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

CM HK LIMITED, *Plaintiff,* SAMSUNG ELECTRONICS CO., LTD. AND SAMSUNG ELECTRONICS AMERICA, INC., *Defendants.*	CASE NO. _____ JURY TRIAL DEMANDED

PLAINTIFF'S ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

1. Plaintiff CM HK Limited. ("Plaintiff" or "CM HK"), by and through its undersigned counsel, files this Complaint against Defendants Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc., as follows:

I. THE PARTIES

2. CM HK is a Hong Kong entity that was incorporated on March 30, 2016, and has a principal place of business at Unit D18 3/F, Wong Kind Industrial Building, No. 2-4 Tai Yau St., San Po Kong, Hong Kong.

3. Defendant Samsung Electronics Company, Ltd. ("Samsung Electronics") is a South Korean corporation with its principal place of business at 129 Samsung Ro Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 433-742, South Korea.

4. Samsung Electronics Co., Ltd's DX division is responsible for the design, manufacture, and sale of mobile devices such as smartphones.

5. Samsung Electronics America, Inc. ("SEA") is a wholly owned subsidiary of Samsung Electronics Co., Ltd. and is a corporation organized under the laws of New York with its principal place of business at 85 Challenger Road, Ridgefield Park, New Jersey 07660.

SEA also has a place of business at 6625 Excellence Way, Plano Texas 75023.

6. SEA oversees U.S. sales and distribution of Samsung's consumer electronic products, including smartphones, tablets, and watches.

7. SEA may be served through its registered agent, CT Corporation System, located at 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

8. Defendants Samsung and SEA are collectively referred to as "Samsung" or "Defendants". Defendants are doing business in the United States and more particularly, in the State of Texas and the Eastern District of Texas, by designing, marketing, making, using, selling, importing, and/or offering for sale products that infringe the patent claims involved in this action or by transacting other business in this District.

II. JURISDICTION AND VENUE

9. This action arises under the patent laws of the United States, 35 U.S.C. § 1 *et seq.*, including 35 U.S.C. §§ 271, 281, 283, 284, 285. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

10. This Court has personal jurisdiction over each Defendant because each Defendant has substantial, systematic and continuous contacts with this judicial district. For example, each Defendant has purposefully and voluntarily availed itself of the privileges of conducting business in the United States, State of Texas, and in the Eastern District of Texas by continuously and systematically placing goods into the stream of commerce through an established distribution channel with the expectation that they will be purchased by consumers in the Eastern District of Texas.

11. As a result, Samsung Electronics and SEA have previously admitted that this Court has personal jurisdiction over them based on, at least, their development, manufacture,

and supply of smartphones and tablets, including at least the Samsung Galaxy line of mobile phones. *TIVO, Inc., v. Samsung Elecs. Co.*, No. 15-cv-01503, Dkt. 25 at ¶ 14 (E.D. Tex. Nov. 17, 2015); *Optimum Imaging Techs. LLC v. Samsung Electronics. Co., Ltd.*, No. 4:23-cv-927-ALM, Dkt. 19 at ¶¶ 7 & 8 (E.D. Tex. July 1, 2024) ("For the purposes of this litigation only, Defendant does not contest that this Court has personal jurisdiction.").

12. Plaintiff's cause of action arises directly from Defendants' business contacts and other activities in the State of Texas and the Eastern District of Texas.

13. Venue is proper for Defendant SEA in the Eastern District of Texas pursuant to 28 U.S.C. §§ 1391(b) and 1400(b) because SEA has committed acts of infringement in this judicial district and maintains a regular and established place of business in this judicial district at 6625 Excellence Way, Plano Texas 752023. *See also TIVO, Inc., v. Samsung Elecs. Co.*, No. 15-cv-01503, Dkt. 25 at ¶ 15 (E.D. Tex. Nov. 17, 2015) ("Samsung admits that venue is permissible for purposes of this action only, under 28 U.S.C. §§ 1391 and 1400…").

14. Venue is proper for Defendant Samsung Electronics in the Eastern District of Texas pursuant to 28 U.S.C. §§ 1391(b), (c) and 1400(b) because (i) Samsung Electronics has done and continues to do business in this district, (ii) Samsung Electronics has committed and continues to commit and/or induce acts of patent infringement in this district, including making, using, offering to sell, and/or selling accused products in this district, and/or importing accused products, (iii) Samsung Electronics is a foreign entity that is not resident in the United States so it may be sued in any judicial district under 28 U.S.C. § 1391(c). *Optimum Imaging Techs. LLC v. Samsung Electronics. Co., Ltd.*, No. 4:23-cv-927-ALM, Dkt. 19 at ¶ 9 (E.D. Tex. July 1, 2024) ("To the extent that a response is required, and for the purposes of this litigation only, Defendant does not contest that venue is proper in this District.").

15. And Samsung employees live within the subpoena power of this judicial districts and have knowledge relevant to the issues of this case. For example, Guy Waitley is the Director of Content and Services Business Development at SEA and lives in the Dallas-Fort Worth region.

III. Factual Allegations

A. The Asserted Patents.

16. U.S Patent Numbers 10,852,846 (the "'846 Patent") and 11,698,687 (the "'687 Patent) (collectively the "Asserted Patents") are assigned to CM HK.

17. All maintenance fees have been paid to the USPTO for the Asserted Patents.

18. The '846 Patent is valid and enforceable.

19. A copy of the '846 Patent is attached as **Exhibit A**.

20. The '687 Patent is valid and enforceable.

21. A copy of the '687 Patent is attached as **Exhibit B**.

B. Android Operating System

22. Android is an operating system (OS) owned by Google that powers a wide range of devices, including smartphones, tablets, smartwatches, TVs, and cars.

23. Android devices come with built-in apps and services from Google, like Google Maps, Gmail, and Google Assistant.

24. Android has required sensor fusion technology for Android devices since API 9, also known as Android Gingerbread, which was released on December 6, 2010.

25. The "Rotation Vector" sensor was introduced in Android 2.3 (API Level 9 – Gingerbread) that was released on December 6, 2010.

26. The "Rotation Vector" sensor provides device orientation as a quaternion, combining data from the accelerometer, gyroscope, and magnetometer to offer accurate

rotation tracking.

27. The "Rotation Vector" sensor allows Android devices to determine the device's orientation relative to the global coordinate system.

28. "Rotation Vector" is an example of a composite sensor, also called synthetic or software sensors.

29. The "Game Rotation Vector" sensor was introduced in Android 4.4 (API Level 19 – KitKat) that was released on October 31, 2013.

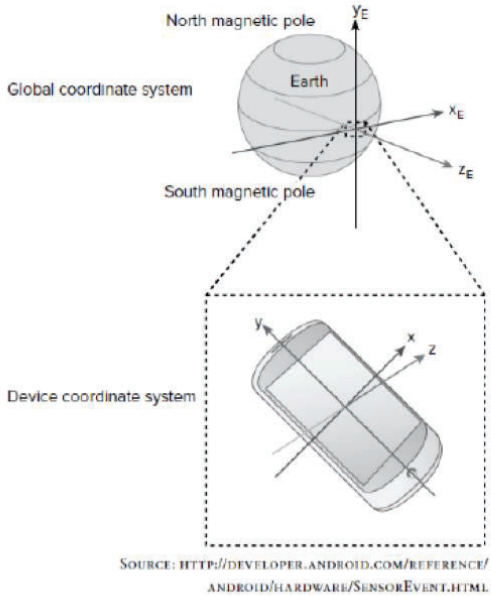
30. The "Game Rotation Vector" sensor was introduced to support devices that lack a magnetometer, so it only relies only on the gyroscope and accelerometer data.

31. The "Game Rotation Vector" sensor is used in games and AR applications where precise orientation is needed, but alignment with magnetic north is unnecessary.

32. Android uses two reference frames, (1) a device coordinate system (the "display reference frame" of claim 1 of the '846 Patent) and (2) a global coordinate system (the "spatial reference frame" of claim 1 of the '846 Patent).

Coordinate Systems

When using orientation and movement sensors in Android, two coordinate systems are defined: the *global coordinate system* x_E, y_E, z_E, and a *device coordinate system* x, y, z. Both coordinate systems are illustrated in Figure 5-4. This figure shows the device positioned at the equator of Earth, with some tilt with respect to Earth. All coordinate systems for three-axis sensors obey these coordinate systems, except `Sensor.TYPE_ORIENTATION`, which is deprecated.



SOURCE: HTTP://DEVELOPER.ANDROID.COM/REFERENCE/ANDROID/HARDWARE/SENSOREVENT.HTML

FIGURE 5-4: Android coordinate systems

C. Samsung Sensor Fusion Algorithm.

33. Samsung customizes the Android operating system for its smartphones through a layer called ***One UI***, which adds unique design elements, features, and tools intended to enhance a user's experience. https://www.samsung.com/us/apps/one-ui/.

34. One customization Samsung made was to replace Android's sensor fusion library with its own library starting with the Marshmallow version of Android that was released on October 2, 2015.

35. Gongbo Moon is Senior Research Engineer at Samsung Electronics with knowledge of Samsung's sensor fusion library.

36. Samsung's custom sensor fusion code outputs the same output as the Android sensor fusion code.

37. Samsung's sensor fusion code uses the same reference frames as Android, an ENU (East-North-Up) frame that is fixed and does not rotate with the device and a body frame that rotates with the device.

38. An ENU frame defines its coordinate axes relative to the Earth's surface along lines of latitude and longitude. The x-axis points eastward, the y-axis points northward, and the z-axis points up (perpendicular to gravity).

39. Samsung's mobile devices calculate quaternions using measured angular velocity and axial acceleration.

40. In sensor fusion, comparing angular velocities and axial accelerations ensures precise orientation and motion tracking.

41. The gyroscope handles fast movements, but its readings can drift over time.

42. The accelerometer provides a stable reference to gravity but is noisy.

43. Together, these sensors complement each other, and their comparison is essential for accurate, drift-free motion tracking in smartphones, AR/VR applications, and drones.

D. Samsung Galaxy Phones

44. Since December 1, 2020, Samsung has released the following smartphones (collectively the "**Galaxy Phones**") in the United States:

Name	**US Release Date**	**Chipset**
Galaxy S21	1/29/21	Qualcomm Snapdragon 888
Galaxy S21+	1/29/21	Qualcomm Snapdragon 888
Galaxy S21 Ultra	1/29/21	Qualcomm Snapdragon 888
Galaxy Z Flip3	8/27/21	Qualcomm Snapdragon 888
Galaxy Z Fold3	8/27/21	Qualcomm Snapdragon 888
Galaxy S21 FE	1/11/22	Qualcomm Snapdragon 888
Galaxy S22	2/25/22	Qualcomm Snapdragon 8 Gen 1
Galaxy S22+	2/25/22	Qualcomm Snapdragon 8 Gen 1
Galaxy S22 Ultra	2/25/22	Qualcomm Snapdragon 8 Gen 1

Galaxy Z Flip4	8/26/22	Qualcomm Snapdragon 8+ Gen 1
Galaxy Z Fold4	8/26/22	Qualcomm Snapdragon 8+ Gen 1
Galaxy S23	2/17/23	Snapdragon 8 Gen 2 for Galaxy
Galaxy S23+	2/17/23	Snapdragon 8 Gen 2 for Galaxy
Galaxy S23 Ultra	2/17/23	Snapdragon 8 Gen 2 for Galaxy
Galaxy Z Flip5	8/11/23	Snapdragon 8 Gen 2 for Galaxy
Galaxy Z Fold5	8/11/23	Snapdragon 8 Gen 2 for Galaxy
Galaxy S24	1/31/24	Snapdragon 8 Gen 3 for Galaxy
Galaxy S24+	1/31/24	Snapdragon 8 Gen 3 for Galaxy
Galaxy S24 Ultra	1/31/24	Snapdragon 8 Gen 3 for Galaxy
Galaxy Z Flip6	7/24/24	Snapdragon 8 Gen 3 for Galaxy
Galaxy Z Fold6	7/24/24	Snapdragon 8 Gen 3 for Galaxy

45. Samsung and Qualcomm have partnered on "Snapdragon for Galaxy," which provides Samsung with a custom version of Snapdragon chips with higher clock speeds and other performance improvements that are exclusively for Samsung devices.

46. Since December 1, 2020, Samsung's Galaxy Phones have captured between 28% and 35% of the United States market.

47. Every Galaxy Phone listed in the paragraph above has an accelerometer, gyroscope, magnetometer.

48. Every Galaxy Phone listed above also has a Qualcomm Snapdragon Sensor Core.

49. Every Galaxy Phone listed above also has a Qualcomm Sensing Hub.

50. The Qualcomm Sensing Hub is always on processing and collecting information.

51. Qualcomm Sensor Execution Environment is a software framework that provides services to sensors, manages registry, handles client interface, and manages power features.

52. The which is a low-power processor that handles data from sensors like accelerometers, gyroscopes, magnetometers, and more.

53. Samsung uses the sensor hub in its Galaxy Phones to offload sensor-related tasks from the main CPU, reducing power consumption and enabling features like always-on fitness tracking, motion gestures, and camera stabilization without significantly draining the battery.

54. Every Galaxy Phone has a display.

55. Every Galaxy Phone has a motion sensor module.

56. Every Galaxy Phone has one or more computer processors.

57. Every Galaxy Phone comes with Google Maps preinstalled.

58. Every Galaxy Phone comes with the Google Play store preinstalled.

59. Every Galaxy Phone comes with the Samsung Galaxy Apps store preinstalled.

60. Samsung provides instructions for using Google Maps on each Galaxy Phone.

61. Samsung also provides instructions on each Galaxy Phone for downloading apps using the Google Play store or Galaxy Apps store.

62. Every Galaxy Phone is capable of outputting a Rotation Vector based on non-ASOP (Android Open Source Project) sensor fusion algorithms.

63. Every Galaxy Phone is capable of outputting a Rotation Vector that can be accessed by third-party applications through standard documented Android API methods.

64. Rotation Vector reports the orientation of the device relative to the East-North-Up coordinates frame.

65. Rotation Vector obtains the phones orientation through the integration of the accelerometer, gyroscope, and magnetometer readings.

66. Every Galaxy Phone is capable of outputting a Game Rotation Vector based on non-ASOP (Android Open Source Project) sensor fusion algorithms.

67. Every Galaxy Phone is capable out outputting a Game Rotation Vector that can be accessed by third-party applications through standard documented Android API methods.

68. Game Rotation Vector reports the orientation of the device that is relative to an unspecified coordinate frame.

69. Game Rotation Vector obtains the orientation through integration of accelerometer and gyroscope readings.

70. Google Maps uses Rotation Vector when it runs on a Galaxy Phone.

71. Google Maps uses Game Rotation Vector when it runs on a Galaxy Phone.

72. Google Maps uses Gravity when it runs on a Galaxy Phone.

73. Google Maps uses Linear Acceleration when it runs on a Galaxy Phone.

74. Samsung knows that Google Maps utilizes the Rotation Vector sensor.

75. Samsung knows that Google Maps utilizes the Game Rotation Vector sensor.

76. Samsung knows that Google Maps utilizes the Gravity sensor.

77. Samsung knows that Google Maps utilizes the Linear Acceleration sensor.

78. Google Maps provides a heading or direction that changes as a user's device changes direction.

79. Another example of the utilization of the Sensor Fusion Code is exemplified through Samsung selling its SmartTag and SmartTag2 ("Smart Tag").

80. The Smart Tag is attached to a user's keys, phones, luggage, laptops and other possessions.

81. The Smart Tag allows a user to track its missing or lost possessions in both a 2-D, 3-D, and AR view.

82. The Smart Tag works in combination of the SmartThings App which includes features such as "Search Nearby, Navigate, and Ring."

83. The Navigate feature integrates with Google Maps to help a user navigate in real time to the location of their Smart Tag'd possession.

84. Samsung knows that SmartThings app utilizes the Rotation Vector sensor.

85. Samsung knows that SmartThings app utilizes the Game Rotation Vector sensor.

86. Samsung knows that SmartThings app utilizes the Gravity sensor.

87. Samsung knows that SmartThings app utilizes the Linear Acceleration sensor.

COUNT ONE: INFRINGEMENT OF U.S. PATENT NO. 10,852,846

88. The '846 Patent, titled "Electronic device for use in motion detection and method for obtaining resultant deviation thereof" was duly and legally issued by the United States Patent and Trademark Office on December 1, 2020.

89. CM HK is the owner of all right, title, and interest in and to the '846 Patent with full right to bring suit to enforce the patent, including the right to recover for past infringement damages.

90. Each claim of the '846 Patent is valid and enforceable, and each enjoys a statutory presumption of validity separate, apart, and in addition to the statutory presumption of validity enjoyed by every other of its claims. 35 U.S.C. § 282.

91. Samsung has been and continues to directly infringe claims 1, 2, 7 and 8 of the '846 Patent by making, using, offering for sale, importing, or selling Galaxy Phones in the United States in violation of 35 U.S.C. § 271(a), as shown in **Exhibit D**.

92. In addition, Samsung has and is continuing to actively and knowingly induce,

infringement of the '846 Patent under 35 U.S.C. § 271(b) by making, using, offering for sale, importing, and/or selling '846 Accused Products, all with knowledge of the '846 Patent and its claims.

93. Defendants' acts of infringement have caused and will continue to cause substantial and irreparable damage to CM HK.

94. As a result, Plaintiff is entitled to an award of damages adequate to compensate for Samsung's infringement, but not less than a reasonable royalty, together with pre- and post-judgment interest and costs as fixed by the Court under 35 U.S.C. § 284.

COUNT TWO: PATENT INFRINGEMENT OF U.S. PATENT NO. 11, 698, 687

95. The '687 Patent, titled "Electronic device for use in motion detection and method for obtaining resultant deviation thereof," was duly and legally issued by the United States Patent and Trademark Office on July 11, 2023 to CM HK Limited, as assignee of named inventors Zhou Ye, Chin-Lung Li, and Shun-Nan Liou.

96. CM HK is the owner of all right, title, and interest in and to the '687 Patent with full right to bring suit to enforce the patent, including the right to recover for past infringement damages.

97. Each claim of the '687 Patent is valid and enforceable, and each enjoys a statutory presumption of validity separate, apart, and in addition to the statutory presumption of validity enjoyed by every other of its claims. 35 U.S.C. § 282.

98. Samsung has been and continues to directly infringe claims 1, 2, 3, 9, 14, 15, 16, 22 of the '687 Patent by making, using, offering for sale, importing, or selling Galaxy Phones in the United States in violation of 35 U.S.C. § 271(a), as shown in **Exhibit E**.

99. In addition, Samsung has and is continuing to actively and knowingly induce,

infringement of the '687 Patent under 35 U.S.C. § 271(b) by making, using, offering for sale, importing, and/or selling '687 Accused Products, all with knowledge of the '687 Patent and its claims.

100. Defendants' acts of infringement have caused and will continue to cause substantial and irreparable damage to CM HK.

101. As a result, Plaintiff is entitled to an award of damages adequate to compensate for Samsung's infringement, but not less than a reasonable royalty, together with pre- and post-judgment interest and costs as fixed by the Court under 35 U.S.C. § 284.

COUNT THREE: WILLFUL INFRINGEMENT

102. Samsung has known about the '846 and '687 Patents since at least September 18, 2024, when it filed a declaratory judgment action against CM HK, Ltd. and CyWee Group Ltd. in the Northern District of California, a copy of which is attached as **Exhibit C.**

103. In that complaint, Samsung alleges that its mobile devices do not infringe claims 1 and 7 of the '846 Patent:

> 82. The accused Samsung mobile devices do not include or practice multiple claim limitations of at least claims 1 and 7 of the '846 Patent including, but not limited to obtaining a quaternion by predicting axial accelerations; comparing predicted axial accelerations with measured axial accelerations; and using predicted axial accelerations converted from measured angular velocities. To the extent that Samsung mobile devices calculate quaternions using sensor data, such calculations utilize measured angular velocity and acceleration.

104. And claims 1, 14 and 27 of the '687 Patent:

88. The accused Samsung mobile devices do not include or practice multiple claim limitations of at least claims 1, 14 and 27 of the '687 Patent including, but not limited to obtaining a quaternion by predicting axial accelerations; comparing predicted axial accelerations with measured axial accelerations; and using predicted axial accelerations converted from measured angular velocities. To the extent that Samsung mobile devices calculate quaternions using sensor data, such calculations utilize measured angular velocity and acceleration.

105. Samsung has continued to sell Galaxy Phones since it learned about the Asserted Patents.

106. Samsung knew that its decision to continue to sell Galaxy Phones likely infringed at claims 1 and 7 of the '846 Patent and claims 1 and 14 of the '687 Patent.

107. Samsung knew that its actions likely infringed in two separate ways.

108. First, Samsung knows that its Galaxy Phones likely infringe claims 1 and 7 of the '846 Patent and claims 1 and 14 of the '687 Patent based on a prior lawsuit by CyWee Group accusing Samsung's mobile phones of infringing related patents.

109. Second, Samsung knows that the Galaxy Phones likely infringe claims 1 and 7 of the '846 Patent and claims 1 and 14 of the '687 Patent based on its rule 11 investigation for the declaratory judgment action it recently filed California.

110. In addition, Samsung will continue to sell infringing Galaxy Phones after it has been served this Complaint.

111. Samsung has continued making, using, offering for sale, and selling Galaxy Phones despite an objectively high likelihood that its actions constitutes infringement of claims 1 and 7 of the '846 Patent and claims 1 and 14 of the '687 Patent.

112. Samsung has copied the inventions disclosed in the '846 and '687 Patents.

113. Samsung has made no effort to avoid infringing claims 1 and 7 of the '846 Patent and claims 1 and 14 of the '687 Patent.

114. Samsung did not obtain an opinion of counsel concerning its infringement of either the '846 or '687 Patents.

115. Therefore, Plaintiff should receive enhanced damages up to three times the amount of actual damages for Samsung's willful infringement under 35 U.S.C. § 284.

JURY DEMAND

116. Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiff hereby demands a trial by jury on all issues triable to a jury.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff prays for entry of judgment against Defendants as follows:

A. A judgment that Defendants have infringed and continue to infringe the '846 and '687 Patents;

B. A judgment and Order requiring Defendants to pay Plaintiff damages under 35 U.S.C. § 284, including treble damage for willful infringement, and supplemental damages for any continuing post-verdict infringement through entry of the final judgment with an accounting needed;

C. A judgment and Order requiring Defendants to pay Plaintiff pre-judgment and post-judgment interest on the damages awarded;

D. A judgment and Order awarding a compulsory on-going royalty; and

E. Such other further relief as the Court deems just and equitable.

Dated: October 31, 2024

Respectfully submitted,

/s/ Michael W. Shore

Michael W. Shore
Texas State Bar No. 18294915
Zachary R. Della Porta
Texas State Bar No. 24134899
Kenneth E. Shore
Texas State Bar No. 24027972

The Shore Firm LLP
5646 Milton Street, Suite 423
Dallas, Texas 75206

Christopher L. Evans
Texas State Bar No. 24058901
Chijioke E. Offor
Texas State Bar No. 24065840

Offor Evans PLLC
1122 Jackson Street, No. 901
Dallas, Texas 75202

Attorneys for Plaintiff
CM HK Ltd.