 to ensure maximum flexibility. Our unique physical layer supports up to DDR5-4800 and DDR4-3200 in addition to low-power LP5-5200 and LP4x-4266 alternatives. To further conserve power and ensure maximum performance on demand, Alder Lake can scale memory frequency and voltage dynamically in response to bandwidth requirements and workload behavior. Enhanced overclocking support enables even higher performance with the right DIMMs"

Id.

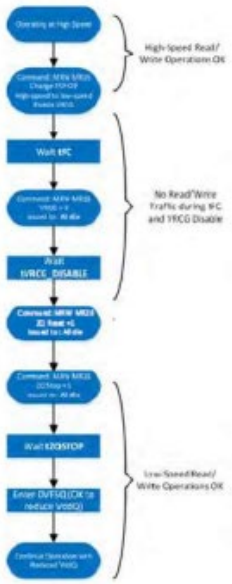


See id.

> "System Agent Enhanced Intel SpeedStep® Technology is a dynamic voltage frequency scaling of the System Agent clock based on memory utilization. Unlike processor core and package Enhanced Intel SpeedStep® Technology, System Agent Enhanced Intel SpeedStep® Technology has three valid operating points. When running light workload and SA Enhanced Intel SpeedStep® Technology is enabled, the DDR data rate may change as follows: **BIOS/MRC DDR training at maximum, mid and minimum frequencies sets I/O and timing parameters**."

See https://www.intel.com/content/www/us/en/content-details/655258/12th-generation-intel-core-processors-datasheet-volume-1-of-2.html at 69 (emphasis added).

39. LPDDR5 DRAM, such as that of the XPS 13 Plus 9320, supports Dynamic Voltage and Frequency Scaling (DVFS) consisting of two modes ("DVFSC" and "DVFSQ") that allow the memory operating frequency and voltages to be controllably adjusted, such as by lowering one or both of these parameters to reduce energy consumption during times when high performance is not required. *See* JESD209-5B at 414; *see also* JESD209-5C at 430. When DVFSQ mode is enabled, "LPDDR5 devices can allow the VDDQ to be ramped during operation including Read/Write transactions. Exact speeds and levels are to be determined by the system builder." JESD509-5B at 416; *see also* JESD209-5C at 435.



An example DVFSQ high-to-low transition sequence is:

1. Operating at high speed with VddQ=0.5v nominal
2. FSP switch from high frequency to a low frequency suitable for non-ODT operation; enable VRCG
3. Wait tFC (stall traffic)
4. Issue MRW MR16 – set VRCG = 0
5. Wait tVRCG_DISABLE (stall traffic)
6. Issue MRW MR28 – ZQ reset OP[0] = 1 to set default ZQ strength to meet VDDQ = 0.3V operation
7. Wait tZQRESET without ZQ latch
8. Issue MRW MR28 – set ZQ Stop=1 to disable background calibration
9. Wait tZQSTOP
10. Enter DVFSQ (reduce VddQ below 0.5v nominal)
11. Continue operation with reduced VddQ

Background ZQ Calibration mode is assumed. Refer to 4.2.1 for details and options related to ZQ requirements.

See JESD509-5B at 417; *see also* JESD209-5C at 436.

40. Since the I/O circuitry of the LPDDR5 DRAM is coupled to the memory bus of the XPS 13 Plus 9320, frequency and VDDQ adjustment necessarily result in signal frequency and voltage scaling on the memory bus.

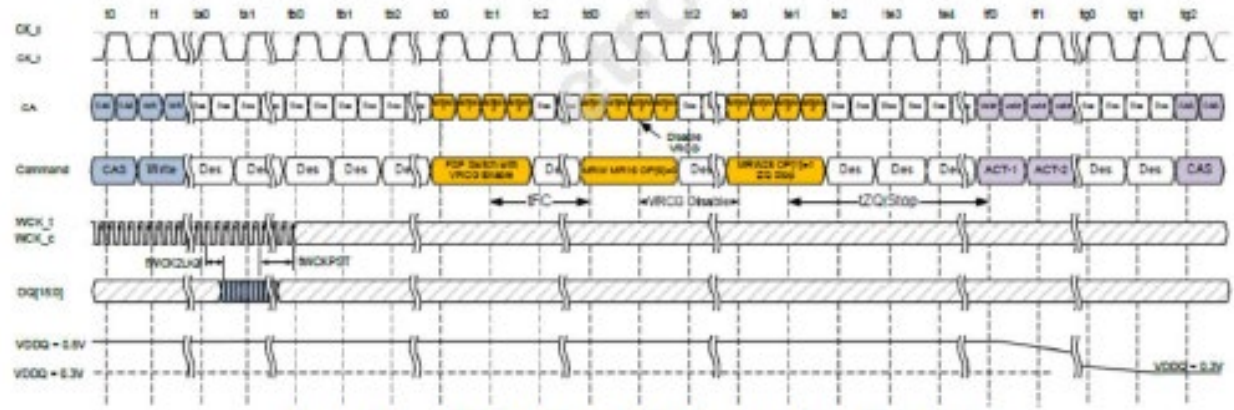
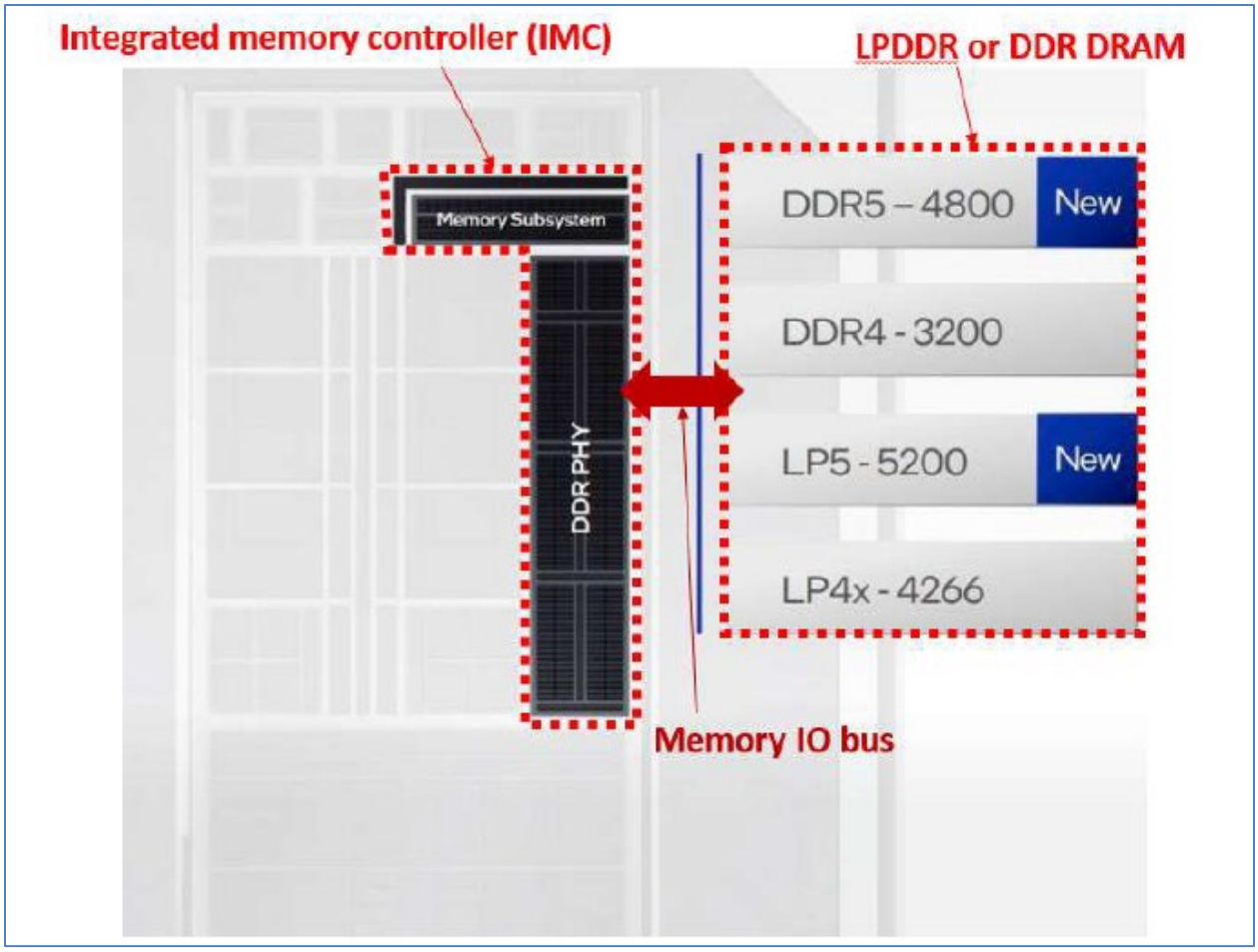


Figure 246 — DVFSQ High (VDDQ) to Low Transition Timing

See JESD209-5B at 417; *see also* JESD209-5C at 436.

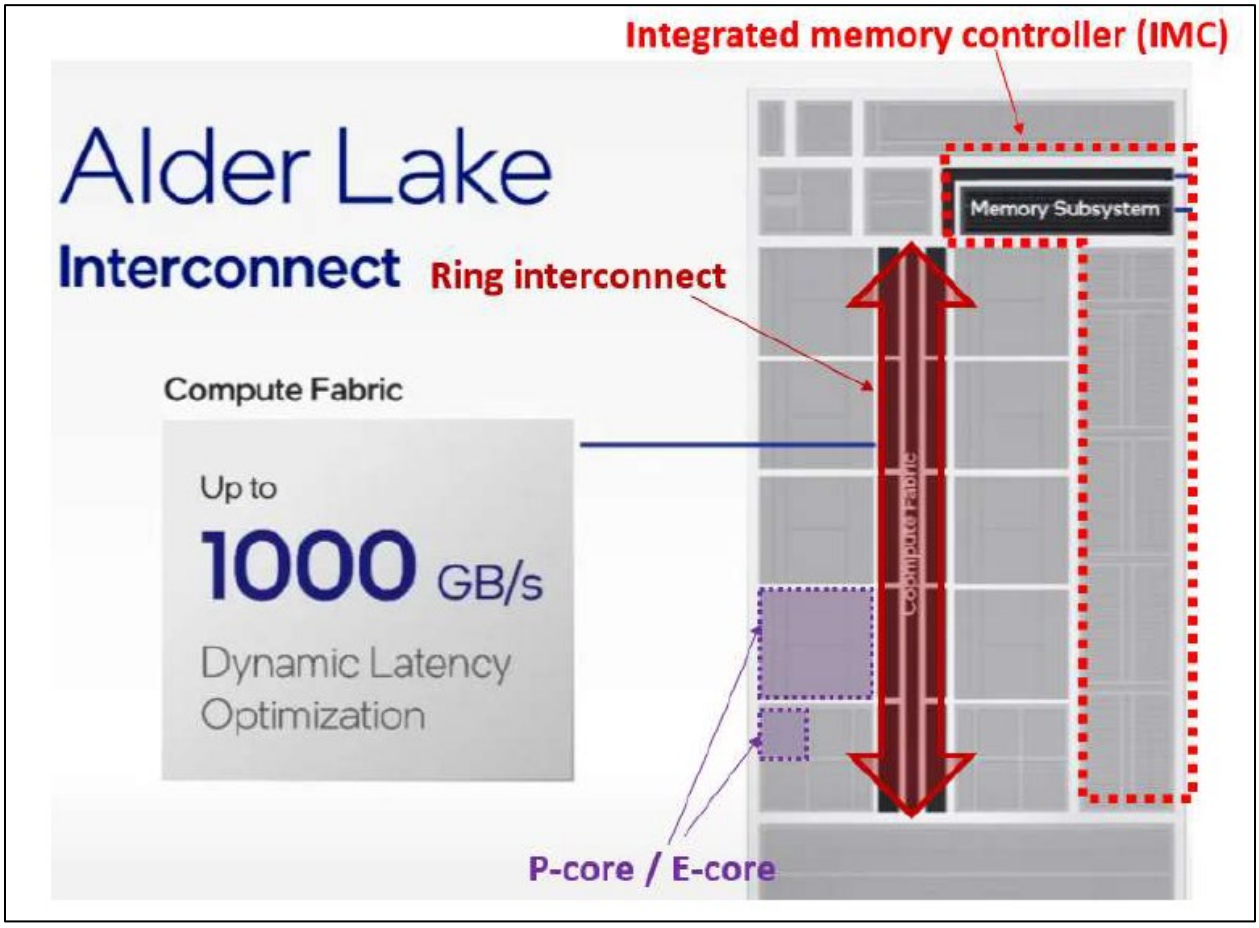
41. On information and belief, the Accused Products further include a logic unit coupled to the first transmission bus for accessing the type of memory cell array group through the first transmission bus. For example, on information and belief, the IMC of the Alder Lake is coupled to the memory bus (*i.e.*, a first transmission bus) for accessing the LPDDR5 DRAM module as shown below.



See https://medium.com/intel-tech/alder-lake-introduces-a-new-client-soc-architecture-that-scales-from-powerful-desktops-to-baf2533c6326 (annotated).

42. On information and belief, the Accused Products further include a second transmission bus coupled between the logic unit and the ASIC processor having a second programmable transmitting or receiving data rate, a second programmable transmitting or receiving signal swing associated to the firmware or the software comprised in the ASIC processor. For example, the Alder Lake processor includes a ring interconnect (*i.e.*, second transmission bus) which connects the cores (P-cores and E-cores) and the IMC. On information and belief, the ring interconnect provides a programmable data rate and voltage swing controlled by firmware or software. For example, the Alder Lake processor supports dynamic frequency changes, which

correspond to data rate changes on the ring interconnect. (Datasheet at 51.). Furthermore, the ring interconnect shares voltage and frequency with the Last Level Cache (LLC). (Id.) Additionally, the Alder Lake processor supports various levels of low power states, called Package C-State. (Id. at 73-77.) For example, if the Alder Lake processor enters into PKG C8 state, the LLC voltage is removed, and accordingly the ring interconnect voltage is also removed. Finally, the package C-state transitions depend on the core C-state, which is associated with x86 instructions (*e.g.*, MWAIT).



See https://medium.com/intel-tech/alder-lake-introduces-a-new-client-soc-architecture-that-scales-from-powerful-desktops-to-baf2533c6326 (annotated).

"Ring Interconnect

The Ring is a high speed, wide interconnect that links the processor cores, processor graphics and the System Agent.

The Ring shares frequency and voltage with the Last Level Cache (LLC).

The Ring's frequency dynamically changes. Its frequency is relative to both processor cores and processor graphics frequencies."

See https://edc.intel.com/content/www/us/en/design/ipla/software-development-platforms/client/platforms/alder-lake-desktop/12th-generation-intel-core-processors-datasheet-volume-1-of-2/010/ring-interconnect/.

Core C-states

Core C-State	C-State Request Instruction	Description
C0	N/A	The normal operating state of a processor IA core where a code is being executed
C1	MWAIT(C1)	AutoHalt - core execution stopped, autonomous clock gating (package in C0 state)
C1E	MWAIT(C1E)	Core C1 + lowest frequency and voltage operating point (package in C0 state)

See https://www.intel.com/content/www/us/en/content-details/655258/12th-generation-intel-core-processors-datasheet-volume-1-of-2.html.

PKG C8	Of all IA cores requested C8 + LLC should be flushed at once, voltage will be removed from the LLC. The processor will enter Package C8 when: • All IA cores in C8 or deeper + Processor Graphic cores in RC6. • The platform components/devices allow proper LTR for entering Package C8.	Package C6 If all IA cores requested C8, LLC is flushed in a single step, voltage will be removed from the LLC.

See https://www.intel.com/content/www/us/en/content-details/655258/12th-generation-intel-core-processors-datasheet-volume-1-of-2.html at 65.

43. Dell indirectly infringes one or more claims of the '834 Patent by knowingly and intentionally inducing others, including Dell customers and end-users of the Accused Products and products that include the Accused Products, to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States products that include infringing technology, such as the Accused Products.

44. Dell indirectly infringes one or more claims of the '834 Patent, as provided by 35 U.S.C. § 271(b), by inducing infringement by others, such as Dell's customers and end-users, in this Judicial District and elsewhere in the United States. For example, Dell's customers and end-users directly infringe, either literally or under the doctrine of equivalents, through their use of the inventions claimed in the '834 Patent. Dell induces this direct infringement through affirmative acts of manufacturing, selling, distributing, and/or otherwise making available the Accused Products, and providing instructions, documentation, and other information to customers and end-users urging them to use the Accused Products in an infringing manner, including technical support, marketing, product manuals, advertisements, and online documentation. Because of

Dell's inducement, Dell's customers and end-users use Accused Products in a way Dell intends. Dell performs these affirmative acts with knowledge of the '834 Patent and with the intent, or willful blindness, that the induced acts directly infringe the '834 Patent.

45. Dell indirectly infringes one or more claims of the '834 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement by others, such as customers and end-users, in this Judicial District and elsewhere in the United States. Dell's affirmative acts of selling and offering to sell the Accused Products in this Judicial District and elsewhere in the United States causing the Accused Products to be manufactured, used, sold and offered for sale contributes to others' use and manufacture of the Accused Products, such that the '834 Patent is directly infringed by others. The accused components within the Accused Products are material to the invention of the '834 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by Dell to be especially made or adapted for use in the infringement of the '834 Patent. Dell performs these affirmative acts with knowledge of the '834 Patent and with intent, or willful blindness, that they cause the direct infringement of the '834 Patent.

46. WeCrevention has suffered damages as a result of Defendants' direct and indirect infringement of the '834 Patent in an amount to be proved at trial.

COUNT II
(Infringement of the '017 Patent)

47. Paragraphs 1 through 30 are incorporated by reference as if fully set forth herein.

48. WeCrevention has not licensed or otherwise authorized Dell to make, use, offer for sale, sell, or import any products that embody the inventions of the '017 Patent.

49. Dell has and continues to directly infringe the '017 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making,

using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the ’017 Patent.

50. For example, Dell directly infringes at least claim 1 of the ’017 Patent by making, using, offering to sell, selling, and/or importing into the United States products that comprise a dynamic random access memory (“DRAM”), comprising: a DRAM core cell, wherein the DRAM core cell is supplied with a first voltage within a first voltage range to make the DRAM core cell operate at the first voltage, and the DRAM core cell is a volatile memory cell, wherein the first voltage is lower than 1.1V; and a peripheral circuit electrically connected to the DRAM core cell, wherein the peripheral circuit is supplied with a second voltage within a second voltage range to make the peripheral circuit operate at the second voltage, wherein the second voltage is lower than 1.1V, and wherein the DRAM core cell and the peripheral circuit are formed on a single chip, and the peripheral circuit is external to the DRAM core cell; wherein the first voltage and the second voltage are capable of making the DRAM be applied to an embedded display port (eDP).

51. The Accused Products include a dynamic random access memory (DRAM), powered by an external voltage source. For example, the Dell XPS 13 Plus 9320 includes a 16 GB LPDDR5 DRAM module, which is a dynamic random access memory. *See* https://www.amazon.com/Dell-XPS-9320-Touchscreen -Thunderbolt/dp/B0C7KQRTML/.

52. The Accused Products further include a DRAM core cell, wherein the DRAM core cell is supplied with a first voltage within a first voltage range to make the DRAM core cell operate at the first voltage, and the DRAM core cell is a volatile memory cell, wherein the first voltage is lower than 1.1V. *See*, *e.g.*, JESD209-5B at Table 6; *see also* JESD209-5C at 430-439. The LPDDR5 DRAM module of the XPS 13 Plus 9320 supports (DVFS), including a DVFSC mode that permits the IMC to change the power supply voltage to peripheral circuitry and certain

portions of the core. *See* JESD209-5B at 414-416; *see also* JESD209-5C at 430-439. Specifically, when DVFSC mode is enabled, power may be provided from either a high voltage rail VDD2H or a low voltage rail VDD2L, both of which are typically less than 1.1V.

> "LPDDR5 Dynamic Voltage and Frequency Scaling (DVFS) consists of two modes intended to reduce the LPDRAM energy consumption. The two modes are **DVFSC (DVFS Core)** and DVFSQ (DVFS VDDQ)."
>
> "In DVFSC mode, when enabled by MR19 OP[1:0]=01B, the LPDRAM may operate internal circuitry from either the **VDD2H rail or the VDD2L rail**."

Source: JESD209-5B at 414 (emphasis added); *see also* JESD209-5C at 430.

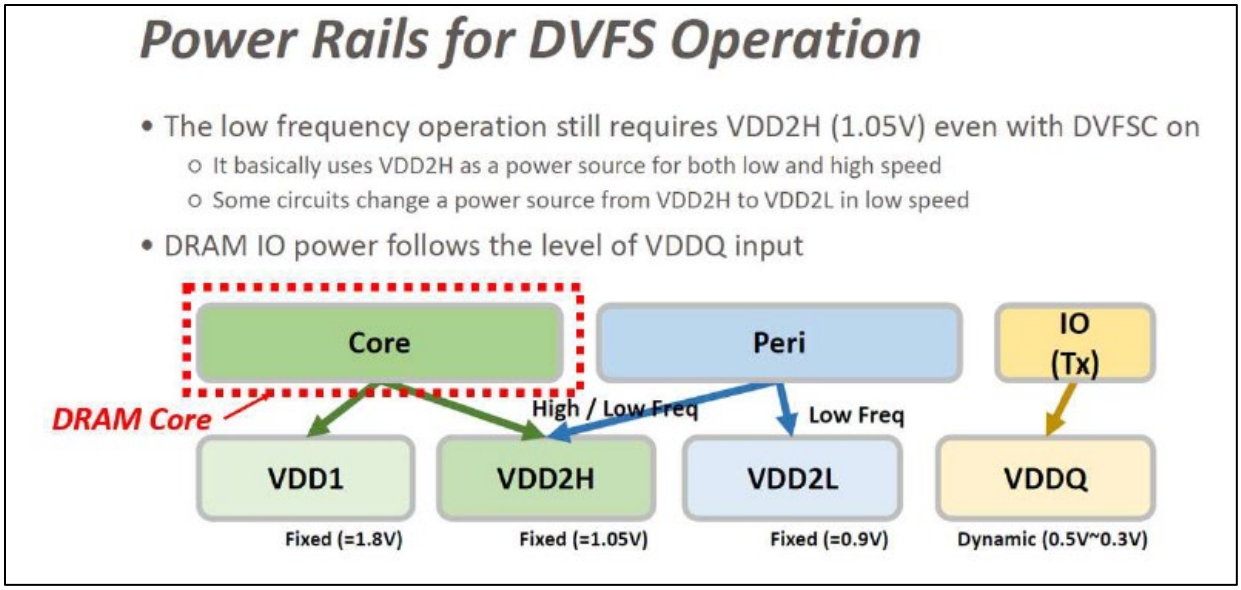
53. When DVFSC mode is enabled, the LPDDR5 DRAM module is controllable via the Alder Lake to operate certain circuitry of the module from either the VDD2H or the VDD2L rail. Voltage ranges for the two rails are shown below.

11.1 Recommended DC Operating Conditions

Table 396 — Recommended Voltage o

			Low Freq Voltage Spec Freq:DC to 2 MHz			
DRAM	Symbol		Min	Typ	Max	Unit
Core 1 Power	VDD1		1.7	1.8	1.95	V
Core 2 Power/Input Buffer Power	VDD2H		1.01	1.05	1.12	V
	VDD2L	Single Core Power Rail (MR13 OP[7]=1_B)	1.01	1.05	1.12	V
		Dual Core Power Rail (MR13 OP[7]=0_B)	0.87	0.9	0.97	
I/O Buffer Power	VDDQ	SPEC Range-1	0.47	0.5	0.57	V
		Spec Range-2	0.27	0.3	0.37	V
		Allowable Range	0.27	N/A	0.57	V

See JESD209-5B at Table 396 (annotated); *see also* JESD209-5C at Table 408.



See A. Chang, "JEDEC LPDDR5 Workshop – Commands & New Features," 2019 ("LPDDR5 Workshop") at 3 (annotated).

54. The Accused Products further comprise a peripheral circuit electrically connected to the DRAM core cell, wherein the peripheral circuit is supplied with a second voltage within a second voltage range to make the peripheral circuit operate at the second voltage, wherein the second voltage is lower than 1.1V. For example, the LPDDR5 DRAM module includes buffers and other data path circuits (*i.e.*, peripheral circuits) connected to the DRAM core cell. When DVFSC mode is enabled, power is supplied via VDD2H or VDD2L, both of which are typically below 1.1V. *See* JESD209-5Bat 414; *See also* JESD209-5C at 430.

> "In DVFSC mode, when enabled by MR19 OP[1:0]=01B, the LPDRAM may operate internal circuitry from either the VDD2H rail or the VDD2L rail)."

Source: *See* JESD209-5B at 414; *see also* JESD209-5C at 430.

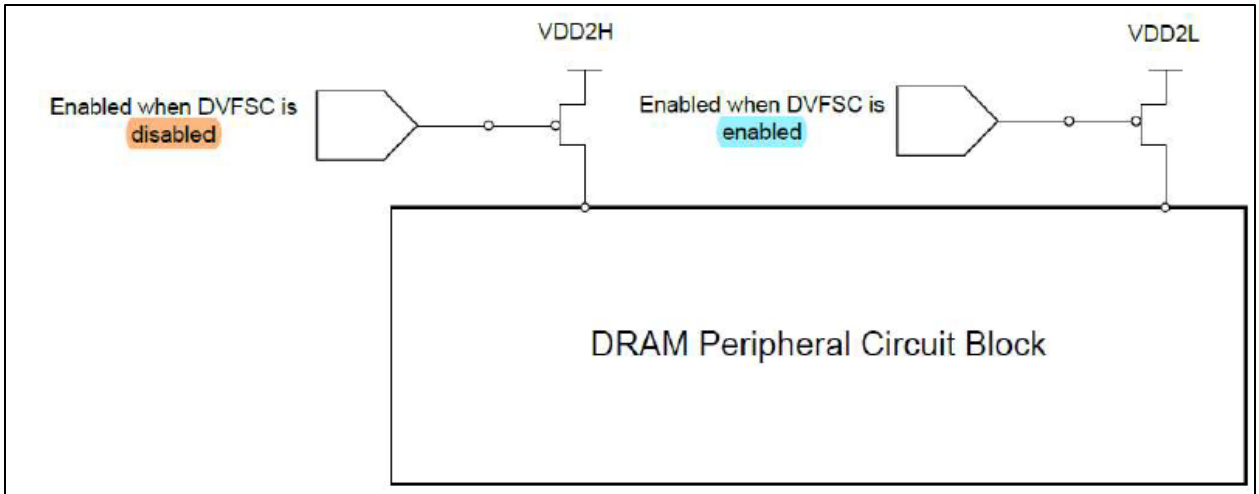
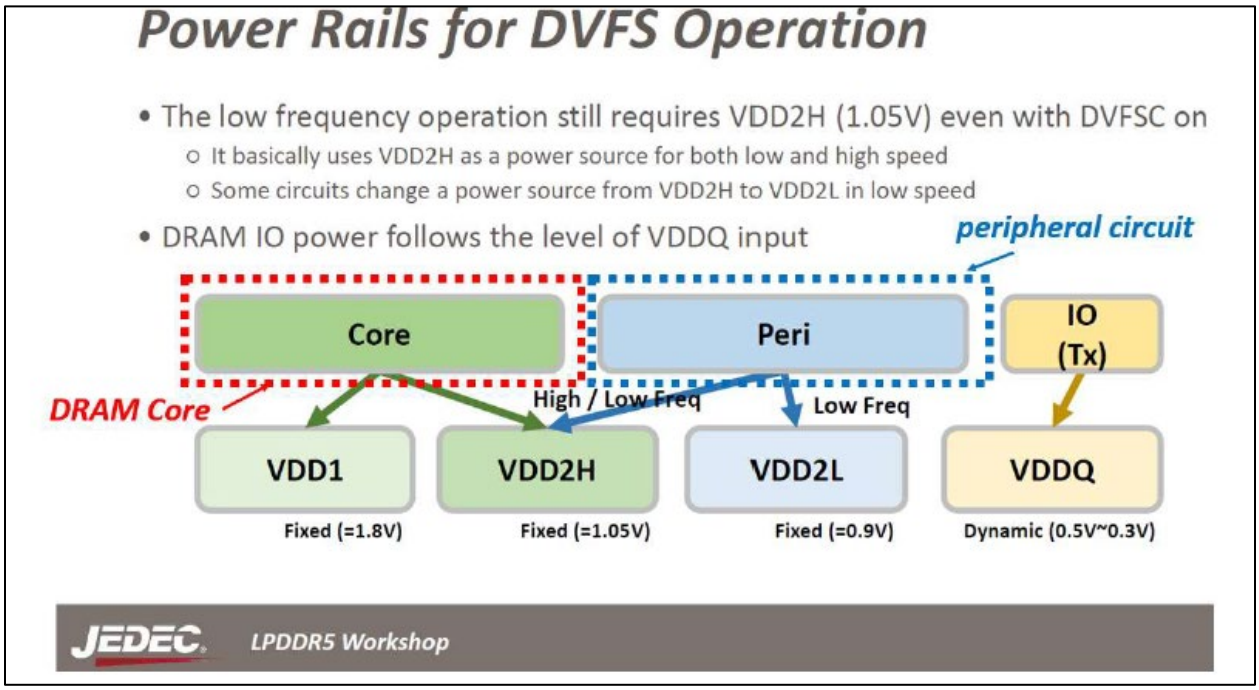


Figure 244 — Example DVFSC Block Diagram

See JESD209-5B at 416; *see also* JESD209-5C at 434.



See JEDEC LPDDR5 Workshopat 3 (annotated).

55. The Accused Products further comprise wherein the DRAM core cell and the peripheral circuit are formed on a single chip, and the peripheral circuit is external to the DRAM core cell. For example, on information and belief, DRAM core cells and the corresponding

peripheral circuits of the LPDDR5 DRAM module of the XPS 13 Plus 9320 are typically formed on a single chip module with the peripheral circuits being external to the DRAM core cells.

56. The Accused Products further comprise wherein the first voltage and the second voltage are capable of making the DRAM be applied to an embedded display port (eDP). On information and belief, the LPDDR5 DRAM module of the XPS 13 Plus 9320 may be applied to an embedded display port (eDP). On information and belief, the accused Dell devices utilize an eDP protocol at least to communicate with embedded LCD screens and external displays.

57. Dell indirectly infringes one or more claims of the ’017 Patent by knowingly and intentionally inducing others, including Dell customers and end-users of the Accused Products and products that include the Accused Products, to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States products that include infringing technology.

58. Dell indirectly infringes one or more claims of the ’017 Patent, as provided by 35 U.S.C. § 271(b), by inducing infringement by others, such as Dell’s customers and end-users, in this Judicial District and elsewhere in the United States. For example, Dell’s customers and end-users directly infringe, either literally or under the doctrine of equivalents, through their use of the inventions claimed in the ’017 Patent. Dell induces this direct infringement through affirmative acts of manufacturing, selling, distributing, and/or otherwise making available the Accused Products, and providing instructions, documentation, and other information to customers and end-users urging them to use the Accused Products in an infringing manner, including technical support, marketing, product manuals, advertisements, and online documentation. Because of Dell’s inducement, Dell’s customers and end-users use Accused Products in a way Dell intends.

Dell performs these affirmative acts with knowledge of the ’017 Patent and with the intent, or willful blindness, that the induced acts directly infringe the ’017 Patent.

59. Dell indirectly infringes one or more claims of the ’017 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement by others, such as customers and end-users, in this Judicial District and elsewhere in the United States. Dell’s affirmative acts of selling and offering to sell the Accused Products in this Judicial District and elsewhere in the United States and causing the Accused Products to be manufactured, used, sold and offered for sale contributes to others’ use and manufacture of the Accused Products, such that the ’017 Patent is directly infringed by others. The accused components within the Accused Products are material to the invention of the ’017 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by Dell to be especially made or adapted for use in the infringement of the ’017 Patent. Dell performs these affirmative acts with knowledge of the ’017 Patent and with intent, or willful blindness, that they cause the direct infringement of the ’017 Patent.

60. WeCrevention has suffered damages as a result of Defendants’ direct and indirect infringement of the ’017 Patent in an amount to be proved at trial.

COUNT III
(Infringement of the ’098 Patent)

61. Paragraphs 1 through 30 are incorporated by reference as if fully set forth herein

62. WeCrevention has not licensed or otherwise authorized Dell to make, use, offer for sale, sell, or import any products that embody the inventions of the ’098 Patent.

63. Dell has and continues to directly infringe the ’098 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making,

using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the ’098 Patent.

64. For example, Dell directly infringes at least claim 1 of the ’098 Patent by making, using, offering to sell, selling, and/or importing into the United States products that comprise A dynamic random access memory (DRAM), comprising: a DRAM core cell comprised in the DRAM, wherein the DRAM core cell is supplied with a first voltage within a first voltage range to make the DRAM core cell operate at the first voltage, and the DRAM core cell is a volatile memory cell, wherein the first voltage is lower than 1.1V; and a peripheral circuit comprised in the DRAM, wherein the peripheral circuit is electrically connected to the DRAM core cell, and the peripheral circuit is supplied with a second voltage within a second voltage range to make the peripheral circuit operate at the second voltage, wherein the second voltage is lower than 1.1V, and wherein the DRAM core cell and the peripheral circuit are formed on a single chip, and the peripheral circuit is external to the DRAM core cell, and wherein the first voltage is different from the second voltage.

65. The Accused Products include a dynamic random access memory (DRAM) powered by an external voltage source. For example, the Dell XPS 13 Plus 9320 includes a 16 GB LPDDR5 DRAM module, which is a dynamic random access memory. *See:* https://www.amazon.com/Dell-XPS-9320-Touchscreen-Thunderbolt/dp/B0C7KQRTML/.

66. The Accused Products further comprise a DRAM core cell comprised in the DRAM, wherein the DRAM core cell is supplied with a first voltage within a first voltage range to make the DRAM core cell operate at the first voltage, and the DRAM core cell is a volatile memory cell, wherein the first voltage is lower than 1.1V. *See* JESD209-5Bat Table 6; *see also* JESD209-5C at 430-439. The LPDDR5 DRAM module supports Dynamic Voltage and Frequency

Scaling (DVFS), including a DVFSC mode, which permits changes of power supply voltage to the core. JESD209-5B at 414-416; JESD209-5C at 430-439.

> "LPDDR5 Dynamic Voltage and Frequency Scaling (DVFS) consists of two modes intended to reduce the LPDRAM energy consumption. The two modes are **DVFSC (DVFS Core)** and DVFSQ (DVFS VDDQ)."

> "In DVFSC mode, when enabled by MR19 OP[1:0]=01B, the LPDRAM may operate internal circuitry from either the **VDD2H rail or the VDD2L rail**."

Source: *See* JESD209-5B at 414 (emphasis added); *see also* JESD209-5C at 430.

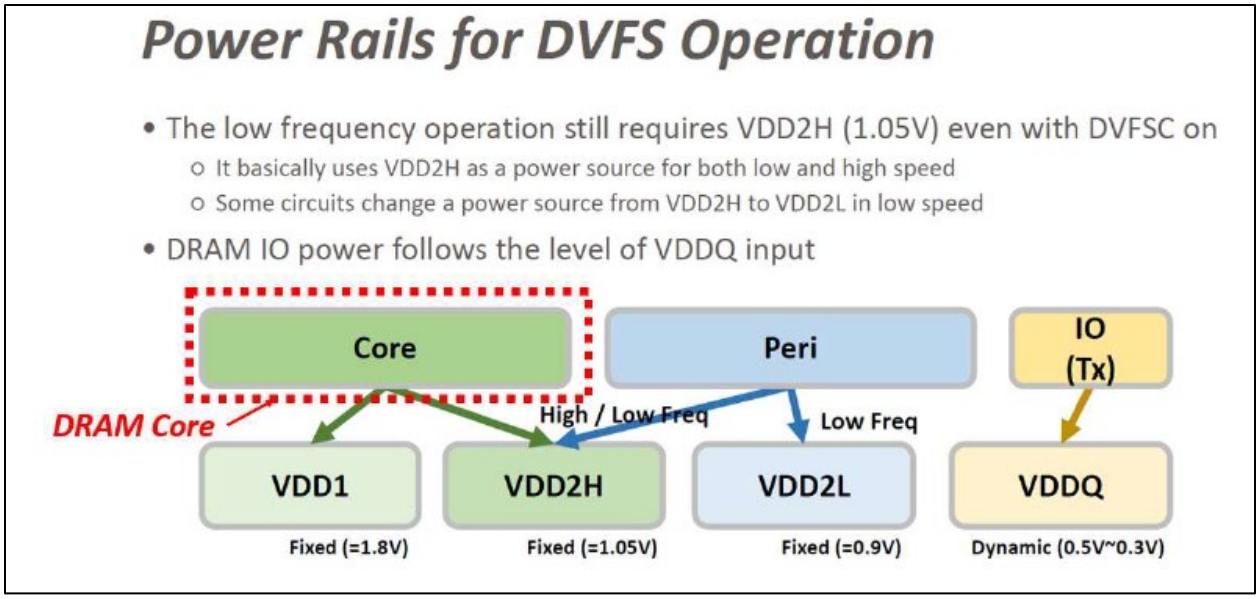
67. When DVFSC mode is enabled, the LPDDR5 DRAM module is controllable via the Alder Lake to operate certain circuitry of the module from either the VDD2H or the VDD2L rail. Voltage ranges for the two rails are shown below.

11.1 Recommended DC Operating Conditions

Table 396 — Recommended Voltage o

			Low Freq Voltage Spec Freq:DC to 2 MHz			
DRAM	Symbol		Min	Typ	Max	Unit
Core 1 Power	VDD1		1.7	1.8	1.95	V
Core 2 Power/Input Buffer Power	VDD2H		1.01	1.05	1.12	V
	VDD2L	Single Core Power Rail (MR13 OP[7]=1_B)	1.01	1.05	1.12	V
		Dual Core Power Rail (MR13 OP[7]=0_B)	0.87	0.9	0.97	
I/O Buffer Power	VDDQ	SPEC Range-1	0.47	0.5	0.57	V
		Spec Range-2	0.27	0.3	0.37	V
		Allowable Range	0.27	N/A	0.57	V

See JESD209-5B at Table 396 (annotated); *see also* JESD209-5C at Table 408. However, even when the LPDDR5 DRAM module is operated in the low frequency/power mode, VDD2H still provides power to certain critical circuitry of the DRAM core.



See LPDDR5 Workshop at 3 (annotated).

68. The Accused Products further include a peripheral circuit comprised in the DRAM, wherein the peripheral circuit is electrically connected to the DRAM core cell, and the peripheral circuit is supplied with a second voltage within a second voltage range to make the peripheral circuit operate at the second voltage, wherein the second voltage is lower than 1.1V. For example, the LPDDR5 DRAM module of the XPS 13 Plus 9320 includes buffers and other data path circuits (*i.e.*, peripheral circuits) connected to the DRAM core cell of the module. When the DVFSC mode is enabled, power is supplied to the peripheral circuits via VDD2H or VDD2L, both of which are typically below 1.1V. *See* JESD209-5B at Table 396; *see also* JESD209-5C at Table 408.

69. The Accused Products further comprise wherein the DRAM core cell and the peripheral circuit are formed on a single chip, and the peripheral circuit is external to the DRAM core cell, and wherein the first voltage is different from the second voltage. On information and belief, the DRAM core cell and peripheral circuits of the LPDDR5 DRAM module of the XPS 13 Plus 9320 are formed on a single chip, with the peripheral circuit being external to the DRAM core cell, and wherein the first voltage is different from the second voltage. For example, when DVFSC

mode is enabled and the LPDDR5 DRAM module is operated in a low frequency/power mode, a first voltage VDD2H supplied to certain portions of the core is different from a second voltage VDD2L supplied to the peripheral circuit.

70. Dell indirectly infringes one or more claims of the ’098 Patent by knowingly and intentionally inducing others, including Dell customers and end-users of the Accused Products and products that include the Accused Products, to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States products that include infringing technology.

71. Dell indirectly infringes one or more claims of the ’098 Patent, as provided by 35 U.S.C. § 271(b), by inducing infringement by others, such as Dell’s customers and end-users, in this Judicial District and elsewhere in the United States. For example, Dell’s customers and end-users directly infringe, either literally or under the doctrine of equivalents, through their use of the inventions claimed in the ’098 Patent. Dell induces this direct infringement through affirmative acts of manufacturing, selling, distributing, and/or otherwise making available the Accused Products, and providing instructions, documentation, and other information to customers and end-users urging them to use the Accused Products in an infringing manner, including technical support, marketing, product manuals, advertisements, and online documentation. Because of Dell’s inducement, Dell’s customers and end-users use Accused Products in a way Dell intends. Dell performs these affirmative acts with knowledge of the ’098 Patent and with the intent, or willful blindness, that the induced acts directly infringe the ’098 Patent.

72. Dell indirectly infringes one or more claims of the ’098 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement by others, such as customers and end-users, in this Judicial District and elsewhere in the United States. Dell’s affirmative acts of selling

and offering to sell the Accused Products in this Judicial District and elsewhere in the United States and causing the Accused Products to be manufactured, used, sold and offered for sale contributes to others' use and manufacture of the Accused Products, such that the '098 Patent is directly infringed by others. The accused components within the Accused Products are material to the invention of the '098 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by Dell to be especially made or adapted for use in the infringement of the '098 Patent. Dell performs these affirmative acts with knowledge of the '098 Patent and with intent, or willful blindness, that they cause the direct infringement of the '098 Patent.

73. WeCrevention has suffered damages as a result of Defendants' direct and indirect infringement of the '098 Patent in an amount to be proved at trial.

COUNT IV
(Infringement of the '652 Patent)

74. Paragraphs 1 through 30 are incorporated by reference as if fully set forth herein.

75. WeCrevention has not licensed or otherwise authorized Dell to make, use, offer for sale, sell, or import any products that embody the inventions of the '652 Patent.

76. Dell has and continues to directly infringe the '652 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '652 Patent.

77. For example, Dell directly infringes at least claim 1 of the '652 Patent by making, using, offering to sell, selling, and/or importing into the United States products that comprise a dynamic random access memory (DRAM), comprising: a DRAM core cell comprised in the DRAM, wherein the DRAM core cell is supplied with a first voltage within a first voltage range

to make the DRAM core cell operate at the first voltage, and the DRAM core cell is a volatile memory cell, wherein the first voltage is lower than 1.1V; and an input/output circuit comprised in the DRAM, wherein the input/output circuit is electrically connected to the DRAM core cell, and the input/output circuit is supplied with a third voltage to make the input/output circuit operate at the third voltage, wherein the third voltage is lower than 1.1V, and wherein the DRAM core cell and the input/output circuit are formed on a single chip, the input/output circuit is external to the DRAM core cell, and the first voltage is different from the third voltage.

78. The Accused Products include a dynamic random access memory (DRAM) powered by an external voltage source. For example, Dell XPS 13 Plus 9320 includes a 16 GB LPDDR5 DRAM module, which is a dynamic random access memory. *See* https://www.amazon.com/Dell-XPS-9320-Touchscreen -Thunderbolt/dp/B0C7KQRTML/.

79. The Accused Products further include a DRAM core cell comprised in the DRAM, wherein the DRAM core cell is supplied with a first voltage within a first voltage range to make the DRAM core cell operate at the first voltage, and the DRAM core cell is a volatile memory cell, wherein the first voltage is lower than 1.1V. *See* JESD209-5B at Table 6; *see also* JESD209-5C at 430-439. For example, the LPDDR5 DRAM module of the XPS 13 Plus 9320 includes multiple volatile DRAM memory core cells. The LPDDR5 DRAM module supports a DVFSC mode, which permits the IMC of the Adler Lake to change the power supply voltage to the peripheral circuitry and certain portions of the core of the module. *See* JESD209-5B at 414-416; *see also* JESD209-5C at 430-439.

> "LPDDR5 Dynamic Voltage and Frequency Scaling (DVFS) consists of two modes intended to reduce the LPDRAM energy consumption. The two modes are **DVFSC (DVFS Core)** and DVFSQ (DVFS VDDQ)."

> "In DVFSC mode, when enabled by MR19 OP[1:0]=01B, the LPDRAM may operate internal circuitry from either the **VDD2H rail or the VDD2L rail**."

See JESD209-5B at 414 (emphasis added); *see also* JESD209-5C at 430.

80. When DVFSC mode is enabled, the LPDDR5 DRAM module is controllable via the Alder Lake to operate certain circuitry of the module from either the VDD2H or the VDD2L rail. Voltage ranges for the two rails are shown below.

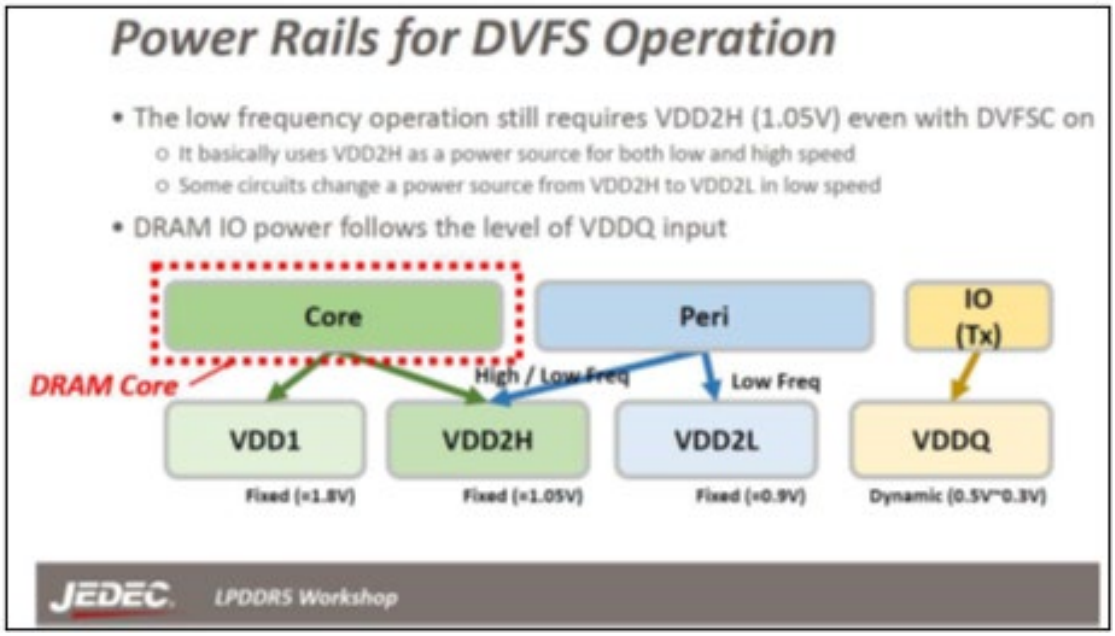
11.1 Recommended DC Operating Conditions

Table 396 — Recommended Voltage o

			Low Freq Voltage Spec Freq:DC to 2 MHz			
DRAM	Symbol		Min	Typ	Max	Unit
Core 1 Power	VDD1		1.7	1.8	1.95	V
Core 2 Power/Input Buffer Power	VDD2H		1.01	1.05	1.12	V
	VDD2L	Single Core Power Rail (MR13 OP[7]=1_B)	1.01	1.05	1.12	V
		Dual Core Power Rail (MR13 OP[7]=0_B)	0.87	0.9	0.97	
I/O Buffer Power	VDDQ	SPEC Range-1	0.47	0.5	0.57	V
		Spec Range-2	0.27	0.3	0.37	V
		Allowable Range	0.27	N/A	0.57	V

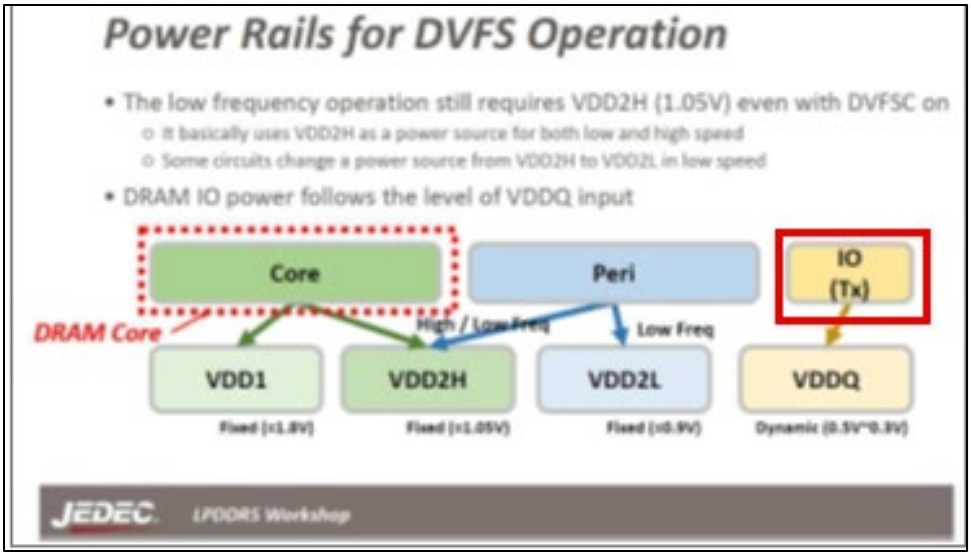
See JESD209-5B at Table 396 (annotated); *see also* JESD209-5C at Table 408.

81. However, even when the LPDDR5 DRAM is operated in the low frequency/power mode, VDD2H still provides power to certain critical circuitry of the DRAM core.



See LPDDR5 Workshop at 3 (annotated).

82. The Accused Products further comprise an input/output circuit comprised in the LPDDR5 DRAM module, wherein the input/output circuit is electrically connected to the DRAM core cell, and the input/output circuit is supplied with a third voltage to make the input/output circuit operate at the third voltage, wherein the third voltage is lower than 1.1V. For example, the LPDDR5 DRAM module includes an I/O circuit (an "an input/output circuit") that is electrically connected to the DRAM core cell which operates a voltage lower than 1.1 V, (*i.e.*, VDDQ), as shown below.



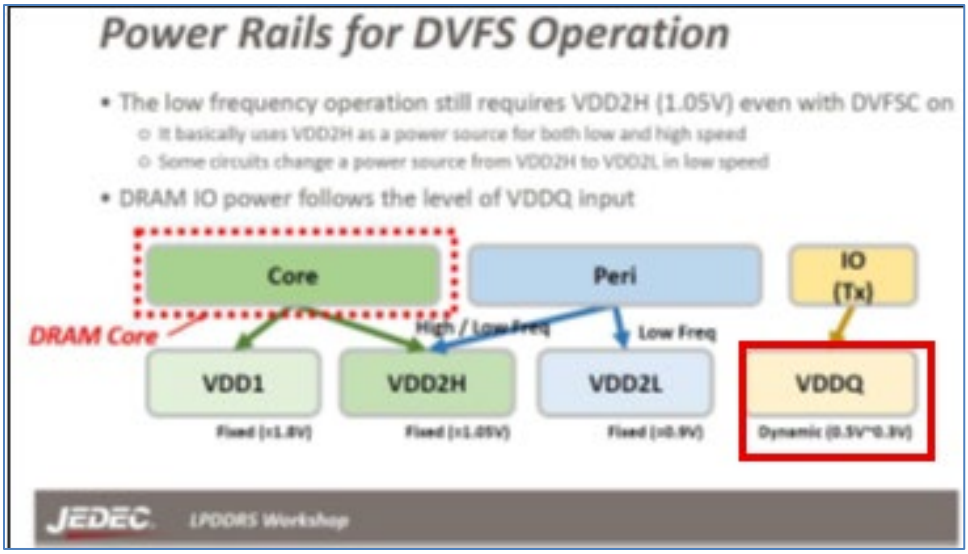
See LPDDR5 Workshop at 3 (annotated).

11.1 Recommended DC Operating Conditions

Table 396 — Recommended Voltage o

			Low Freq Voltage Spec Freq:DC to 2 MHz			
DRAM	Symbol		Min	Typ	Max	Unit
Core 1 Power	VDD1		1.7	1.8	1.95	V
Core 2 Power/Input Buffer Power	VDD2H		1.01	1.05	1.12	V
	VDD2L	Single Core Power Rail (MR13 OP[7]=1_B)	1.01	1.05	1.12	V
		Dual Core Power Rail (MR13 OP[7]=0_B)	0.87	0.9	0.97	
I/O Buffer Power	VDDQ	SPEC Range-1	0.47	0.5	0.57	V
		Spec Range-2	0.27	0.3	0.37	V
		Allowable Range	0.27	N/A	0.57	V

See JESD209-5B at Table 396 (annotated via red box); *see also* JESD209-5C at Table 408.



See LPDDR5 Workshop at 3 (annotated).

83. The Accused Products further comprise wherein the DRAM core cell and the input/output circuit are formed on a single chip, the input/output circuit is external to the DRAM core cell, and the first voltage is different from the third voltage. For example, on information and belief, DRAM core cells and I/O circuits of the LPDDR5 DRAM module of the XPS 13 Plus 9320 are formed on a single chip with the I/O circuits being external to the DRAM core cell. The DRAM core cells have different power supply rails (*e.g.*, VDD1, VDD2H, VDD2L) that are separate and distinct from the I/O circuit (*i.e.*, VDDQ).

11.1 Recommended DC Operating Conditions

Table 396 — Recommended Voltage o

			Low Freq Voltage Spec Freq:DC to 2 MHz			
DRAM	Symbol		Min	Typ	Max	Unit
Core 1 Power	VDD1		1.7	1.8	1.95	V
Core 2 Power/Input Buffer Power	VDD2H		1.01	1.05	1.12	V
	VDD2L	Single Core Power Rail (MR13 OP[7]=1_B)	1.01	1.05	1.12	V
		Dual Core Power Rail (MR13 OP[7]=0_B)	0.87	0.9	0.97	
I/O Buffer Power	VDDQ	SPEC Range-1	0.47	0.5	0.57	V
		Spec Range-2	0.27	0.3	0.37	V
		Allowable Range	0.27	N/A	0.57	V

See JESD209-5B at Table 396 (annotated via red box); *see also* JESD209-5C at Table 408.

84. Further, the DRAM core cell operates at a first voltage lower than 1.1V (*e.g.*, VDD2H = 1.05V or VDD2L = 0.9V) and the I/O circuit operates at a third voltage lower than 1.1V (*e.g.*, VDDQ at 0.3–0.5V). Thus, the first voltage is different from the third voltage. *See* JESD209-5B at 414-416; *see also* JESD209-5C at 430-439 and Table 408.

85. Dell indirectly infringes one or more claims of the ’652 Patent by knowingly and intentionally inducing others, including Dell customers and end-users of the Accused Products and products that include the Accused Products, to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States products that include infringing technology.

86. Dell indirectly infringes one or more claims of the ’652 Patent, as provided by 35 U.S.C. § 271(b), by inducing infringement by others, such as Dell’s customers and end-users, in this Judicial District and elsewhere in the United States. For example, Dell’s customers and end-

users directly infringe, either literally or under the doctrine of equivalents, through their use of the inventions claimed in the ’652 Patent. Dell induces this direct infringement through affirmative acts of manufacturing, selling, distributing, and/or otherwise making available the Accused Products, and providing instructions, documentation, and other information to customers and end-users urging them to use the Accused Products in an infringing manner, including technical support, marketing, product manuals, advertisements, and online documentation. Because of Dell’s inducement, Dell’s customers and end-users use Accused Products in a way Dell intends. Dell performs these affirmative acts with knowledge of the ’652 Patent and with the intent, or willful blindness, that the induced acts directly infringe the ’652 Patent.

87. Dell indirectly infringes one or more claims of the ’652 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement by others, such as customers and end-users, in this Judicial District and elsewhere in the United States. Dell’s affirmative acts of selling and offering to sell the Accused Products in this Judicial District and elsewhere in the United States and causing the Accused Products to be manufactured, used, sold and offered for sale contributes to others’ use and manufacture of the Accused Products, such that the ’652 Patent is directly infringed by others. The accused components within the Accused Products are material to the invention of the ’652 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by Dell to be especially made or adapted for use in the infringement of the ’652 Patent. Dell performs these affirmative acts with knowledge of the ’652 Patent and with intent, or willful blindness, that they cause the direct infringement of the ’652 Patent.

88. WeCrevention has suffered damages as a result of Defendants’ direct and indirect infringement of the ’652 Patent in an amount to be proved at trial.

COUNT V
(Infringement of the ’942 Patent)

89. Paragraphs 1 through 30 are incorporated by reference as if fully set forth herein

90. WeCrevention has not licensed or otherwise authorized Dell to make, use, offer for sale, sell, or import any products that embody the inventions of the ’942 Patent.

91. Dell has and continues to directly infringe the ’942 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the ’942 Patent.

92. For example, Dell directly infringes at least claim 19 of the ’942 Patent by making, using, offering to sell, selling, and/or importing into the United States products that comprise an electronics system device with a high speed memory chip module, the device comprising: an ASIC processor; a type of memory cell array group, wherein the type of memory cell array group comprises multiple memory cell array ICs, each of the memory cell array ICs has an (I/O) data bus; and a logic unit for accessing the type of memory cell array group through a first transmission bus, wherein the first transmission bus is used for transmitting a first set of parallel data along with the memory cell array ICs, and bus width of the first transmission bus is wider than bus width of an (I/O) data bus of each of the memory cell array ICs, wherein the logic unit is further used for converting the first set of parallel data of the first transmission bus into a second set of parallel data through a second transmission bus, and transmits the second set of parallel data to the ASIC processor; wherein the ASIC processor executes a predetermined function corresponding to the second set of parallel data while the ASIC processor is under operating condition, wherein bit width of the first set and the second set of parallel data are different.

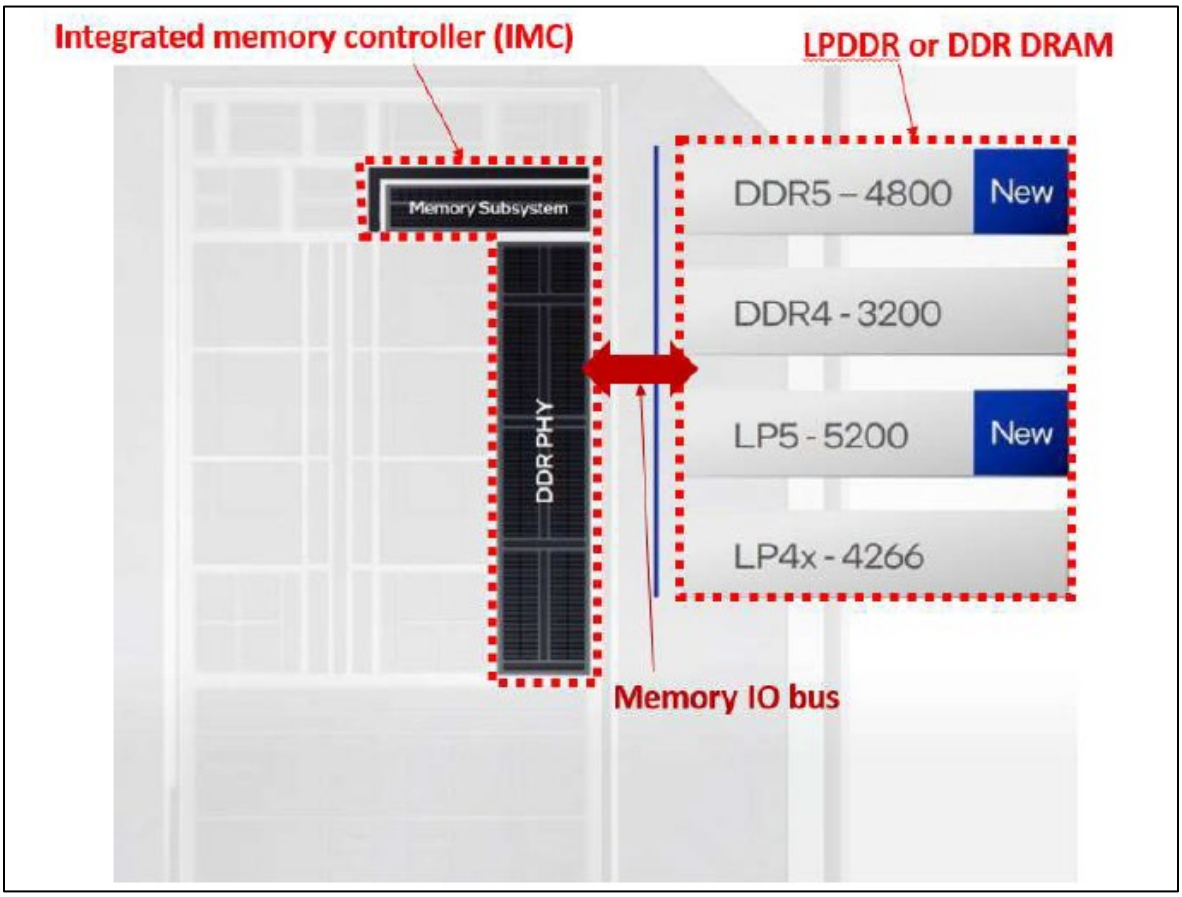
93. The Accused Products comprise an electronics system device with a high speed memory chip module. For example, the Dell XPS 13 Plus 9320 is a laptop (*i.e.*, an electronics system device), which has an Alder Lake processor and a 16 GB LPDDR5 DRAM module (*i.e.*, high speed memory chip module). *See:* https://www.amazon.com/Dell-XPS-9320-Touchscreen-Thunderbolt/dp/B0C7KQRTML/.

94. The Accused Products further include an ASIC processor. For example, Dell's XPS 13 Plus 9320 includes an ASIC processor having at least P-Cores for performance, E-Cores for Efficiency, and a graphics core. *See* https://www.intel.com/content/www/us/en/content-details/655258/12th-generation-intel-core-processors-datasheet-volume-1-of-2.html at 13-16.

95. On information and belief, the Accused Products further comprise a type of memory cell array group, wherein the type of memory cell array group comprises multiple memory cell array ICs, each of the memory cell array ICs has an (I/O) data bus. For example, on information and belief, the Dell XPS 13 Plus 9320 includes a 16 GB LPDDR5 DRAM module having a memory cell array group while multiple memory cell array ICs each of which has an (I/O) data bus. The memory cell array ICs and their (I/O) data busses are organized to produce a combined x128 data bus across two channels (x64 width per channel). *See* https://i.dell.com/sites/csdocuments/Corporate_corp-Comm_Documents/en/dell-suppliers.pdf; *See also* https://semiconductor.samsung.com/dram/lpddr/lpddr5/k3lk2k20cm-jhcp/.

96. Further, JEDEC-compliant LPDDR5 DRAM devices expose per-die/per-channel I/O buses, which are typically x16 bit per channel. *See* https://www.synopsys.com/articles/key-features-about-lpddr5.html; *see also* https://www.systemverilog.io/design/lpddr5-tutorial-physical-structure/.

97. On information and belief, the Accused Products further comprise a logic unit for accessing the type of memory cell array group through a first transmission bus, wherein the first transmission bus is used for transmitting a first set of parallel data along with the memory cell array ICs, and bus width of the first transmission bus is wider than bus width of an (I/O) data bus of each of the memory cell array ICs, wherein the logic unit is further used for converting the first set of parallel data of the first transmission bus into a second set of parallel data through a second transmission bus, and transmits the second set of parallel data to the ASIC processor . For example, the IMC of the Alder Lake accesses the LPDDR5 DRAM module of the XPS 13 Plus 9320 via a first transmission bus used for transmitting a first set of parallel data. The IMC also communicates with the ASIC processor of the Adler Lake via a second data bus used for transmitting a second set of parallel data.



See https://medium.com/intel-tech/alder-lake-introduces-a-new-client-soc-architecture-that-scales-from-powerful-desktops-to-baf2533c6326 (annotated).

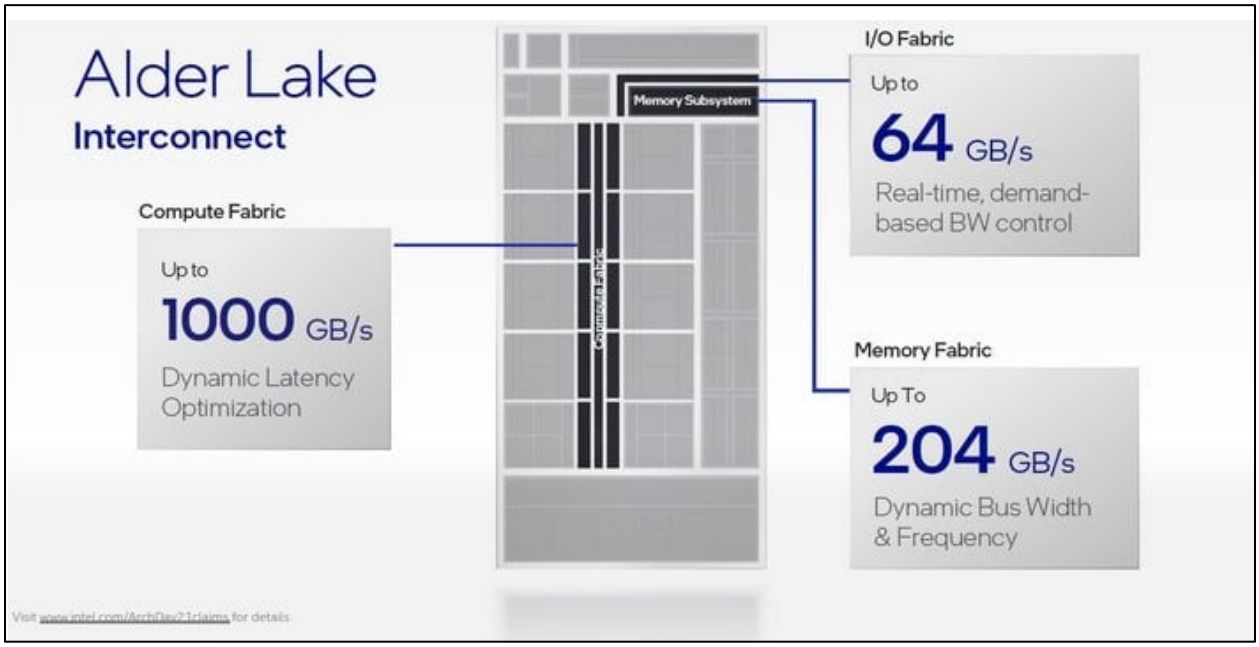
98. Furthermore, the IMC is located between the processor cores of the ASIC and the LPDDR5 DRAM module, as shown above.

99. Furthermore, on information and belief, the bus width of the first transmission bus (*i.e.*, up to x128 dual channel) is wider than bus width of an (I/O) data bus of each of the memory cell array ICs. Upon information and belief, the LPDDR5 DRAM module of the XPS 13 Plus 9320 is constructed from multiple banks and memory dies (i.e., memory cell arrays), each of which communicates over an (I/O) data bus. The (I/O) data busses of multiple banks and dies are combined to form each of the two x64 width channels for communication over the first transmission bus. *See* https://edc.intel.com/content/www/br/pt/design/ipla/software-development-platforms/client/platforms/alder-lake-desktop/12th-generation-intel-core-processors-datasheet-volume-1-of-2/010/introduction/#:~:text=LPDDR5%20DC%20Specification-,Introduction,package%20as%20the%20processor%20die; *see also* https://www.synopsys.com/articles/key-features-about-lpddr5.html; *see* https://www.systemverilog.io/design/lpddr5-tutorial-physical-structure/#:~:text=%F0%9F%A4%94,choose%20depends%20on%202%20factors.

100. Furthermore, on information and belief, the IMC converts the first set of parallel data of the first transmission bus into a second set of parallel data through the second transmission bus.

101. On information and belief, the Accused Products further comprise wherein the ASIC processor executes a predetermined function corresponding to the second set of parallel data while the ASIC processor is under operating condition, wherein bit width of the first set and the

second set of parallel data are different. On information and belief, the Alder Lake is an ASIC that executes predetermined functions corresponding to second sets of parallel data. For example, the Alder Lake performs predetermined functions while the ASIC processor is under certain operating conditions (*e.g.*, camera ISP, GPU rendering, Neural Engine inference) using data fetched from the LPDDR5 DRAM module. Further, on information and belief, the width of the first set of parallel data (*i.e.*, x128 dual channel) and the second set of parallel data (*e.g.*, x128/256 on AXI) are different.



See https://hothardware.com/reviews/intel-architecture-day-2021.

102. Dell indirectly infringes one or more claims of the '942 Patent by knowingly and intentionally inducing others, including Dell customers and end-users of the Accused Products and products that include the Accused Products, to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States products that include infringing technology.

103. Dell indirectly infringes one or more claims of the ’942 Patent, as provided by 35 U.S.C. § 271(b), by inducing infringement by others, such as Dell’s customers and end-users, in this Judicial District and elsewhere in the United States. For example, Dell’s customers and end-users directly infringe, either literally or under the doctrine of equivalents, through their use of the inventions claimed in the ’942 Patent. Dell induces this direct infringement through affirmative acts of manufacturing, selling, distributing, and/or otherwise making available the Accused Products, and providing instructions, documentation, and other information to customers and end-users urging them to use the Accused Products in an infringing manner, including technical support, marketing, product manuals, advertisements, and online documentation. Because of Dell’s inducement, Dell’s customers and end-users use Accused Products in a way Dell intends. Dell performs these affirmative acts with knowledge of the ’942 Patent and with the intent, or willful blindness, that the induced acts directly infringe the ’942 Patent.

104. Dell indirectly infringes one or more claims of the ’942 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement by others, such as customers and end-users, in this Judicial District and elsewhere in the United States. Dell’s affirmative acts of selling and offering to sell the Accused Products in this Judicial District and elsewhere in the United States and causing the Accused Products to be manufactured, used, sold and offered for sale contributes to others’ use and manufacture of the Accused Products, such that the ’942 Patent is directly infringed by others. The accused components within the Accused Products are material to the invention of the ’942 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by Dell to be especially made or adapted for use in the infringement of the ’942 Patent. Dell performs these affirmative acts with knowledge of the

’942 Patent and with intent, or willful blindness, that they cause the direct infringement of the ’942 Patent.

105. WeCrevention has suffered damages as a result of Defendants’ direct and indirect infringement of the ’942 Patent in an amount to be proved at trial.

DEMAND FOR JURY TRIAL

Plaintiff hereby demands a jury for all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, WeCrevention prays for relief against Dell as follows:

a. Entry of judgment declaring that Defendants have directly and/or indirectly infringed one or more claims of the Patents-in-Suit;

b. Entry of judgment declaring that Defendants’ infringement of the Patents-in-Suit is willful;

c. An order awarding damages sufficient to compensate WeCrevention for Defendants’ infringement of the Patents-in-Suit, but in no event less than a reasonable royalty, together with pre-judgment and post-judgment interest and costs;

d. Entry of judgment declaring that this case is exceptional and awarding WeCrevention its costs and reasonable attorneys’ fees under 35 U.S.C. § 285;

e. An accounting for acts of infringement;

f. Such other equitable relief which may be requested and to which the Plaintiff is entitled; and

g. Such other and further relief as the Court deems just and proper.

Dated: October 10, 2025

Respectfully submitted,

/s/Alfred R. Fabricant

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