

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

DAEDALUS PRIME LLC,  
*Plaintiff,*

v.

SAMSUNG ELECTRONICS CO., LTD.,  
SAMSUNG ELECTRONICS AMERICA, INC.,  
SAMSUNG SEMICONDUCTOR, INC., and  
SAMSUNG AUSTIN SEMICONDUCTOR, LLC,  
*Defendants.*

Civil Action No. 2:22cv354

**JURY TRIAL DEMANDED**

**COMPLAINT FOR PATENT INFRINGEMENT AND DAMAGES  
AND DEMAND FOR JURY TRIAL**

Plaintiff Daedalus Prime LLC (“Daedalus” or “Plaintiff”) files this Complaint for Patent Infringement and Damages against Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., Samsung Semiconductor, Inc., and Samsung Austin Semiconductor, LLC (collectively, “Samsung” or “Defendants”) and alleges as follows:

**INTRODUCTION**

1. The novel inventions disclosed in U.S. Patent Nos. 9,996,135 (the “135 Patent”); 10,705,960 (the “960 Patent”); 10,372,197 (the “197 Patent”); 9,887,838 (the “838 Patent”); 8,359,629 (the “629 Patent”) and 9,432,840 (the “840 Patent”) (collectively, the “Asserted Patents”) in this matter were invented by Intel Corporation (“Intel”). Intel pioneered the field of microprocessor and semiconductor chip technology. This technology provides capabilities that are crucial to electronic devices such as personal computers and smart phones. Every year, Intel spends billions of dollars on research and development to invent, market, and sell new technology, and

Intel obtains patents on many of the novel inventions that come out of that work, including the Asserted Patents.

### **THE PARTIES**

2. Plaintiff is the current owner and assignee of the Asserted Patents.

3. Plaintiff is a Delaware limited liability company with its principal place of business located at 51 Pondfield Road, Suite 3, Bronxville, NY 10708.

4. On information and belief, Defendant Samsung Electronics Co., Ltd. (“SEC”) is a company organized and existing under the laws of the Republic of Korea, with its principal place of business located at 129 Samsung-Ro, Yeongtong-Gu, Suwon-Shi, Gyeonggi-Do, 16677, Republic of Korea. SEC’s Information Technology & Mobile Communications division is responsible for the design, manufacture, and sale of mobile devices, such as smartphones, and related software, applications, and payment services that operate on cellular networks around the world and in the United States.

5. On information and belief, Defendant Samsung Electronics America, Inc. (“SEA”) is a corporation organized and existing under the laws of the State of New York with its principal place of business at 85 Challenger Road, Ridgefield Park, New Jersey 07660. On information and belief, SEA is a wholly owned subsidiary of SEC. SEA has a business location in this District at 6625 Excellence Way, Plano, Texas 75023. Defendant SEA may be served at least via its registered agent for service of process in Texas, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

6. On information and belief, Defendant Samsung Semiconductor, Inc. (“SSI”) is a corporation organized and existing under the laws of the State of California with its principal place of business at 3655 North First Street, San Jose, California 95134. On information and belief, SSI

is a wholly owned subsidiary of SEA, and SSI, collectively with SEC, operates the Device Solutions division, which is involved in the design, manufacture, use, offering for sale and/or sales of certain semiconductor products. On information and belief, Defendant SSI has a research center and manufacturing facility located at 3900 San Clemente, Suite 300, North Capital of Texas Highway, Austin, Texas, 78746, and maintains facilities at 6625 Excellence Way, Plano, Texas 75023. Defendant SSI may be served at least via its registered agent for service of process in Texas, National Registered Agents, Inc., 1999 Bryan St., Suite 900, Dallas, Texas 75201.

7. On information and belief, Defendant Samsung Austin Semiconductor, LLC (“SAS”) is a limited liability company organized and existing under the laws of Delaware, with its principal place of business at 12100 Samsung Boulevard, Austin, Texas 78754. On information and belief, SAS is a wholly owned subsidiary of SSI. Defendant SAS may be served at least via its registered agent for service of process in Texas, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

8. On information and belief, Defendants directly and/or indirectly develop, design, manufacture, distribute, market, offer to sell and/or sell infringing products and services in the United States, including in the Eastern District of Texas, and otherwise direct infringing activities to this District in connection with their products and services as set forth in this Complaint.

### **JURISDICTION**

9. This civil action arises under the Patent Laws of the United States, 35 U.S.C. § 1 *et seq.*, including without limitation 35 U.S.C. §§ 271, 281, 283, 284, and 285. Accordingly, this Court has subject matter jurisdiction under, *inter alia*, 28 U.S.C. §§ 1331 and 1338(a).

10. This District has general and specific personal jurisdiction over Defendants because Defendants have committed acts, directly or through intermediaries, in this District, giving rise to

this action; are present in and transact and conduct business in this District and the State of Texas; and transact and conduct business with residents of this District and the State of Texas.

11. Plaintiff's causes of action arise, at least in part, from Defendants' contacts with and activities in this District and the State of Texas.

12. Defendants have infringed the Asserted Patents within this District and the State of Texas by making, using, selling, offering for sale, and/or importing in or into this District and elsewhere in the State of Texas, products that infringe the Asserted Patents. Defendants, directly and through intermediaries, make, use, sell, offer for sale, import, ship, distribute, advertise, promote, and/or otherwise commercialize such infringing products in or into this District and the State of Texas. Defendants regularly conduct and solicit business in, engage in other persistent courses of conduct in, and/or derive substantial revenue from goods and services provided to residents of this District and the State of Texas.

13. This Court has personal jurisdiction over Defendants pursuant to TEX. CIV. PRAC. & REM. CODE § 17.041 *et seq.*

14. Personal jurisdiction exists over Defendants because Defendants have minimum contacts with this forum as a result of business regularly conducted within this District and the State of Texas, and, on information and belief, specifically as a result of, at least, committing the tort of patent infringement within this District and the State of Texas.

15. This Court also has personal jurisdiction over Defendants, in part, because Defendants each do continuous and systematic business in this District, including by providing infringing products and services to the residents of this District that Defendants knew would be used within this District, and by soliciting business from the residents of this District.

16. For example, Defendants are subject to personal jurisdiction in this Court because, *inter alia*, Defendants through agents regularly solicit and transact business in this District and have an established place of business in this District. Accordingly, this Court's jurisdiction over the Defendants comports with the constitutional standards of fair play and substantial justice and arises directly from Defendants' purposeful minimum contacts with the State of Texas.

17. This Court also has personal jurisdiction over Defendants because Defendants have made their products available for, at least, purchase and use within this District.

18. Venue is proper in this Court under 28 U.S.C. §§ 1391 and 1400(b) because each Defendant is subject to personal jurisdiction in this Judicial District and has committed acts of infringement in this Judicial District. Each Defendant, through its own acts and/or through the acts of each other Defendant acting as its agent, representative, or alter ego, makes uses, sells, offers to sell, and/or imports infringing products within this Judicial District, has a continuing presence within the Judicial District, and has the requisite minimum contacts with the Judicial District such that this is a fair and reasonable venue.

19. For example, on information and belief, SEA maintains a regular and established place of business in this judicial district at 6625 Excellence Way, Plano, Texas 75023 and has committed acts of infringement in this District. Further, on information and belief, SEC directs and controls the actions of SEA such that it too maintains a regular and established place of business in this judicial district at 6625 Excellence Way, Plano, Texas 75023 and has committed acts of infringement in this District.

20. Additionally, venue is proper as to SEC, a foreign corporation, because suits against foreign entities are proper in any judicial district under 28 U.S.C. § 1391(c)(3).

21. Defendants have not contested proper venue and exercise of personal jurisdiction in this District for patent infringement in actions in the past. *See, e.g.*, Answer, ¶¶ 13, 18, *Cal. Inst. Tech v. Samsung Elecs. Co., Ltd. et al.*, No. 2:21-cv-00446, Dkt. 19 (E.D. Tex. Apr. 5, 2022); Answer to Amended Complaint, ¶¶ 6, 7, *Jawbone Innovations, LLC v. Samsung Elecs. Co., Ltd. et al.*, No. 2:21-cv-00186, Dkt. 27 (E.D. Tex. Dec. 9, 2021).

### **THE ASSERTED PATENTS**

22. The Intel inventions contained in the Asserted Patents in this case relate to groundbreaking improvements to microprocessor circuitry and mobile wireless, and have particular application in consumer electronics such as smart phones, tablets, and personal computers.

### **U.S PATENT NO. 9,996,135**

23. On August 27, 2019, the United States Patent Office duly and legally issued the '135 Patent, entitled "Controlling Operating Voltage of a Processor." A true and correct copy of the '135 Patent is attached hereto as **Exhibit 1**.

24. Daedalus is the owner and assignee of all right, title, and interest in and to the '135 Patent, including the right to assert all causes of action arising under the '135 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

25. The '135 Patent describes, among other things, processors having a core domain with a plurality of cores and a power controller having a first logic to receive a first request to increase an operating voltage of the first core of the core domain to a second voltage, to instruct a voltage regulator to increase the operating voltage to an interim voltage, and to thereafter instruct the voltage regulator to increase the operating voltage to the second voltage. '135 Patent, Abstract. As the '135 Patent explains, "as the density of integrated circuits has grown, the power

requirements for computing systems (from embedded systems to servers) have also escalated. Furthermore, software inefficiencies, and its requirements of hardware, have also caused an increase in computing device energy consumption.” *Id.* at 1:26–32.

26. The novel features of the invention are recited in the claims. For example, claim 1 of the ’135 Patent recites:

A processor comprising:

a plurality of cores; and

a power controller including a control logic to receive a first request to increase an operating voltage to be provided to a first core to a second voltage and, responsive to the first request, cause a voltage regulator to increase the operating voltage to an interim voltage, thereafter enable a second core to exit an inactive state and enter an active state, and thereafter enable an operating frequency of the first core to be increased.

’135 Patent, Claim 1.

27. Figure 1 of the ’135 Patent, reproduced below, shows a block diagram of a portion of a system designed in accordance with the claimed invention. As shown in Figure 1, the system 100 may include various components, including a processor 110 which as shown is a multicore processor. The processor 110 may be coupled to a power supply 150 via an external voltage regulator 160, which may perform a first voltage conversion to provide a primary regulated voltage to a processor 110. The processor may comprise a plurality of cores 120a-120n, with associated low-dropout voltage regulators 125a-125n. Also shown is a power control unit (PCU) 138, which may include hardware, software and/or firmware to perform power management operations with regard to processor 110. *See Id.* at 2:38–3:18.

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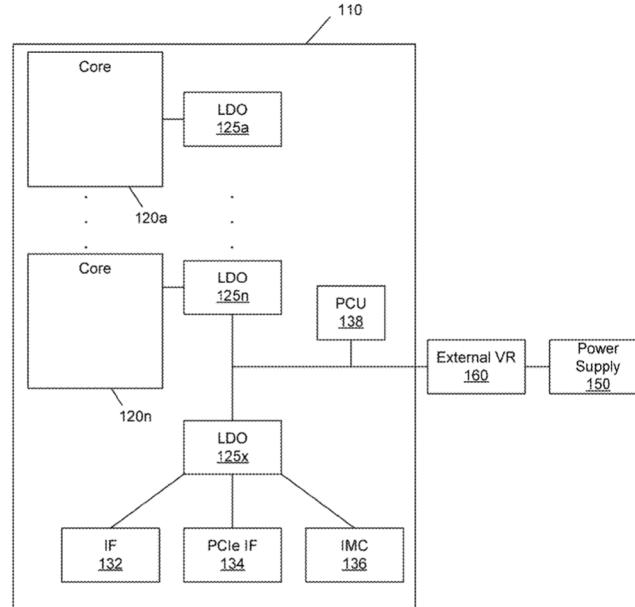


FIG. 1

'135 Patent, Figure 1.

**U.S PATENT NO. 10,705,960**

28. On July 7, 2020, the U.S. Patent Office duly and legally issued the '960 Patent, entitled "Processors Having Virtually Clustered Cores and Cache Slices." A true and correct copy of the '960 Patent is attached hereto as **Exhibit 2**.

29. Daedalus is the owner and assignee of all right, title, and interest in and to the '960 Patent, including the right to assert all causes of action arising under the '960 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

30. The '960 Patent describes, among other things, a system comprising a plurality of processors each having one or more corresponding lower-level caches, and a shared higher-level cache, which includes a plurality of distributed cache slices. '960 Patent, Abstract. The claimed



processors include logic to direct an access that misses in one or more lower-level caches of a corresponding logical processor to a subset of the distributed cache slices in a virtual cluster that corresponds to the logical processor. *Id.* As the '960 Patent explains, “many processors now have multiple to many cores that are monolithically integrated on a single integrated circuit or die,” which “generally help to allow multiple threads or other workloads to be performed concurrently, which generally helps to increase execution throughput.” *Id.* at 1:26–31. “However, the multiple cores may have a downside in terms of longer hit and/or miss latencies to a shared cache...In addition, the multiple or many cores also tend to increase the memory address entropy at memory controllers, which may tend to result in lower effective memory bandwidth.” *Id.* at 1:32–47. The inventions described and claimed in the '960 Patent overcome these challenges by providing novel processors with virtually clustered cores and cache slices, which has the effect of resulting in higher effective memory bandwidth.

31. The novel features of the invention are recited in the claims. For example, claim 1 of the '960 Patent recites:

A system comprising:

a plurality of cores, the plurality of cores comprising symmetric multi-threaded cores;

a cache subsystem, the cache subsystem comprising a plurality of first level caches and at least one higher level distributed cache comprising a plurality of distributed cache portions that are physically distributed across a die and shared by the plurality of cores, each first level cache integral to one of the plurality of cores and each distributed cache portion accessible to each of the plurality of cores;

cache management circuitry operative to provide coherent, non-uniform access to the plurality of distributed cache portions by the plurality of cores;

power management circuitry operative to enable a first frequency of operation for a first cluster of the plurality of cores which are physically proximate to one another and a second frequency of operation for a second cluster of the plurality of cores which are physically proximate to one another, wherein an average distance between cores in the first cluster is less than an average distance between the plurality of cores, the power management circuitry

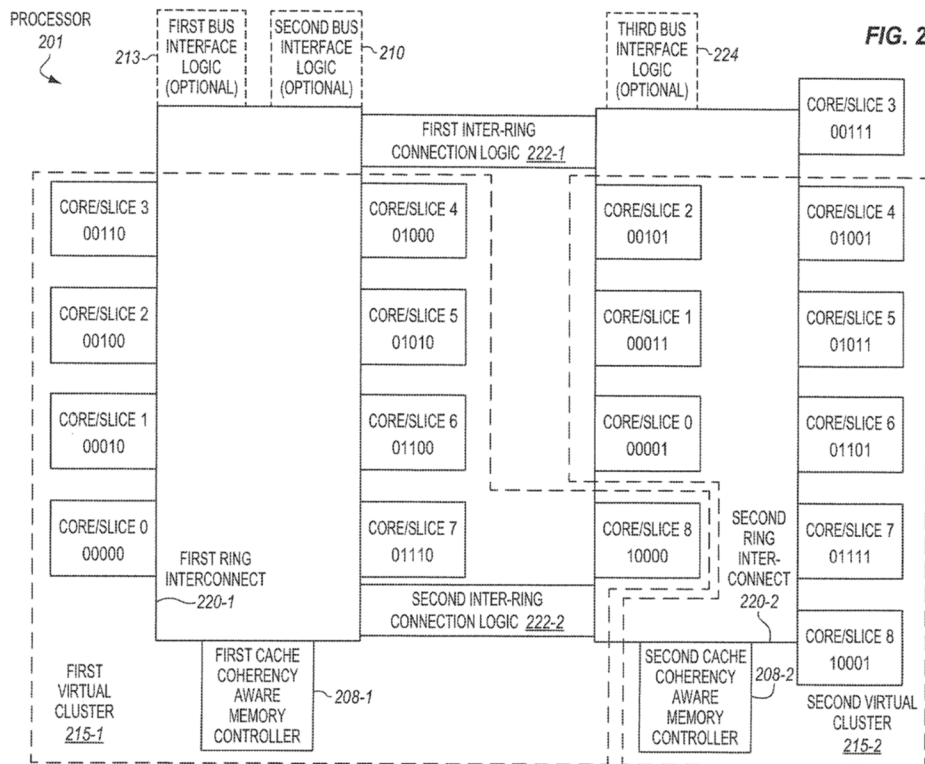
operative to selectively gate power the first cluster of the plurality of cores and distributed cache portions of the at least one higher level distributed cache that correspond to the first cluster and/or the second cluster of the plurality of cores and distributed cache portions of the at least one higher level distributed cache that correspond to the second cluster;

a first integrated memory controller coupled with the symmetric multi-threaded cores; and

a second integrated memory controller coupled with the symmetric multi-threaded cores.

'960 Patent at claim 1.

32. Figure 2 of the '960 Patent, reproduced below, shows a block diagram of an embodiment of a processor 201 having a first virtual cluster 215-1 and a second virtual cluster 215-2. The processor includes eighteen cores and eighteen corresponding cache slices. The cores/slices are coupled with first and second ring interconnects, which are coupled by a first inter-ring connection logic and a second inter-ring connection logic.



'960 Patent, Fig. 2.

**U.S PATENT NO. 10,372,197**

33. On August 6, 2019, the United States Patent Office duly and legally issued the '197 Patent, entitled "User Level Control of Power Management Policies." A true and correct copy of the '197 Patent is attached hereto as **Exhibit 3**.

34. Daedalus is the owner and assignee of all right, title, and interest in and to the '197 Patent, including the right to assert all causes of action arising under the '197 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

35. The '197 Patent describes, among other things, a multicore processor comprising a power controller that receives a workload configuration input and a plurality of energy performance bias values, determines a global energy performance bias value to update one or more power settings of one or more management features. *See id.* Fig. 4, 6:61-7:14; 7:55-8:4.

36. The novel features of the invention are recited in the claims. For example, claim 1 of the '197 Patent recites:

A processor comprising:

a plurality of cores;

a cache memory;

an interconnect to couple the plurality of cores and the cache memory; and

a power controller to control a plurality of power management features of the processor, wherein the power controller includes a tuning circuit to receive a workload configuration input regarding a workload, receive a plurality of energy performance bias (EPB) values and determine a global EPB value based thereon, and update at least one setting of at least one of the plurality of power management features based on the workload configuration input and the global EPB value.

37. Figure 4 of the '197 Patent, reproduced below, is a block diagram of a processor in accordance with an embodiment of the inventions disclosed in the '197 Patent. As shown in FIG. 4, processor 300 may be a multicore processor including a plurality of cores 310a-31. The various cores may be coupled via an interconnect 315 to a system agent or uncore 320 that includes various

components. The uncore 320 may include a shared cache 330 which may be a last level cache. In addition, the uncore may include a power control unit 355.

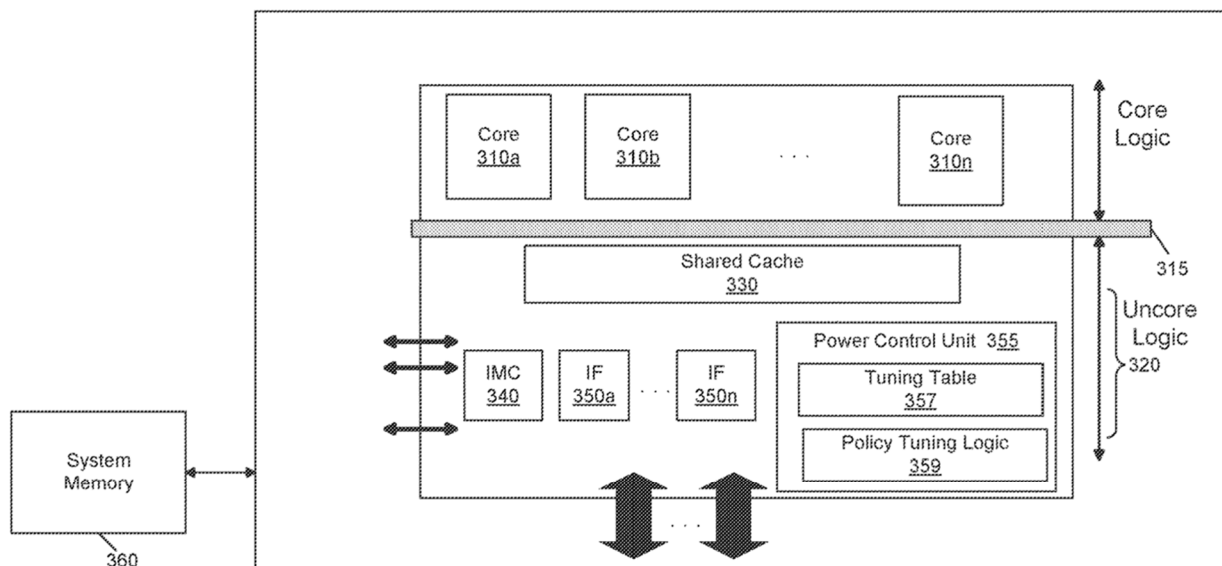


FIG. 4

**U.S PATENT NO. 9,887,838**

38. On February 6, 2018, the United States Patent Office duly and legally issued the '838 Patent, entitled "Method And Device For Secure Communications Over A Network Using A Hardware Security Engine." A true and correct copy of the '838 Patent is attached hereto as **Exhibit 4**.

39. Daedalus is the owner and assignee of all right, title, and interest in and to the '838 Patent, including the right to assert all causes of action arising under the '838 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

40. The '838 Patent describes, among other things, establishing a secure communication session with a server including initiating a request for a secure communication

session with a server using a nonce value generated in a security engine of a system-on-a-chip (SOC) of a client device. '838 Patent, Abstract.

41. The novel features of the invention are recited in the claims. For example, claim 1 of the '838 Patent recites:

1. A system-on-a-chip apparatus comprising:

a system-on-a-chip comprising a security engine that is separate from a processor core of the system-on-a-chip and has a secure memory accessible only by the security engine, wherein the secure memory includes a security key that was encoded in the secure memory during a manufacturing process of the system-on-a-chip, the security engine to:

generate a random nonce for initiating a request for a secure communication session with a remote server over a network using the nonce;

perform a cryptographic key exchange with the remote server;

generate a symmetric session key, based on the cryptographic key exchange, to encrypt messages sent to the remote server and decrypt messages received from the remote server during the secure communication session;

encrypt the symmetric session key based on the security key; and

store the encrypted session key in the secure memory,

the system-on-a-chip to establish the secure communication session with the remote server over the network using the session key.

'838 Patent, Claim 1.

42. Figure 1 in the '838 Patent, reproduced below, shows a simplified block diagram at least one embodiment of a system in accordance with the claimed invention. As shown in Figure 1, a system 100 establishes a secure communication session including a client device 102, server 104, and a network 106. In operation, the client device 102 initiates a request for a secure communication session with the server 104 over the network 106. *Id.* at 3:24–28.

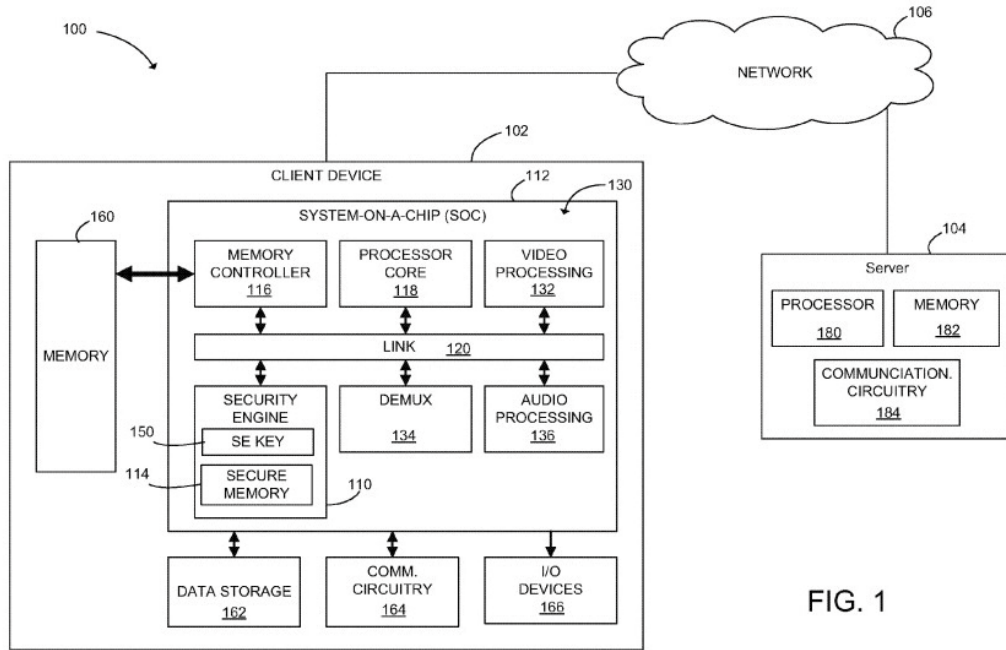


FIG. 1

'838 Patent, Figure 1.

**U.S. PATENT NO. 8,359,629**

43. On January 22, 2013, the U.S. Patent and Trademark Office duly and lawfully issued the '629 Patent entitled "Method and Device for Controlling Use of Context Information of a User." A true and correct copy of the '629 Patent is attached hereto as **Exhibit 5**.

44. Daedalus is the owner and assignee of all right, title, and interest in and to the '629 Patent, including the right to assert all causes of action arising under the '629 Patent and the right to any remedies for infringement.

45. The '629 Patent describes, among other things, methods and devices for controlling the use of context information of a user by establishing a context policy engine that responds to context requests based on a set of defined context rules. *See* '629 Patent at Abstract. The context policy rules may also dictate the level of granularity of the response based on appropriate data such

as the identity of the requesting entity, the current or historical context data (e.g., the current location or activity of the user) or the time of day or day of the week. *Id.* at 6:52-67. The inventions described in the '629 Patent allow mobile computing devices, such as cellular phones and mobile computers, to perform various functions, such as adapting user interfaces, tailoring software applications and/or application data, and publishing data related to or based on the location of the computing device, based on the location of the enabled computing device. *See id.* at 1:7-18.

46. The novel features of the invention are recited in the claims. For example, claim 1 of the '629 Patent recites:

A method comprising:

establishing a context policy enforcement engine on a mobile computing device;  
receiving from a requesting entity, a request for context information related to a user of the mobile computing device,

retrieving context policy data with the context policy enforcement engine, the context policy data defining a set of rules for responding to context requests;

determining a level of specificity of a context characteristic for a context parameter associated with the requested context information as a function of the context policy data and an identity of the requesting entity;

retrieving context data identified by the determined level of specificity of the context characteristic for the context parameter associated with the requested context information; and

responding to the request for context information with the retrieved context data.

'629 Patent at claim 1.

47. Figure 1 of the '629 Patent, reproduced below, shows an illustrative example of a mobile computing device 100 that is configured to have, among other things, a policy enforcement engine 102 that is capable of providing privacy and control over context data related to a user of the device.

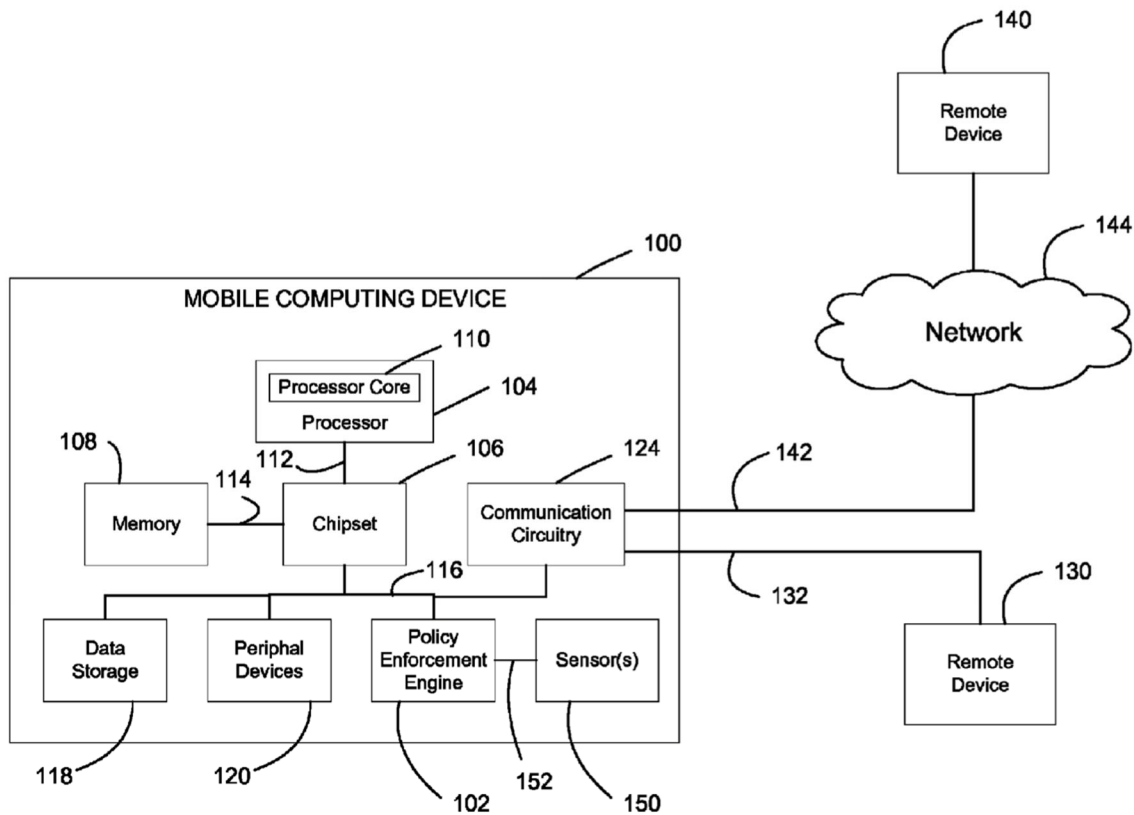


FIG. 1

48. Figure 4, reproduced below, provides an illustrative example of a context policy rule data structure 400, which includes a plurality of context policy rules 402, 404, 406, 408, 410, 412 that define how the computing device 100 should respond to requests for context data (e.g., what content of context data should be delivered to the requesting application or entity):



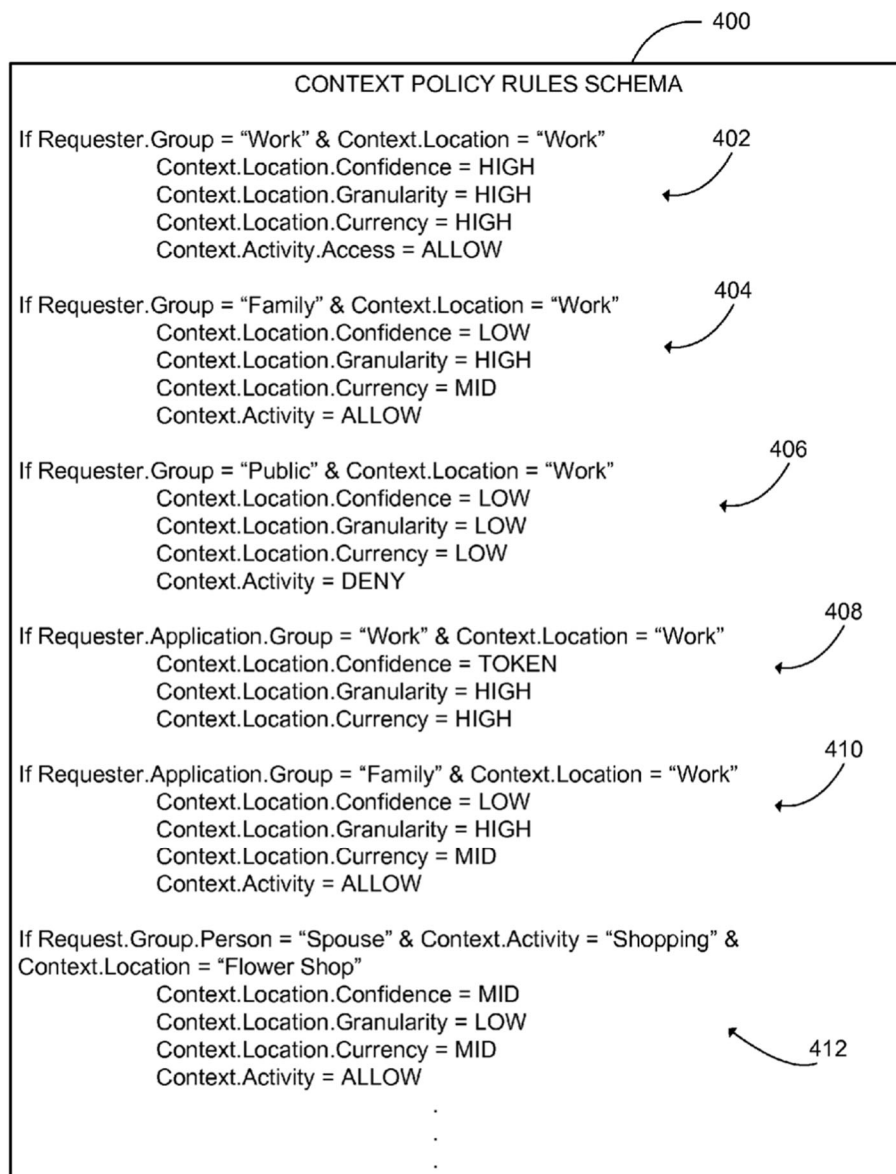


FIG. 4

**U.S. PATENT NO. 9,432,840**

49. On August 30, 2016, the U.S. Patent and Trademark Office duly and lawfully issued the '840 Patent, entitled "Radio Based Location Power Profiles." A true and correct copy of the '840 Patent is attached hereto as **Exhibit 6**.

50. Daedalus is the owner and assignee of all right, title, and interest in and to the '840 Patent, including the right to assert all causes of action arising under the '840 Patent and the right to any remedies for infringement.

51. The '840 Patent describes, among other things, novel methods and systems for managing radio-based power on a mobile platform. The inventive improvements described in the '840 Patent maximize the power efficiency of mobile devices, and consequently extend battery life, by turning Wi-Fi on or off depending on the location of the mobile device.

52. As the '840 Patent explains, mobile platforms such as smartphones and tablets may include multiple radios, such as cellular radios for voice and/or data communications and/or Wi-Fi, that provide off platform communication for various purposes. '840 Patent at 1:19-26. There may be occasions, however, where a mobile device user is in transit and Wi-Fi is not available, so the Wi-Fi radio is not used for communications. *Id.* at 1:27-30. The '840 Patent teaches that, "in such a case, the Wi-Fi radio might remain activated and could continue to draw power – particularly in scanning mode – unless it is manually deactivated." '840 Patent at 1:30-33. These constraints can negatively impact power efficiency, causing mobile device batteries to die at a faster rate.

53. The '840 Patent overcomes these issues by providing a novel system that turns Wi-Fi on or off depending on location profiles that indicate whether Wi-Fi is or is not available. Ultimately, this allows users to maximize the power efficiency of their mobile devices without having to manually turn Wi-Fi on or off while they are in transit.

54. The novel features of the invention are recited in the claims. For example, claim 6 of the '840 Patent recites:

A mobile platform comprising:  
a plurality of radios; and

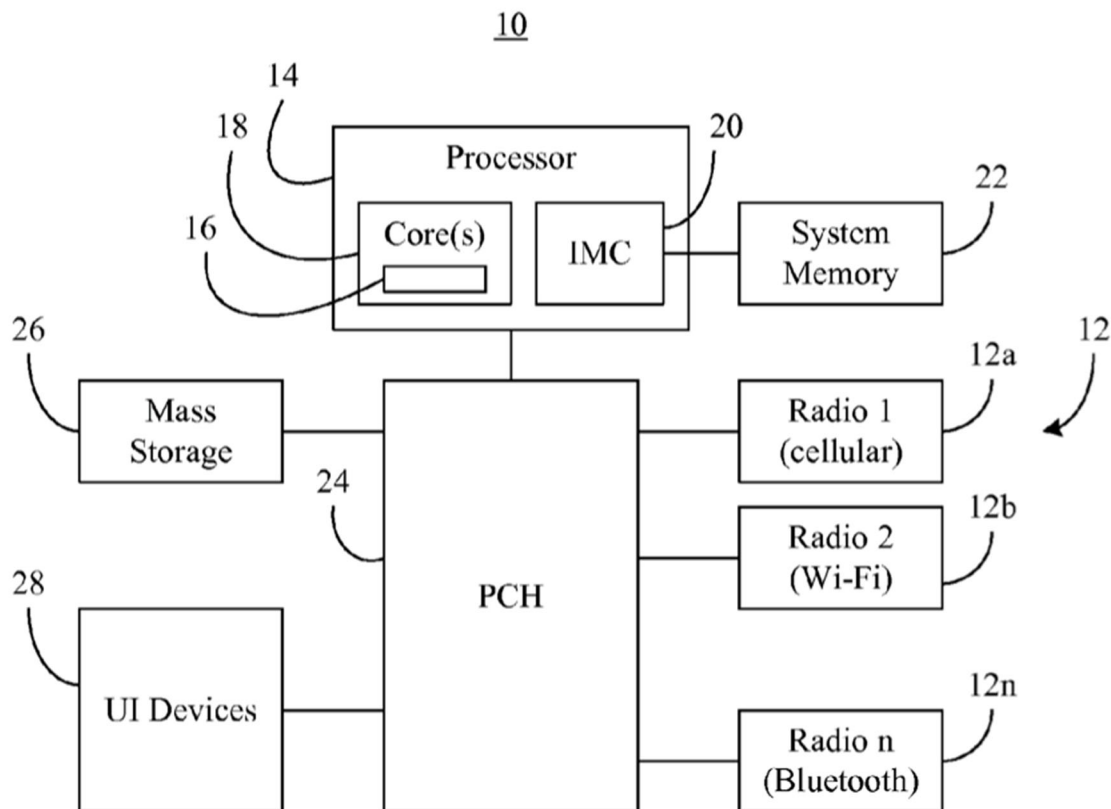
logic to,

detect a change in location for the mobile platform, wherein each of the plurality of radios supports a different wireless technology, and the change in location is based on information received from one or more active radios of the plurality of radios on the mobile platform including a connection loss, and activate a Wi-Fi radio in response to the change in location,

wherein a first profile is associated with a first location and a second profile is associated with a second location, and the first profile and the second profile each include location entry criteria, location exit criteria, and radio settings including activation and deactivation information for the plurality of radios.

'840 Patent at claim 6.

55. Figure 1 of the '840 Patent, reproduced below, shows an illustrative example of a mobile platform 10 having a plurality of radios 12, that can be part of a system such as a mobile internet device, personal digital assistant, wireless smartphone, media player, notebook, computer, and/or tablet. *See* '840 Patent at 2:4-9; Fig. 1. The mobile platform 10 may include a processor 14 that includes/executes logic 16 to detect changes in location for the mobile platform 10, and to deactivate (e.g., power off), configure (e.g., place in a low power mode) and/or activate (e.g., power on) the radios 12 on an individual basis in response to changes in location. *Id.* at 2:12-17.



**FIG. 1**

'840 Patent, Figure 1.

**SAMSUNG'S USE OF THE PATENTED TECHNOLOGY**

56. Samsung is a South Korean multinational manufacturing conglomerate founded in 1938. Samsung is a major manufacturer of electronic components. Samsung is one of the global leaders in semiconductor manufacturing, and in 2021, Samsung's semiconductor revenue was \$73.2 billion.

57. On information and belief, Samsung makes, uses, sells, and/or offers to sell in the United States, and/or imports into the United States various semiconductor chips, and electronic devices containing the same, which infringe the Asserted Patents.

58. For example, Samsung makes, uses, sells, and/or offers to sell in the United States, and/or imports into the United States the Samsung Galaxy S21 smart phone which includes a Snapdragon 888 SoC, the Samsung Galaxy S8 and Note 8 smart phones which includes a Snapdragon 835, and the Samsung Galaxy S22 smart phone which includes an Exynos 2200 SoC. As described in the counts below, these and other Samsung products that include processors based on the ARMv8.2 architecture, as well as subsequent revisions to the ARM architecture such as the ARMv9 architecture, include power management and security technology that infringe the Asserted Patents.

59. Further, Samsung also makes, uses, sells, and/or offers to sell in the United States, and/or imports into the United States the Samsung Galaxy smartphones (including the Samsung Galaxy S10 smartphone) and Samsung Galaxy tablets, which incorporate “Intelligent Wi-Fi” and variable-resolution location sharing that infringes the Asserted Patents as described in the counts below.

**FIRST COUNT**  
**(Infringement of U.S Patent No. 9,996,135)**

60. Daedalus incorporates by reference the allegations set forth in Paragraphs 1–59 of the Complaint as though fully set forth herein.

61. The claims of the '135 Patent are valid and enforceable.

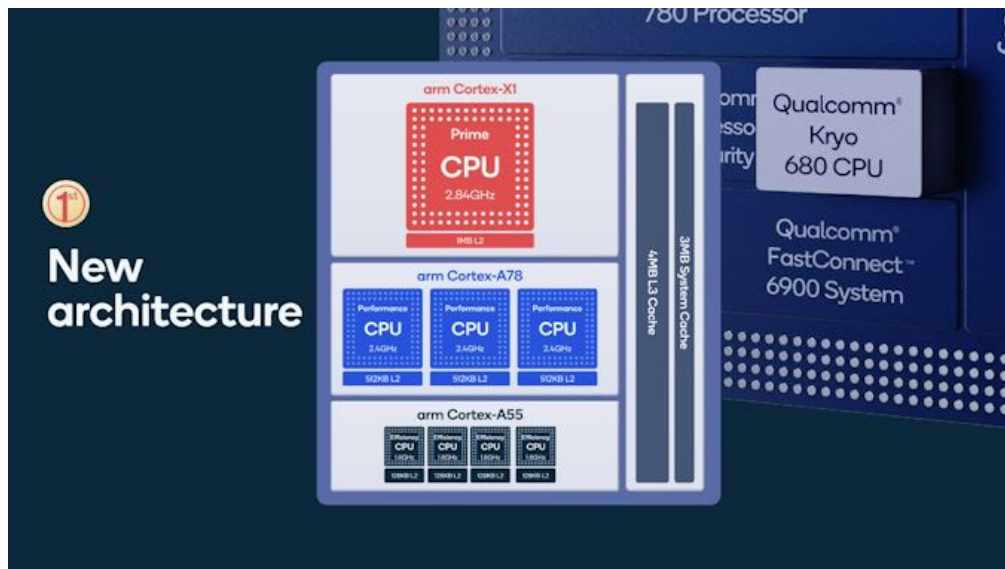
62. On information and belief, in violation of 35 U.S.C. § 271(a), Samsung has directly infringed and continues to directly infringe one or more claims of the '135 Patent, including at least Claim 1 of the '135 Patent, in the state of Texas, in this judicial district, and elsewhere in the United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products that embody one or more of the inventions claimed in the '135 Patent, including but not limited to its electronic devices containing SoCs or microprocessors

based on or derived from ARMv8.2 architecture, as well as subsequent revisions to the ARM architecture such as the ARMv9 architecture, such as the Snapdragon 888 and Exynos 2200 SoCs, and all reasonably similar products (the “’135 Patent Accused Products”).

63. Each of the ’135 Patent Accused Products comprises a processor. For example, the Snapdragon 888 contains one or more microprocessors based on or derived from the ARMv8.2 architecture and the Exynos 2200 contains one or more microprocessors based on or derived from the ARMv9 architecture.

64. Each of the ’135 Patent Accused Products comprises a plurality of cores.

65. For example, Snapdragon 888 SoCs comprise Arm Cortex-X1, ARM Cortex-A78 and ARM Cortex-A55 cores:<sup>1</sup>



66. Similarly, Samsung Exynos 2200 SoCs comprise clusters of ARM Cortex-X2, Cortex-A710 and C510 cores:<sup>2</sup>

<sup>1</sup> <https://www.anandtech.com/show/16271/qualcomm-snapdragon-888-deep-dive>

<sup>2</sup> <https://semiconductor.samsung.com/resources/brochure/Exynos2200.pdf>

67. Each of the '135 Patent Accused Products comprises a power controller including a control logic to receive a first request to increase an operating voltage to be provided to a first core to a second voltage and, responsive to the first request, cause a voltage regulator to increase the operating voltage to an interim voltage, thereafter enable a second core to exit an inactive state and enter an active state, and thereafter enable an operating frequency of the first core to be increased.

68. For example, SoCs or microprocessors derived from the ARMv8.2 architecture, as well as subsequent revisions to the ARM architecture such as the ARMv9 architecture, such as the Snapdragon 888 and Exynos 2200 SoCs, include logic such as ARM Power Policy Units that are configured by systems such as an ARM System Control Processor or a Qualcomm Resource and Power Manager to manage power delivered to CPU cores.<sup>3</sup> On information and belief, such logic or similar logic in each of the '135 Patent Accused Products receives a first request to increase an operating voltage to be provided to a first core to a second voltage and, responsive to the first request, cause a voltage regulator to increase the operating voltage to an interim voltage, thereafter enable a second core to exit an inactive state and enter an active state, and thereafter enable an operating frequency of the first core to be increased.

69. For example, when a System Control Processor programs a Power Policy Unit to go to an allowed PPU mode, the PPU automatically makes the necessary transitions to reach the requested PPU mode.<sup>4</sup>

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<sup>3</sup> [http://armtechforum.com.cn/attached/article/A8\\_ArmPowerControlKit20171226155053.pdf](http://armtechforum.com.cn/attached/article/A8_ArmPowerControlKit20171226155053.pdf), page 13; “Arm DynamIQ Shared Unit-110”, page 78, available at <https://documentation-service.arm.com/static/611e9446d5c3af0155491bf8?token=>; *id.*, page 51; *id.*, page 80; *id.*, page 77.

<sup>4</sup> See “Arm DynamIQ Shared Unit-110”, page 65.

70. Further, on information and belief, Samsung has actively induced and/or contributed to infringement of at least Claim 1 of the '135 Patent in violation of at least 35 U.S.C. § 271(b), (c), and (f).

71. Users of the '135 Patent Accused Products directly infringe at least Claim 1 of the '135 Patent when they use the '135 Patent Accused Products in the ordinary, customary, and intended way. On information and belief, Samsung's inducements in violation of 35 U.S.C. § 271(b) include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the '135 Patent Accused Products within the United States in the ordinary, customary, and intended way by, directly or through intermediaries, supplying the '135 Patent Accused Products to consumers within the United States and instructing and encouraging such customers to use the '135 Patent Accused Products in the ordinary, customary, and intended way, which Samsung knew infringes at least Claim 1 of the '135 Patent, or, alternatively, was willfully blind to the infringement.

72. On information and belief, Samsung's inducements in violation of 35 U.S.C. § 271(b) further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the '135 Patent Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of infringement with respect to the '135 Patent Accused Products in the United States, which Samsung knew infringes at least Claim 1 of the '135 Patent, or, alternatively, was willfully blind to the infringement.

73. On information and belief, in violation of 35 U.S.C. § 271(c), Samsung's contributory infringement further includes offering to sell or selling within the United States, or



importing into the United States, components of the patented invention of at least Claim 1 of the '135 Patent, constituting a material part of the invention. On information and belief, Samsung knows and has known the same to be especially made or especially adapted for use in an infringement of the '135 Patent, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

74. On information and belief, in violation of 35 U.S.C. § 271(f)(1), Samsung's infringement further includes without authority supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of at least Claim 1 of the '135 Patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

75. On information and belief, in violation of 35 U.S.C. § 271(f)(2), Samsung's infringement further includes without authority supplying or causing to be supplied in or from the United States components of the patented invention of at least Claim 1 of the '135 Patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

76. Samsung is not licensed or otherwise authorized to practice the claims of the '135 Patent.

77. Thus, by its acts, Samsung has injured Daedalus and is liable to Daedalus for directly and/or indirectly infringing one or more claims of the '135 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 1.

78. On information and belief, Samsung has known about the '135 Patent at least since its issuance on June 12, 2018. At a minimum, Samsung has knowledge of the '135 Patent at least as of the filing of this Complaint. Accordingly, Samsung's infringement of the '135 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys' fees and costs pursuant to 35 U.S.C. §§ 284 and 285.

79. As a result of Samsung's infringement of the '135 Patent, Daedalus has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Samsung's infringement, but in no event less than a reasonable royalty with interest and costs.

80. On information and belief, Samsung will continue to infringe the '135 Patent unless enjoined by this Court. Samsung's infringement of Daedalus' rights under the '135 Patent will continue to damage Daedalus, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

**SECOND COUNT**  
**(Infringement of U.S Patent No. 10,705,960)**

81. Daedalus incorporates by reference the allegations set forth in Paragraphs 1–80 of the Complaint as though fully set forth herein.

82. The claims of the '960 Patent are valid and enforceable.

83. On information and belief, in violation of 35 U.S.C. § 271(a), Samsung has directly infringed and continues to directly infringe one or more claims of the '960 Patent, including at least Claim 1 of the '960 Patent, in the state of Texas, in this judicial district, and elsewhere in the

United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products that embody one or more of the inventions claimed in the '960 Patent, including but not limited to its electronic devices containing SoC's or microprocessors based on or derived from ARMv8.2 architecture, as well as subsequent revisions to the ARM architecture such as the ARMv9 architecture, such as the Snapdragon 888 and/or the Exynos 2200, and all reasonably similar products (the "'960 Patent Accused Products") in combination with multithreaded software such as the Android operating system.

84. Each of the '960 Patent Accused Products comprises a system. For example, the Snapdragon 888 and Samsung Exynos 2200 are each system-on-a-chip (SoC) processors, based on or derived from the ARMv8.2 and ARMv9 architecture, respectively.<sup>5</sup> These SoC processors are combined with multithreading software such as the Android operating system in devices such as the Samsung Galaxy S21 and Samsung Galaxy AS22 smartphones.

85. Each of the '960 Patent Accused Products comprises a system further comprising a plurality of cores, the plurality of cores comprising symmetric multi-threaded cores.

86. More specifically, each of the '960 Patent Accused Products include SoCs that include two or more symmetric cores with identical core architectures and identical performance specifications. For example, '960 Patent Accused Products based on or derived from ARMv8.2 architecture such as the Snapdragon 888 include two or more identical ARM processor cores such as Cortex-A78 and/or Cortex-A55 cores. '960 Patent Accused Products based on or derived from ARMv9 architecture such as the Exynos 2200 include two or more identical ARM processor cores such as Cortex-A710 and/or Cortex-A510 cores. The symmetric cores are capable of and support

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<sup>5</sup> [https://www.gsmarena.com/samsung\\_launches\\_exynos\\_2200\\_with\\_xclipse\\_gpu\\_based\\_on\\_amd\\_rdna2\\_architecture-news-52728.php](https://www.gsmarena.com/samsung_launches_exynos_2200_with_xclipse_gpu_based_on_amd_rdna2_architecture-news-52728.php)

the processing of multiple threads when used in conjunction with an operating system such as the Android operating system.

87. The symmetric cores in the '960 Patent Accused Products contain specific support for the use of multiple threads including the use of logical processing elements that are implemented using a multithreading approach.<sup>6</sup>

Bits	Name	Description	Reset
[24]	MT	Indicates whether the lowest level of affinity consists of logical PEs that are implemented using a multithreading type approach. See the description of Aff0 for more information about affinity levels. The possible values of this bit are:  <b>0b1</b>  Performance of PEs at the lowest affinity level, or PEs with MPIDR_EL1.MT set to 1, different affinity level 0 values, and the same values for affinity level 1 and higher, is very interdependent.	

Further, the ARMv8 programmer's guide describes features from the architecture that are designed to assist in the execution of multiple threads.<sup>7</sup>

The additions to the architecture mean that a single physical core can execute code from both the Normal world and the Secure world in a time-sliced fashion, although this depends on the availability of interrupt-generating peripherals that can be configured to be accessible only by the Secure World. For example, a Secure timer interrupt could be used to guarantee some execution time for the Secure world, in a manner resembling preemptive multitasking. Such peripherals may or may not be available, depending on the level of security and use cases that the platform designer intends to support.

88. The symmetric cores are capable of processing multiple threads in combination with an operating system in the '960 Patent Accused Products such as the Android operating system. Android contains built in support for the creation of more than one thread of execution within a process wherein those threads run concurrently.<sup>8</sup>

<sup>6</sup> <https://developer.arm.com/documentation/101800/latest>

<sup>7</sup> <https://developer.arm.com/documentation/den0024/a/>

<sup>8</sup> <https://developer.android.com/courses/extras/multithreading>

# Multi-threading & callbacks primer 🔖

On this page

Callbacks

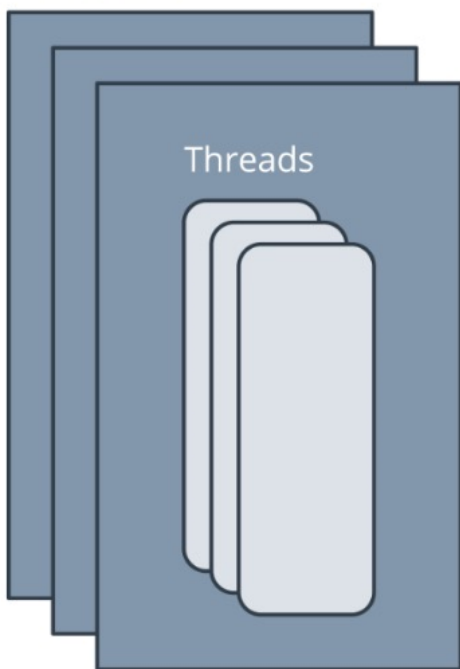
Coroutines

The [Developing Android Apps in Kotlin course](#) assumes that you are familiar with the concept and terminology of multi-threading. This page is a high-level introduction and refresher.

Mobile devices have processors, and these days, most devices have multiple hardware processors that each run processes concurrently. This is called *multiprocessing*.

To use processors more efficiently, the operating system can enable an application to create more than one thread of execution within a process. This is called *multi-threading*.

## Processors



For example, Android contains support for the use of multiple threads within programs such as worker threads described below.<sup>9</sup>

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<sup>9</sup> <https://developer.android.com/guide/components/processes-and-threads>

## Worker threads

Because of the single threaded model described above, it's vital to the responsiveness of your application's UI that you do not block the UI thread. If you have operations to perform that are not instantaneous, you should **make sure to do them in separate threads ("background" or "worker" threads).**

However, note that you cannot update the UI from any thread other than the UI thread or the "main" thread.

To fix this problem, Android offers several ways to access the UI thread from other threads. Here is a list of methods that can help:

- `Activity.runOnUiThread(Runnable)`
- `View.post(Runnable)`
- `View.postDelayed(Runnable, long)`

89. Each of the '960 Patent Accused Products comprises a cache subsystem, the cache subsystem comprising a plurality of first level caches and at least one higher level distributed cache comprising a plurality of distributed cache portions that are physically distributed across a die and shared by the plurality of cores, each first level cache integral to one of the plurality of cores and each distributed cache portion accessible to each of the plurality of cores.

90. For example, the Exynos 2200 SoCs include Cortex-A510 and Cortex-A710 clusters and a cache system including L1, L2 and L3 caches. The L3 caches are physically distributed across a die and shared by a plurality of cores. Each of the L1 and/or L2 caches are integral to one of the plurality of cores and the L3 caches comprise distributed cache portions accessible to each of the plurality of cores.<sup>10</sup> Similarly, the Snapdragon 888 SoCs include Cortex-A55 and Cortex-A78 clusters and a cache system including L1, L2 and L3 caches. The L3 caches are physically distributed across a die and shared by a plurality of cores. Each of the L1 and/or L2

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<sup>10</sup> See, e.g., Arm® Cortex®-A510 Core Technical Reference Manual, Revision r0p3, sections 7-9; Arm® Cortex®-A710 Core Technical Reference Manual, Revision r2p0, sections 7-9; Arm® DynamIQ™ Shared Unit-110 Technical Reference Manual Revision r2p1, section 7.

caches are integral to one of the plurality of cores and the L3 caches comprise distributed cache portions accessible to each of the plurality of cores.<sup>11</sup>

91. Each of the '960 Patent Accused Products comprises cache management circuitry operative to provide coherent, non-uniform access to the plurality of distributed cache portions by the plurality of cores.

92. For example, the Exynos 2200 SoCs include a DynamIQ Shared Unit-110 (DSU-110). The DSU-110 comprises cache management circuitry operative to provide coherent, non-uniform access to the plurality of distributed cache portions by the plurality of cores.<sup>12</sup>

93. Similarly, on information and belief, the Snapdragon 888 SoCs comprise a DynamIQ Shared Unit (DSU). The DSU comprises cache management circuitry operative to provide coherent, non-uniform access to the plurality of distributed cache portions by the plurality of cores.<sup>13</sup>

94. Each of the '960 Patent Accused Products comprise power management circuitry operative to enable a first frequency of operation for a first cluster of the plurality of cores which are physically proximate to one another and a second frequency of operation for a second cluster of the plurality of cores which are physically proximate to one another.

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<sup>11</sup> See, e.g., Arm® Cortex®-A55 Core Technical Reference Manual, Revision r1p0, sections A6-A7; Arm® Cortex®-A78 Core Technical Reference Manual, Revision r1p2, sections A6-A7; Arm® DynamIQ™ Shared Unit-110 Technical Reference Manual Revision r2p1, section 7; <https://www.anandtech.com/print/16271/qualcomm-snapdragon-888-deep-dive>

<sup>12</sup> See, e.g., Arm® DynamIQ™ Shared Unit-110 Technical Reference Manual, Revision r2p1, at 19.

<sup>13</sup> See, e.g., <https://www.anandtech.com/show/16463/snapdragon-888-vs-exynos-2100-galaxy-s21-ultra/3>

95. For example, the DSU-110 included Samsung Exynos 2200 SoCs includes Power Policy Units (PPU, “power management circuitry”) and a Power Control Module that provides Dynamic Voltage and Frequency Scaling (DVFS) control on per-core and per-cluster level.<sup>14</sup>

96. Similarly, on information and belief, the DSU included in Snapdragon 888 SoCs includes power controller functionality that controls the frequency of operation of the cores in each of a plurality of clusters.

97. In each of the ’960 Patent Accused Products, including for example the Samsung Exynos 2200 and the Snapdragon 888, the cores of a cluster are physically proximate to one another.<sup>15</sup>

98. In each of the ’960 Patent Accused Products, including for example the Samsung Exynos 2200 and the Snapdragon 888, an average distance between cores in the first cluster is less than an average distance between the plurality of cores.<sup>16</sup>

99. In each of the ’960 Patent Accused Products, the power management circuitry is operative to selectively gate power to the first cluster of the plurality of cores and distributed cache portions of the at least one higher level distributed cache that correspond to the first cluster and/or the second cluster of the plurality of cores and distributed cache portions of the at least one higher level distributed cache that correspond to the second cluster.

100. For example, the Samsung Exynos 220 SoCs includes Power Policy Units (PPUs). The PPU provides advanced power management features including selectively reducing power to

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<sup>14</sup> “Arm DynamIQ Shared Unit-110 Technical Reference Manual,” pages 49, 51, *available at* <https://documentation-service.arm.com/static/611e9446d5c3af0155491bf8?token=>.

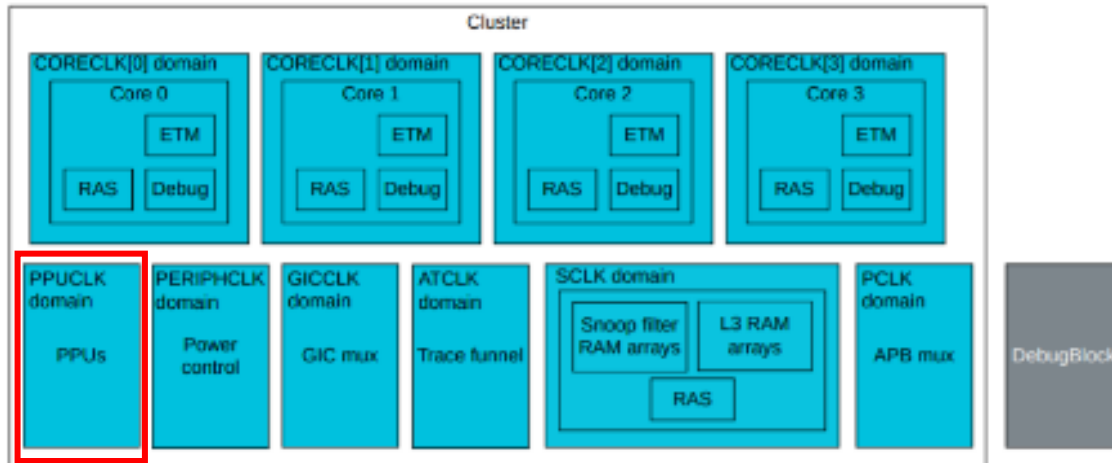
<sup>15</sup> *See, e.g.*, <https://www.anandtech.com/show/16463/snapdragon-888-vs-exynos-2100-galaxy-s21-ultra>

<sup>16</sup> *See, e.g.*, <https://www.anandtech.com/show/16463/snapdragon-888-vs-exynos-2100-galaxy-s21-ultra>



individual CPU cluster cores as well as the L2 cache through DVFS. Additionally, L3 cache slices can be powered down by the PPU.<sup>17,18</sup>

**Figure 4-2: DSU-110 pin-controlled reset domains**



The Power Policy Units (PPUs) for the cluster and each of the cores are used to control the power management features of the cluster and cores using a software interface. This includes managing various power states and transitions between these states. Certain power mode changes, for example powering up the cluster from a powered down state, include implicit resets to internal logic.

## 5.1 Power management in the DSU-110

The DynamIQ™ Shared Unit-110 (DSU-110) provides various mechanisms to control both dynamic and static power dissipation. These mechanisms are associated with a set of power domains, power modes, and operational modes. Some of these mechanisms are brought under software control using Power Policy Units (PPUs).

The power management techniques employed by the DSU-110 and cores in the cluster include:

- Internal core clock gating where different internal parts of the core are clock idle
- Per-core Dynamic Voltage and Frequency Scaling (DVFS)
- Powerdown
- Retention, a low-power mode that retains the register and RAM state

<sup>17</sup> “Arm DynamIQ Shared Unit-110 Technical Reference Manual,” pages 49, 51, 58, *available at* <https://documentation-service.arm.com/static/611e9446d5c3af0155491bf8?token=>.

<sup>18</sup> “Arm DynamIQ Shared Unit-110 Technical Reference Manual,” pages 20, 89, *available at* <https://documentation-service.arm.com/static/611e9446d5c3af0155491bf8?token=>.

## 5.4 L3 RAM power control

In addition to retention features, the *DynamiQ™ Shared Unit-110* (DSU-110) can further reduce static leakage power using two powerdown features. Firstly, optionally power down of all but one of the L3 cache slices. Secondly, within each L3 cache slice powerdown a portion of the L3 cache RAM that the cache slice contains.

### 5.4.1 L3 cache RAM powerdown

The L3 cache RAMs typically contribute to a large proportion of the total leakage power, particularly for large cache sizes. Therefore, it is beneficial to be able to power down the RAMs when only some of the L3 cache is required, but it also results in reducing cache capacity. Parts of the L3 cache RAM can be independently powered down to reduce RAM leakage power when not in use. L3 cache powerdown is controlled by the cluster *Power Policy Unit* (PPU).

The L3 cache RAM powerdown feature allows the RAMs to be powered down in groups of ways, giving options of 100%, 50%, or 0% of the L3 cache capacity. When a workload is making light use of the L3 cache, then this can be detected and the L3 cache capacity reduced without significant impact on the performance. For example, this can occur when the L3 cache has a relatively small memory footprint that mostly fits within the L2 cache.

#### Cluster features

The DSU-110 has the following cluster features:

- Support for Arm®v9.0-A architecture cores
- Support for up to three types of core, and a maximum of eight cores in the cluster
- *Power Policy Units* (PPUs) providing autonomous power management of the L3 cache and the cores

The DSU-110 *DynamiQ™* cluster can be implemented with various power domains to target power performance levels. These power domains are managed through the *Power Policy Units* (PPUs). The DSU-110 *DynamiQ™* cluster supports many mechanisms to reduce static and dynamic power dissipation. For example, placing the cores and L3 cache into retention and powering down parts of the L3 cache.

## 6.6 Programming sequences for the cluster and the core

Example *Power Policy Unit* (PPU) programming sequences are provided for both the cluster and the cores. One of these sequences uses the static mode policy to demonstrate programming using this policy. However, because static power management can require considerable activity from the System Control Processor, Arm strongly recommends that you use dynamic power management for normal operation of the cluster.

### 6.6.1 Programming sequence to bring the cluster and cores from Off to On mode

Use the following steps, to program the *Power Policy Unit* (PPU) for the DSU-110 *DynamiQ™* cluster and each of the cores to request a change of PPU mode from Off mode to On mode.

### 6.6.2 Programming sequence to bring the cluster and cores from On to Off mode

Use the following steps, to program the *Power Policy Unit* (PPU) for the DSU-110 *DynamiQ™* cluster and each of the cores to request a change of PPU mode from On to Off.

101. The L3 cache slices in SoCs or microprocessors derived from or based on the ARMv8.2 and/or ARMv9 architecture, such as the Samsung Exynos 2200 microprocessors, can be partially powered down based on the system workload.<sup>19</sup>

#### Cache features

The DSU-110 has the following cache features:

- Optional unified 16-way set-associative L3 cache, configurable from 256KB to 16MB
- 64-byte cache lines
- L3 cache slice support, for improved bandwidth and cache RAM layout, up to eight slices supported
- L3 cache powerdown based either on cache slices or cache ways

## 5.4 L3 RAM power control

In addition to retention features, the *DynamiQ™ Shared Unit-110* (DSU-110) can further reduce static leakage power using two powerdown features. Firstly, optionally power down of all but one of the L3 cache slices. Secondly, within each L3 cache slice powerdown a portion of the L3 cache RAM that the cache slice contains.

### 5.4.1 L3 cache RAM powerdown

The L3 cache RAMs typically contribute to a large proportion of the total leakage power, particularly for large cache sizes. Therefore, it is beneficial to be able to power down the RAMs when only some of the L3 cache is required, but it also results in reducing cache capacity. Parts of the L3 cache RAM can be independently powered down to reduce RAM leakage power when not in use. L3 cache powerdown is controlled by the cluster *Power Policy Unit* (PPU).

### 5.4.2 L3 cache slice powerdown

In addition to powering down the L3 cache RAMs, you can gain further leakage savings by powering down some of the L3 cache slice control logic as well. Control of powering up or powering down L3 cache slices is performed by the cluster *Power Policy Unit* (PPU).

<sup>19</sup> “Arm DynamIQ Shared Unit-110 Technical Reference Manual,” pages 19, 20, 58, 62, 54, 58, available at <https://documentation-service.arm.com/static/611e9446d5c3af0155491bf8?token=>.



### 5.3 Cluster power modes

The DSU-110 DynamIQ™ cluster and each of the cores and complexes in the cluster have a defined set of power modes and corresponding legal transactions between these modes.

The following table shows the supported power modes for the DSU-110 DynamIQ™ cluster.

Power mode	Short name	Description
On mode	ON	On mode is the normal mode of operation where all cluster functionality is available.
Off mode	OFF	In Off mode, power is removed from the cluster logic and all the RAMs.
Functional retention mode	FUNC_RET	In Functional retention mode, the L3 cache RAMs and snoop filter RAMs are placed in a retention state. Data is retained in these RAMs.  The rest of the DynamIQ™ cluster shared logic remains powered up.

#### 5.4.1 L3 cache RAM powerdown

The L3 cache RAMs typically contribute to a large proportion of the total leakage power, particularly for large cache sizes. Therefore, it is beneficial to be able to power down the RAMs when only some of the L3 cache is required, but it also results in reducing cache capacity. Parts of the L3 cache RAM can be independently powered down to reduce RAM leakage power when not in use. L3 cache powerdown is controlled by the cluster *Power Policy Unit* (PPU).

The L3 cache RAM powerdown feature allows the RAMs to be powered down in groups of ways, giving options of 100%, 50%, or 0% of the L3 cache capacity. When a workload is making light use of the L3 cache, then this can be detected and the L3 cache capacity reduced without significant impact on the performance. For example, this can occur when the L3 cache has a relatively small memory footprint that mostly fits within the L2 cache.

102. Similarly, on information and belief, the DSU in the Snapdragon 888 SoCs can control the power to the clusters and put parts, or all, of the L3 control logic and L3 cache RAM into retention modes or powering down portions of the RAM.<sup>20</sup>

103. Each of the '960 Patent Accused Products comprise at least two integrated memory controllers coupled with the symmetric multi-threaded cores. For example, each of the Samsung Exynos 2200 SoC and the Snapdragon 888 SoC comprise at least two separate channels of LPDDR5 memory control.<sup>21</sup>

<sup>20</sup> See, e.g., <https://www.anandtech.com/show/16463/snapdragon-888-vs-exynos-2100-galaxy-s21-ultra>

<sup>21</sup> See, e.g., <https://www.anandtech.com/show/16463/snapdragon-888-vs-exynos-2100-galaxy-s21-ultra>

104. Further, on information and belief, Samsung has actively induced and/or contributed to infringement of at least Claim 1 of the '960 Patent in violation of at least 35 U.S.C. § 271(b), (c), and (f).

105. Users of the '960 Patent Accused Products directly infringe at least Claim 1 of the '960 Patent when they use the '960 Patent Accused Products in the ordinary, customary, and intended way. On information and belief, Samsung's inducements in violation of 35 U.S.C. § 271(b) include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the '960 Patent Accused Products within the United States in the ordinary, customary, and intended way by, directly or through intermediaries, supplying the '960 Patent Accused Products to consumers within the United States and instructing and encouraging such customers to use the '960 Patent Accused Products in the ordinary, customary, and intended way, which Samsung knew infringes at least Claim 1 of the '960 Patent, or, alternatively, was willfully blind to the infringement.

106. On information and belief, Samsung's inducements in violation of 35 U.S.C. § 271(b) further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the '960 Patent Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of infringement with respect to the '960 Patent Accused Products in the United States, which Samsung knew infringes at least Claim 1 of the '960 Patent, or, alternatively, was willfully blind to the infringement.

107. On information and belief, in violation of 35 U.S.C. § 271(c), Samsung's contributory infringement further includes offering to sell or selling within the United States, or

importing into the United States, components of the patented invention of at least Claim 1 of the '960 Patent, constituting a material part of the invention. On information and belief, Samsung knows and has known the same to be especially made or especially adapted for use in an infringement of the '960 Patent, and such components are not staple articles or commodities of commerce suitable for substantial noninfringing use.

108. On information and belief, in violation of 35 U.S.C. § 271(f)(1), Samsung's infringement further includes without authority supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of at least Claim 1 of the '960 Patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

109. On information and belief, in violation of 35 U.S.C. § 271(f)(2), Samsung's infringement further includes without authority supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of at least Claim 1 of the '960 Patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

110. Samsung is not licensed or otherwise authorized to practice the claims of the '960 Patent.

111. Thus, by its acts, Samsung has injured Daedalus and is liable to Daedalus for directly and/or indirectly infringing one or more claims of the '960 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 1.

112. On information and belief, Samsung has known about the '960 Patent at least since its issuance on July 7, 2020. At a minimum, Samsung has knowledge of the '960 Patent at least as of the filing of this Complaint. Accordingly, Samsung's infringement of the '960 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys' fees and costs pursuant to 35 U.S.C. §§ 284 and 285.

113. As a result of Samsung's infringement of the '960 Patent, Daedalus has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Samsung's infringement, but in no event less than a reasonable royalty with interest and costs.

114. On information and belief, Samsung will continue to infringe the '960 Patent unless enjoined by this Court. Samsung's infringement of Daedalus' rights under the '960 Patent will continue to damage Daedalus, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

**THIRD COUNT**  
**(Infringement of U.S Patent No. 10,372,197)**

115. Daedalus incorporates by reference the allegations set forth in Paragraphs 1–114 of the Complaint as though fully set forth herein.

116. The claims of the '197 Patent are valid and enforceable.

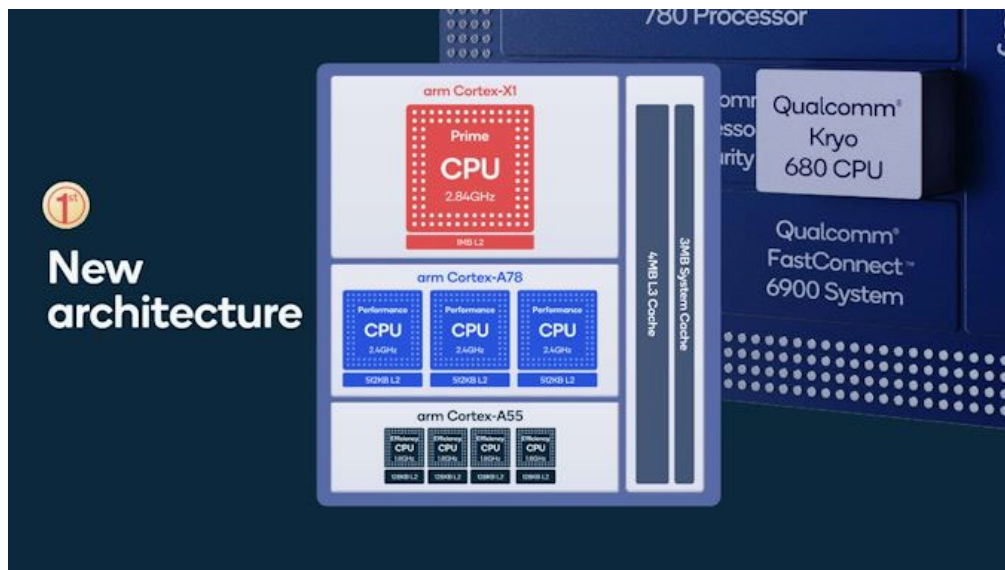
117. On information and belief, in violation of 35 U.S.C. § 271(a), Samsung has directly infringed and continues to directly infringe one or more claims of the '197 Patent, including at least Claim 1 of the '197 Patent, in the state of Texas, in this judicial district, and elsewhere in the

United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products that embody one or more of the inventions claimed in the '197 Patent, including but not limited to its electronic devices containing SoC's or microprocessors based on or derived from ARMv8.2 architecture, as well as subsequent revisions to the ARM architecture such as the ARMv9 architecture, such as the Snapdragon 888 and Exynos 2200 SoCs, and all reasonably similar products (the "'197 Patent Accused Products").

118. Each of the '197 Patent Accused Products comprises a processor. For example, the Snapdragon 888 contains one or more microprocessors based on or derived from the ARMv8.2 architecture and the Exynos 2200 contains one or more microprocessors based on or derived from the ARMv9 architecture.

119. Each of the '197 Patent Accused Products comprises a plurality of cores.

120. Specifically, the '197 Patent Accused Products include one or more clusters comprising a plurality of cores. For example, Snapdragon 888 SoCs comprise Arm Cortex-X1, ARM Cortex-A78 and ARM Coretex-A55 cores<sup>22</sup>:



<sup>22</sup> <https://www.anandtech.com/show/16271/qualcomm-snapdragon-888-deep-dive>



121. Similarly, the Samsung Exynos 2200 SoCs comprise clusters of ARM Cortex-X2, Cortex-A710 and C510 cores.<sup>23</sup>

122. Each of the '197 Patent Accused Products comprises a cache memory.

123. For example, Snapdragon 888 SoCs comprise L1, L2 and L3 cache memories.<sup>24</sup>

124. Similarly, the Exynos 2200 SoCs include Cortex-A510 and Cortex-A710 clusters and a cache system including L1, L2 and L3 caches.<sup>25</sup>

125. Each of the '197 Patent Accused Products comprises an interconnect to couple the plurality of cores and the cache memory.

126. For example, the Exynos 2200 SoCs include a DynamIQ Shared Unit-110 (DSU-110). The DSU-110 couples the plurality of cores to the L3 cache memory.<sup>26</sup>

127. Similarly, on information and belief, the Snapdragon 888 SoCs comprises a DynamIQ Shared Unit (DSU). The DSU couples the plurality of cores to the L3 cache memory.<sup>27</sup>

128. Each of the '197 Patent Accused Products comprises a power controller to control a plurality of power management features of the processor, wherein the power controller includes a tuning circuit to receive a workload configuration input regarding a workload, receive a plurality of energy performance bias (EPB) values and determine a global EPB value based thereon, and update at least one setting of at least one of the plurality of power management features based on the workload configuration input and the global EPB value.

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<sup>23</sup> See, e.g., <https://semiconductor.samsung.com/resources/brochure/Exynos2200.pdf>

<sup>24</sup> See, e.g., <https://www.anandtech.com/show/16271/qualcomm-snapdragon-888-deep-dive>

<sup>25</sup> See, e.g., Arm® Cortex®-A510 Core Technical Reference Manual, Revision r0p3, sections 7-9; Arm® Cortex®-A710 Core Technical Reference Manual, Revision r2p0, sections 7-9; Arm® DynamIQ™ Shared Unit-110 Technical Reference Manual Revision r2p1, section 7.

<sup>26</sup> See, e.g., Arm® DynamIQ™ Shared Unit-110 Technical Reference Manual Revision r2p1, at 19.

<sup>27</sup> See, e.g., <https://www.anandtech.com/show/16463/snapdragon-888-vs-exynos-2100-galaxy-s21-ultra/3>

129. For example, SoCs or microprocessors derived from the ARMv8.2 architecture, as well as subsequent revisions to the ARM architecture such as the ARMv9 architecture, such as the Snapdragon 888 and Samsung Exynos 2200 SoCs, include logic such as ARM Power Policy Units that are configured by systems such as an ARM System Control Processor.<sup>28</sup>

130. On information and belief, the '197 Patent Accused Products use ARM's Intelligent Power Allocation technology in conjunction with the Power Policy units and a System Control Processor or Resource and Power Manager to receive a workload configuration input regarding a workload, receive a plurality of energy performance bias (EPB) values and determine a global EPB value based thereon, and update at least one setting of at least one of the plurality of power management features based on the workload configuration input and the global EPB value.

131. For example, on information and belief, in the Snapdragon 888 and Samsung Exynos 2200 SoCs, the Intelligent Power Allocation logic receives real-time CPU and GPU performance requests and based on the requested workload configuration and power models to cause settings of Power Policy Units to be updated to maximize requested performance without exceeding the Thermal Design Power for the SoC<sup>29</sup>:

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<sup>28</sup> "Arm DynamIQ Shared Unit-110", page 78, available at <https://documentation-service.arm.com/static/611e9446d5c3af0155491bf8?token=> ; *id.*, page 51; *id.*, page 80; *id.*, page 77.

<sup>29</sup> ARM Whitepaper, "Intelligent Power Allocation, *Maximize performance in the thermal envelope*," Xin Wang, March 2017 at 11-14, available at <https://developer.arm.com/Tools%20and%20Software/Intelligent%20Power%20Allocation>.

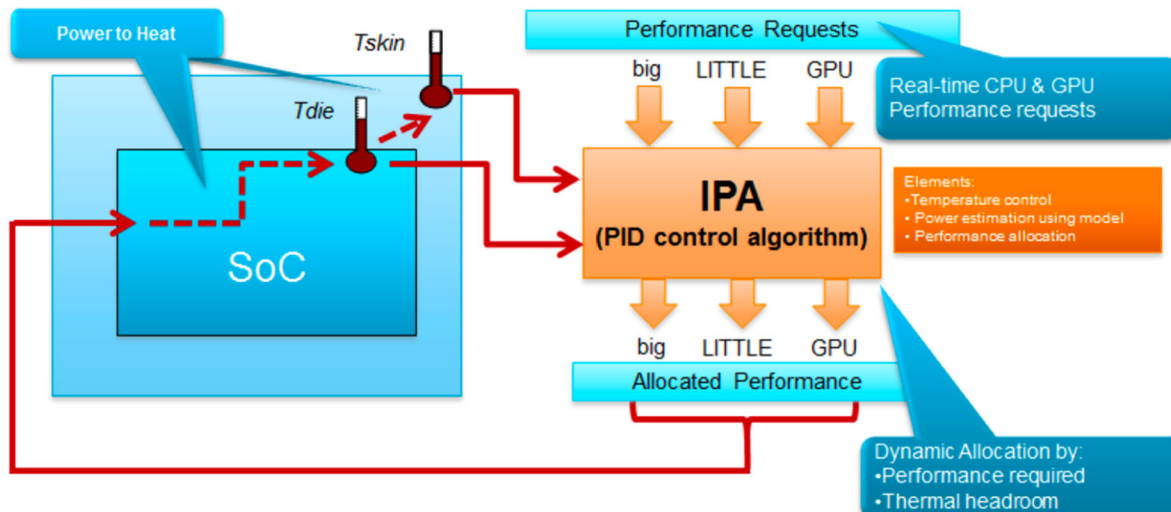


Figure 7 ARM Intelligent Power Allocation

132. Further, on information and belief, Samsung has actively induced and/or contributed to infringement of at least Claim 1 of the '135 Patent in violation of at least 35 U.S.C. § 271(b), (c), and (f).

133. Users of the '135 Patent Accused Products directly infringe at least Claim 1 of the '135 Patent when they use the '135 Patent Accused Products in the ordinary, customary, and intended way. On information and belief, Samsung's inducements in violation of 35 U.S.C. § 271(b) include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the '135 Patent Accused Products within the United States in the ordinary, customary, and intended way by, directly or through intermediaries, supplying the '135 Patent Accused Products to consumers within the United States and instructing and encouraging such customers to use the '135 Patent Accused Products in the ordinary, customary, and intended way, which Samsung knew infringes at least Claim 1 of the '135 Patent, or, alternatively, was willfully blind to the infringement.

134. On information and belief, Samsung's inducements in violation of 35 U.S.C. § 271(b) further include, without limitation and with specific intent to encourage the infringement,

knowingly inducing customers to commit acts of infringement with respect to the '135 Patent Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of infringement with respect to the '135 Patent Accused Products in the United States, which Samsung knew infringes at least Claim 1 of the '135 Patent, or, alternatively, was willfully blind to the infringement.

135. On information and belief, in violation of 35 U.S.C. § 271(c), Samsung's contributory infringement further includes offering to sell or selling within the United States, or importing into the United States, components of the patented invention of at least Claim 1 of the '135 Patent, constituting a material part of the invention. On information and belief, Samsung knows and has known the same to be especially made or especially adapted for use in an infringement of the '135 Patent, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

136. On information and belief, in violation of 35 U.S.C. § 271(f)(1), Samsung's infringement further includes without authority supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of at least Claim 1 of the '135 Patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

137. On information and belief, in violation of 35 U.S.C. § 271(f)(2), Samsung's infringement further includes without authority supplying or causing to be supplied in or from the United States components of the patented invention of at least Claim 1 of the '135 Patent that are especially made or especially adapted for use in the invention and not staple articles or

commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

138. Samsung is not licensed or otherwise authorized to practice the claims of the '135 Patent.

139. Thus, by its acts, Samsung has injured Daedalus and is liable to Daedalus for directly and/or indirectly infringing one or more claims of the '135 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 1.

140. On information and belief, Samsung has known about the '135 Patent at least since its issuance on June 12, 2018. At a minimum, Samsung has knowledge of the '135 Patent at least as of the filing of this Complaint. Accordingly, Samsung's infringement of the '135 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys' fees and costs pursuant to 35 U.S.C. §§ 284 and 285.

141. As a result of Samsung's infringement of the '135 Patent, Daedalus has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Samsung's infringement, but in no event less than a reasonable royalty with interest and costs.

142. On information and belief, Samsung will continue to infringe the '135 Patent unless enjoined by this Court. Samsung's infringement of Daedalus' rights under the '135 Patent will continue to damage Daedalus, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

**FOURTH COUNT**  
**(Infringement of U.S Patent No. 9,996,838)**

143. Daedalus incorporates by reference the allegations set forth in Paragraphs 1–142 of the Complaint as though fully set forth herein.

144. The claims of the '838 Patent are valid and enforceable.

145. On information and belief, in violation of 35 U.S.C. § 271(a), Samsung has directly infringed and continues to directly infringe one or more claims of the '838 Patent, including at least Claim 1 of the '838 Patent, in the state of Texas, in this judicial district, and elsewhere in the United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products that embody one or more of the inventions claimed in the '838 Patent, including but not limited to its electronic devices containing SoC's or microprocessors based on or derived from ARMv8.2 architecture, as well as subsequent revisions to the ARM architecture such as the ARMv9 architecture, such as the Qualcomm Snapdragon 888 and Exynos 2200 SoCs, and all reasonably similar products (the "'838 Patent Accused Products").

146. Each of the '838 Patent Accused Products comprises a system-on-a-chip. For example, the Qualcomm Snapdragon 888 and Samsung Exynos 2200 are each system-on-a-chip (SoC) processors, based on or derived from the ARMv8.2 and ARMv9 architecture, respectively.<sup>30</sup>

147. Each of the '838 Patent Accused Products comprises system-on-a-chip with a security engine that is separate from the processor core and has a secure memory accessible only by the security engine. Further, the secure memory includes a security key that gets encoded in the secure memory during a manufacturing process of the system-on-a-chip.

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<sup>30</sup> [https://www.gsmarena.com/samsung\\_launches\\_exynos\\_2200\\_with\\_xclipse\\_gpu\\_based\\_on\\_amd\\_rdna2\\_architecture-news-52728.php](https://www.gsmarena.com/samsung_launches_exynos_2200_with_xclipse_gpu_based_on_amd_rdna2_architecture-news-52728.php)

148. Specifically, Samsung implements ARM Trust Zone in Samsung Knox, which is Samsung's defense grade security platform in mobile devices. Arm TrustZone is an embedded security technology at the hardware level. The ARM TrustZone creates two environments, namely a secure world and a non-secure world. Both the secure and non-secure worlds run in a single core. Consequently, ARM TrustZone configures secure memory and non-secure memory domains on a single ARM core.<sup>31</sup> Knox environment includes a security key such as the Device Root Key, an asymmetric key that is generated at manufacture, and used by Knox for secure processes.<sup>32</sup> The Knox Vault unique key is written into one-time-programmable fuses.

Knox leverages a processor architecture known as ARM® TrustZone®. While TrustZone maintains the two modes described above, it also provides a new security-specific construct called *worlds*. In TrustZone, there are two worlds, the *Normal World*, and the *Secure World*. Virtually all smartphone software as we know it today still runs in the Normal World. The Secure World is reserved for highly-sensitive computations, such as those involving *cryptographic keys*. Knox utilizes the TrustZone's Secure World extensively for protecting enterprise confidential data and monitoring the OS kernel running in the Normal World.

**Device Root Key (DRK)** The DRK is a device-unique asymmetric key pair that is signed by Samsung's root key through an X.509 certificate. This certificate proves that the DRK was produced by Samsung. The DRK is generated at manufacture time in the Samsung factory and is stored on the device encrypted by the DUHK, thus binding it to the device. The DRK is only accessible from within the TrustZone Secure World.

### **Knox Vault unique key**

The Knox Vault unique key is written into one-time-programmable fuses. This unique key is used for protecting keys imported into or generated in the Knox Vault Subsystem. Thus, a key generated in Knox Vault on one device cannot be used outside of that device.

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<sup>31</sup> <https://docs.samsungknox.com/samsung-knox-whitepaper/Samsung-Knox-Security-Solution-Whitepaper.pdf>

<sup>32</sup> <https://docs.samsungknox.com/admin/whitepaper/kpe/knox-vault.htm>



149. Each of the '838 Patent Accused Products comprises a security engine that generates a random nonce for initiating a request for a secure communication session with a remote server over a network using the nonce.

150. Specifically, for example, the crypto processor in the secure world of ARM TrustZone generates one or more random nonces (random numbers) for initiating secure communications using a random number generator. In Knox, depending on the Device Root Key, a random nonce is generated to initiate a secure connection with the outside world or a server.<sup>33</sup>

The remote server requesting attestation provides a random nonce to prevent replay attacks. The nonce, the attestation verdict, and the rest of the attestation data are returned to the server, signed with the attestation certificate. The attestation certificate is signed by the Device Root Key (DRK), a device-unique asymmetric key that is signed by a Samsung root key through an X.509 certificate. This chain of certificates ensures that the attestation verdict cannot be altered in transit.

151. Each of the '838 Patent Accused Products comprises a security engine that performs a cryptographic key exchange with the remote server. For example, Knox provides broad support for key exchange for the IPSec protocol.<sup>34</sup>

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<sup>33</sup> [https://nl.insight.com/content/dam/insight-web/nl\\_NL/learn/techbooks/security/Samsung\\_KNOX\\_platform\\_overzicht.pdf](https://nl.insight.com/content/dam/insight-web/nl_NL/learn/techbooks/security/Samsung_KNOX_platform_overzicht.pdf)

<sup>34</sup> [https://nl.insight.com/content/dam/insight-web/nl\\_NL/learn/techbooks/security/Samsung\\_KNOX\\_platform\\_overzicht.pdf](https://nl.insight.com/content/dam/insight-web/nl_NL/learn/techbooks/security/Samsung_KNOX_platform_overzicht.pdf)



The KNOX platform offers broad feature support for the IPSec protocol suite including:

- Internet Key Exchange (IKE and IKEv2)
- IPsec IETF RFCs – IKEv1
- IKEv1 – Main and aggressive IKE exchange modes with pre-shared key, certificates, Hybrid RSA, and EAP-MD5 authentications
- IKEv2 with PSK and certificate-based authentication
- IKEv2 – Pre-shared key, certificates, EAP-MD5 EAP-MSCHAPv2 authentication methods, and mobile extensions
- Triple DES (56/168-bit), AES (128/256-bit) encryption with MD5 or SHA
- IKEv1 Suite B Cryptography supported with PSK and ECDS signature-based authentications
- IKEv2 Suite B Cryptography supported with ECDSA signatures

152. Each of the '838 Patent Accused Products comprises a security engine that generates a symmetric session key, based on the cryptographic key exchange, to encrypt messages sent to the remote server and decrypt messages received from the remote server during the secure communication session.

153. For example, in Knox the symmetric key may be pre-shared, derived using a key derivation function based on a shared secret, or generated and encrypted and provisioned dynamically with the encrypted payload.<sup>35</sup>

When encryption is desired there are three options for decryption keys:

- A full pre-shared symmetric key, which must be provisioned securely
- A symmetric key derived using a key derivation function (KDF), which is based on a small pre-shared secret
- An asymmetrically encrypted symmetric key, provisioned dynamically with the encrypted payload

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<sup>35</sup> [https://pages.arm.com/rs/312-SAX-488/images/DEN0072-PSA\\_TBFU\\_1.0-bet1.pdf](https://pages.arm.com/rs/312-SAX-488/images/DEN0072-PSA_TBFU_1.0-bet1.pdf)

154. Each of the '838 Patent Accused Products comprises a security engine that encrypts the symmetric session key based on the security key and stores the encrypted session key in the secure memory.

155. For example, In Samsung Knox, the crypto keys or any other keys are encrypted and then stored in the secure TrustZone memory.<sup>36</sup>

### TrustZone-based KeyStore

Similar to TIMA CCM, TIMA KeyStore is a TrustZone-based security service also built on the basis of Trusted Boot. The KeyStore provides applications with services for generating and maintaining cryptographic keys. The keys are further encrypted with a device-unique hardware key that can only be decrypted by the hardware from within TrustZone. All cryptographic operations are performed only within TrustZone and are disabled if the system is compromised as determined by Trusted Boot.

#### 2.2.1 ARM TrustZone

##### Providing a Trusted Execution Environment

There are several methods to implement a TEE as described in section 2.2 on page 8. Recent ARM processors have a feature called ARM TrustZone® Technology that adds security features to the ARM cores. An overview of ARM TrustZone is given in a white paper [9] by ARM. In this section an overview of ARM TrustZone based on this white paper will be given.

The basis concept of TrustZone is based on two environments within one system called *worlds*. The first world is the *normal world* this is the normal environment in which the operating system and all applications running on it operate. The second world is new and is called the *secure world*. In this world applications are using the requirements discussed in Section 2.2 to provide specific security services such as secure key storage. These worlds are achieved by separating both software and hardware resources [9]:

- All memory in the system is separated. This includes the system's RAM but also the registers of the CPUs. The RAM is split into two separate virtual memory spaces. One for the secure world and one for the normal world. This means that the normal world cannot access the memory used by the secure world. The persistent memory (such as flash memory) can be separated by using encryption.
- A dedicated cryptoprocessor and memory for storing keys can only be made accessible by the secure world. This prevents the normal world from accessing sensitive key material.

156. Each of the '838 Patent Accused Products comprises system-on-a-chip to establish the secure communication session with the remote server over the network using the session key.

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<sup>36</sup> [https://nl.insight.com/content/dam/insight-web/nl\\_NL/learn/techbooks/security/Samsung\\_KNOX\\_platform\\_overzicht.pdf](https://nl.insight.com/content/dam/insight-web/nl_NL/learn/techbooks/security/Samsung_KNOX_platform_overzicht.pdf)

157. For example, as noted above, Knox provides broad support for the IPSec protocol.<sup>37</sup> IPSec is a secure network protocol suite to provide secure encrypted communication between two computers over an Internet Protocol network.

158. Further, on information and belief, Samsung has actively induced and/or contributed to infringement of at least Claim 1 of the '838 Patent in violation of at least 35 U.S.C. § 271(b), (c), and (f).

159. Users of the '838 Patent Accused Products directly infringe at least Claim 1 of the '838 Patent when they use the '838 Patent Accused Products in the ordinary, customary, and intended way. On information and belief, Samsung's inducements in violation of 35 U.S.C. § 271(b) include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the '838 Patent Accused Products within the United States in the ordinary, customary, and intended way by, directly or through intermediaries, supplying the '838 Patent Accused Products to consumers within the United States and instructing and encouraging such customers to use the '838 Patent Accused Products in the ordinary, customary, and intended way, which Samsung knew infringes at least Claim 1 of the '838 Patent, or, alternatively, was willfully blind to the infringement.

160. On information and belief, Samsung's inducements in violation of 35 U.S.C. § 271(b) further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the '838 Patent Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of

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<sup>37</sup> [https://nl.insight.com/content/dam/insight-web/nl\\_NL/learn/techbooks/security/Samsung\\_KNOX\\_platform\\_overzicht.pdf](https://nl.insight.com/content/dam/insight-web/nl_NL/learn/techbooks/security/Samsung_KNOX_platform_overzicht.pdf)

infringement with respect to the '838 Patent Accused Products in the United States, which Samsung knew infringes at least Claim 1 of the '838 Patent, or, alternatively, was willfully blind to the infringement.

161. On information and belief, in violation of 35 U.S.C. § 271(c), Samsung's contributory infringement further includes offering to sell or selling within the United States, or importing into the United States, components of the patented invention of at least Claim 1 of the '838 Patent, constituting a material part of the invention. On information and belief, Samsung knows and has known the same to be especially made or especially adapted for use in an infringement of the '838 Patent, and such components are not staple articles or commodities of commerce suitable for substantial noninfringing use.

162. On information and belief, in violation of 35 U.S.C. § 271(f)(1), Samsung's infringement further includes without authority supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of at least Claim 1 of the '838 Patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

163. On information and belief, in violation of 35 U.S.C. § 271(f)(2), Samsung's infringement further includes without authority supplying or causing to be supplied in or from the United States components of the patented invention of at least Claim 1 of the '838 Patent that are especially made or especially adapted for use in the invention and not a staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and

intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

164. Samsung is not licensed or otherwise authorized to practice the claims of the '838 Patent.

165. Thus, by its acts, Samsung has injured Daedalus and is liable to Daedalus for directly and/or indirectly infringing one or more claims of the '838 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 1.

166. On information and belief, Samsung has known about the '838 Patent at least since its issuance on February 6, 2018. At a minimum, Samsung has knowledge of the '838 Patent at least as of the filing of this Complaint. Accordingly, Samsung's infringement of the '838 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys' fees and costs pursuant to 35 U.S.C. §§ 284 and 285.

167. As a result of Samsung's infringement of the '838 Patent, Daedalus has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Samsung's infringement, but in no event less than a reasonable royalty with interest and costs.

168. On information and belief, Samsung will continue to infringe the '838 Patent unless enjoined by this Court. Samsung's infringement of Daedalus' rights under the '838 Patent will continue to damage Daedalus, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

**FIFTH COUNT**  
**(Infringement of U.S. Patent No. 8,359,629)**

169. Daedalus incorporates by reference the allegations set forth in Paragraphs 1–168 of the Complaint as though fully set forth herein.

170. The claims of the '629 Patent are valid and enforceable.

171. On information and belief, Samsung has directly infringed and continues to directly infringe one or more claims of the '629 Patent, including at least claim 21 of the '629 Patent, in the state of Texas, in this judicial district, and elsewhere in the United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products that embody one or more of the inventions claimed in the '629 Patent, including but not limited to Samsung's Galaxy smartphones and tablets, which employ a Samsung Android Context Policy, and all other products using the methods and systems described in the '629 Patent (the "'629 Patent Accused Products"), in violation of 35 U.S.C. § 271(a).

172. The '629 Patent Accused Products include a non-transitory, machine-readable medium comprising a plurality of instructions, that in response to being executed, result in the product establishing a context policy enforcement engine on a mobile computing device.

173. For example, the Samsung Galaxy S20 FE 5G includes a non-transitory, machine-readable medium that comprises a plurality of instructions that further comprise the Android operating system.<sup>38</sup> When executed, the Android operating system establishes a context policy enforcement engine on the Samsung Galaxy S20 FE 5G mobile computing device.

174. The '629 Patent Accused Products include a non-transitory, machine-readable medium comprising a plurality of instructions, that in response to being executed, result in the product retrieving context policy data with the context policy enforcement engine in response to receiving a request for context information related to a user of the computing device, the context policy data defining a set of rules for responding to context requests.

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<sup>38</sup> <https://www.samsung.com/us/mobile/galaxy-s20-5g/specs/>

175. For example, a Samsung Galaxy S20 FE 5G running the Android operating system uses data defining a set of rules for location tracking settings when responding to requests for location data from apps.<sup>39</sup>

176. The '629 Patent Accused Products include a non-transitory, machine-readable medium comprising a plurality of instructions that, in response to being executed, result in the product determining a level of specificity of a context characteristic for a context parameter associated with the requested context information as a function of the context policy data and an identity of a requesting entity that requested the context information.

177. For example, in a Samsung Galaxy S20 FE 5G running the Android operating system, the Android Operating system determines a level of location specificity for a response to an application request for location data as a function of the user's location tracking settings and the application making the request.<sup>40</sup>

178. The '629 Patent Accused Products include a non-transitory, machine-readable medium comprising a plurality of instructions, that in response to being executed, result in the product retrieving context data identified by the determined level of specificity of the context characteristic for the context parameter associated with the requested context information; and responding to the request for context information with the retrieved context data.

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<sup>39</sup> <https://www.samsung.com/za/support/mobile-devices/how-do-i-change-the-location-tracking-settings-gps-on-my-samsung-galaxy-alpha/#:~:text=Your%20device%20uses%20information%20from,search%20results%20and%20other%20services.>

<sup>40</sup> <https://www.samsung.com/za/support/mobile-devices/how-do-i-change-the-location-tracking-settings-gps-on-my-samsung-galaxy-alpha/#:~:text=Your%20device%20uses%20information%20from,search%20results%20and%20other%20services>; <https://developer.android.com/training/location/permissions>



179. For example, in a Samsung Galaxy S20 FE 5G running the Android operating system, the Android Operating system retrieves the location data identified by the location specificity settings for the requesting app and responds with the appropriate location data.<sup>41</sup>

180. Further, Samsung has actively induced infringement of at least claim 1 of the '629 Patent in violation of at least 35 U.S.C. §271(b), (c), and (f). Users of the '629 Patent Accused Products directly infringe at least claim 1 of the '629 Patent when they use the '629 Patent Accused Products in the ordinary, customary, and intended way. Samsung's inducements include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the '629 Patent Accused Products within the United States in the ordinary, customary, and intended way by, directly or through intermediaries, supplying the '629 Patent Accused Products to consumers within the United States and instructing and encouraging such customers to use the '629 Patent Accused Products in the ordinary, customary, and intended way, which Samsung knew infringes at least claim 1 of the '629 Patent, or, alternatively, was willfully blind to the infringement.

181. Samsung's inducements further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the '629 Patent Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of infringement with respect to the '629 Patent Accused Products in the

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<sup>41</sup> <https://www.samsung.com/za/support/mobile-devices/how-do-i-change-the-location-tracking-settings-gps-on-my-samsung-galaxy-alpha/#:~:text=Your%20device%20uses%20information%20from,search%20results%20and%20other%20services>; <https://developer.android.com/training/location/permissions>



United States, which Samsung knew infringes at least claim 1 of the '629 Patent, or, alternatively, was willfully blind to the infringement.

182. The plurality of instructions stored on the '629 Patent Accused Products that infringe claim 21 have no substantial function or use other than practicing the invention in at least claim 21 of the '629 Patent.

183. By making, using, offering for sale, and/or selling products in the United States and/or importing products into the United States, including but not limited to the '629 Patent Accused Products, Samsung has injured Daedalus and is liable to Daedalus for directly infringing one or more claims of the '629 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 1 pursuant to 35 U.S.C. § 271(a), (b), (c) and (f).

184. On information and belief, Samsung has known about the '629 Patent at least since its issuance on January 22, 2013. At a minimum, Samsung has knowledge of the '629 Patent at least as of the filing of this Complaint. Accordingly, Samsung's infringement of the '629 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys' fees and costs pursuant to 35 U.S.C. §§ 284-285.

185. On information and belief, Samsung will continue to infringe the '629 Patent unless enjoined by this Court.

186. As a result of Samsung's infringement of the '629 Patent, Daedalus has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Samsung's infringement, but in no event less than a reasonable royalty with interest and costs. Samsung's infringement of Daedalus' rights under the '629 Patent will continue to damage

Daedalus, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

**SIXTH COUNT**  
**(Infringement of U.S. Patent No. 9,432,840)**

187. Daedalus incorporates by reference the allegations set forth in Paragraphs 1–186 of the Complaint as though fully set forth herein.

188. The claims of the '840 Patent are valid and enforceable.

189. On information and belief, Samsung has directly infringed and continues to directly infringe one or more claims of the '840 Patent, including at least claim 6 of the '840 Patent, in the state of Texas, in this judicial district, and elsewhere in the United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products that embody one or more of the inventions claimed in the '840 Patent, including but not limited to the Samsung Galaxy smartphones and other devices that use Samsung's Intelligent Wi-Fi and/or Adaptive Wi-Fi to activate a Wi-Fi radio in response to a change in location, including, for example, the Samsung Galaxy S10 and later smartphones, and all other products using the methods and systems described in the '840 Patent (the "'840 Patent Accused Products"), in violation of 35 U.S.C. § 271(a).

190. The '840 Patent Accused Products comprise a mobile platform comprising a plurality of radios.

191. For example, the Samsung Galaxy S10 smartphone comprises a mobile platform comprising at least Wi-Fi, Bluetooth and cellular radios.<sup>42</sup>

192. The '840 Patent Accused Products comprise logic, further comprising hardware and/or software logic.

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<sup>42</sup> <https://www.anandtech.com/show/14072/the-samsung-galaxy-s10plus-review>

193. For example, the Samsung Galaxy S10 smartphone comprises a Snapdragon 855 processor, an Android operating system, and associated software.

194. The '840 Patent Accused Products comprise logic to detect a change in location for the mobile platform, wherein each of the plurality of radios supports a different wireless technology, and the change in location is based on information received from one or more active radios of the plurality of radios on the mobile platform including a connection loss, and activate a Wi-Fi radio in response to the change in location.

195. For example, the Samsung Galaxy S10's Snapdragon 855 processor running the Android operating system and associated software supports Intelligent Wi-Fi and/or Adaptive Wi-Fi, which detects a change in location for the phone and turns Wi-Fi on and off depending on its location.<sup>43</sup> The Wi-Fi, Bluetooth and cellular radios in the Samsung Galaxy S10 support different wireless technology, including, for example IEEE 802.11, Bluetooth 5.0 and LTE.<sup>44</sup> The Samsung Galaxy S10 turns Wi-Fi on when a favorite network is available and turns Wi-Fi off when the Wi-Fi network becomes unavailable.<sup>45</sup>

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<sup>43</sup> <https://docs.samsungknox.com/admin/knox-platform-for-enterprise/kbas/kba-360034073174.htm>

<sup>44</sup> <https://www.anandtech.com/show/14072/the-samsung-galaxy-s10plus-review>

<sup>45</sup> <https://docs.samsungknox.com/admin/knox-platform-for-enterprise/kbas/kba-360034073174.htm>

## 2. Auto Wi-Fi

People use Wi-Fi differently based on their location. In places where Wi-Fi is available, we turn on Wi-Fi to avoid being charged for mobile data. On the other hand, if Wi-Fi is always on, we are subjected to frequent, unwanted connections and higher power consumption. To solve this problem, we have introduced **Auto Wi-Fi, which turns Wi-Fi on and off depending on your location**. Auto Wi-Fi addresses these connectivity-related pain points.

Auto Wi-Fi pays close attention to your connection patterns and remembers your favorite networks. It turns your Wi-Fi on when a favorite network is available. When you leave the area and the network becomes unavailable, Auto Wi-Fi will automatically turn off your Wi-Fi.



Auto Wi-Fi uses geofencing (a virtual geological fence based on cellular stations) to detect a user's location. In registered geofenced areas, "ENTER" and "EXIT" events will be triggered based on location changes detected via the user's device. Since Auto Wi-Fi is only triggered when these events take place, the device does not have to constantly scan for location, thereby saving battery life. Samsung's original cell-based geofencing technique allows users to use Auto Wi-Fi without turning GPS on. Samsung's geofencing technique also incorporates learning algorithms which improves location accuracy over time as users continue to use it.

196. The '840 Patent Accused Products further comprise a first profile that is associated with a first location and a second profile that is associated with a second location, and the first profile and the second profile each include location entry criteria, location exit criteria, and radio settings including activation and deactivation information for the plurality of radios.

197. For example, the Samsung Galaxy S10's Intelligent Wi-Fi and/or Adaptive Wi-Fi

remembers your favorite networks [and]... turns your Wi-Fi on when a favorite network is available. When you leave the area and the network becomes unavailable, Auto Wi-Fi will automatically turn off your Wi-Fi. Auto Wi-Fi uses geofencing (a virtual geological fence based on cellular stations) to detect a user's location. In registered geofenced areas, "ENTER" and "EXIT" events will be triggered based on location changes detected via the user's device. Since

Auto Wi-Fi is only triggered when these events take place, the device does not have to constantly scan for location, thereby saving battery life. Samsung's original cell-based geofencing technique allows users to use Auto Wi-Fi without turning GPS on. Samsung's geofencing technique also incorporates learning algorithms which improves location accuracy over time as users continue to use it.<sup>46</sup>

198. Further, Samsung has actively induced infringement of at least claim 6 of the '840 Patent in violation of at least 35 U.S.C. §271(b), (c), and (f). Users of the '840 Patent Accused Products directly infringe at least claim 6 of the '840 Patent when they use the '840 Patent Accused Products in the ordinary, customary, and intended way. Samsung's inducements include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the '840 Patent Accused Products within the United States in the ordinary, customary, and intended way by, directly or through intermediaries, supplying the '840 Patent Accused Products to consumers within the United States and instructing and encouraging such customers to use the '840 Patent Accused Products in the ordinary, customary, and intended way, which Samsung knew infringes at least claim 6 of the '840 Patent, or, alternatively, was willfully blind to the infringement.

199. Samsung's inducements further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the '840 Patent Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of infringement with respect to the '840 Patent Accused Products in the United States, which Samsung knew infringes at least claim 6 of the '840 Patent, or, alternatively, was willfully blind to the infringement.

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<sup>46</sup> <https://docs.samsungknox.com/admin/knox-platform-for-enterprise/kbas/kba-360034073174.htm>

200. The logic in the '840 Patent Accused Products that infringes claim 6 of the '840 Patent has no substantial function or use other than practicing the invention in at least claim 6 of the '840 Patent.

201. By making, using, offering for sale, and/or selling products in the United States and/or importing products into the United States, including but not limited to the '840 Patent Accused Products, Samsung has injured Daedalus and is liable to Daedalus for directly infringing one or more claims of the '840 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 6 pursuant to 35 U.S.C. § 271(a), (b), (c), and (f).

202. On information and belief, Samsung has known about the '840 Patent at least since its issuance on August 30, 2016. At a minimum, Samsung has knowledge of the '840 Patent at least as of the filing of this Complaint. Accordingly, Samsung's infringement of the '840 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys' fees and costs pursuant to 35 U.S.C. §§ 284-285.

203. On information and belief, Samsung will continue to infringe the '840 Patent unless enjoined by this Court.

204. As a result of Samsung's infringement of the '840 Patent, Daedalus has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Samsung's infringement, but in no event less than a reasonable royalty with interest and costs.

205. Samsung's infringement of Daedalus' rights under the '840 Patent will continue to damage Daedalus, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

**DEMAND FOR JURY TRIAL**

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Plaintiff demands a trial by jury in this action for all issues triable by a jury.

**PRAYER FOR RELIEF**

WHEREFORE, Plaintiff prays for judgment and seeks relief from Samsung as follows:

- a. For judgment that Samsung has infringed and continues to infringe the claims of the '135, '960, '197, '838, '629 and '840 Patents;
- b. For a permanent injunction against Samsung and its respective officers, directors, agents, servants, affiliates, employees, divisions, branches, subsidiaries, parents, and all other acting in active concert therewith from infringement of the '135, '960, '197, '838, '629 and '840 Patents;
- c. For an accounting of all damages sustained by Plaintiff as a result of Samsung's acts of infringement;
- d. For a mandatory future royalty payable on each and every future sale by Samsung of a product that is found to infringe one or more of the Asserted Patents and on all future products which are not colorably different from products found to infringe;
- e. For a judgment and order finding that Samsung's infringement is willful and awarding to Plaintiff enhanced damages pursuant to 35 U.S.C. § 284;
- f. For a judgment and order requiring Samsung to pay Plaintiff's damages, costs, expenses, and pre- and post-judgment interest for its infringement of the '135, '960, '197, '838, '629 and '840 Patents as provided under 35 U.S.C. § 284 and without limitation under 35 U.S.C. § 287;

- g. For a judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285 and awarding to Plaintiff its reasonable attorneys' fees; and
- h. For such other and further relief in law and in equity as the Court may deem just and proper.

Dated: September 12, 2022

Respectfully Submitted,

/s/ Garland Stephens, with permission  
Charles Everingham IV

Garland Stephens

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