**IN THE UNITED STATES DISTRICT COURT**
**FOR THE EASTERN DISTRICT OF TEXAS**
**SHERMAN DIVISION**

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|---|---|
| HANNIBAL IP, LLC,<br><br>Plaintiff,<br><br>v.<br><br>SAMSUNG ELECTRONICS CO., LTD. AND SAMSUNG ELECTRONICS AMERICA, INC.,<br><br>Defendants. | Civil Action No. 4:25-cv-200<br><br>**JURY TRIAL DEMANDED** |

**COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff Hannibal IP, LLC ("Hannibal" or "Plaintiff") files this Complaint for patent infringement against Samsung Electronics Co., Ltd. ("Samsung Electronics") and Samsung Electronics America, Inc. ("Samsung America") (collectively, "Samsung" or "Defendants"), and alleges as follows:

## I. PARTIES

1. Hannibal is a limited liability company organized and existing under the laws of the State of Texas, with its principal place of business located at 5204 Bluewater Dr., Frisco, Texas 75036.

2. Samsung Electronics is incorporated under the laws of the Republic of Korea also known as South Korea. Samsung Electronics is headquartered in South Korea with its principal place of business at 129 Samsung-Ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea. Samsung is a leading manufacturer and seller of smartphones and other consumer electronics in the world and in the United States, including this District. On information and belief, Samsung Electronics does business in Texas, including this District, directly or through intermediaries.

3. Samsung America is a New York corporation with a principal place of business at 105 Challenger Road, Ridgefield Park, NJ 07660. Samsung America is a wholly owned subsidiary of Samsung Electronics. Samsung America's registered agent for service is CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201-3136.

## II. JURISDICTION AND VENUE

4. This civil action for patent infringement arises under the Patent Laws of the United States, 35 U.S.C. §§ 1 *et seq*. The Court has subject-matter jurisdiction over the claims raised in this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

5. The Court has personal jurisdiction over each of Samsung Electronics and Samsung America. Each of the Defendants have committed acts of infringement in this District and continue to commit such acts in this District and/or have placed the Accused Products (defined below) into the stream of commerce knowing that some of such products would be sold in this District.

6. This Court has personal jurisdiction over Samsung in this action pursuant to due process and/or the Texas Long Arm Statute, by virtue of at least the substantial business each Defendant conducts in this forum, directly and/or through intermediaries, including but not limited to: (1) having committed acts within the Eastern District of Texas giving rise to this action and having established minimum contacts with this forum such that the exercise of jurisdiction over each Defendant would not offend traditional notions of fair play and substantial justice; (2) having directed its activities to customers in the State of Texas and this District, solicited business in the State of Texas and this District, transacted business within the State of Texas and this District and attempted to derive financial benefit from residents of the State of Texas and this District, including benefits directly related to the instant patent infringement causes of action set forth herein; (3) having placed their products and services into the stream of commerce throughout the United States and having been actively engaged in transacting business in Texas and in this District; and

(4) either individually, as members of a common business enterprise, and/or in conjunction with third parties, having committed acts of infringement within Texas and in this District.

7. Samsung conducts business in this District and maintains regular and established places of business within this District. For example, Samsung has maintained regular and established places of business with offices and/or other facilities in this Judicial District of Texas at least at 6625 Excellence Way Plano, Texas 75023 (the "Plano Facility"). On information and belief, Defendants have placed or contributed to placing infringing products including, but not limited to, the Accused Products (described below) into the stream of commerce knowing or understanding that such products would be sold and used in the United States, including in this District. On information and belief, Samsung also has derived substantial revenues from infringing acts in this District, including from the sale and use of the Accused Products (described below).

8. On information and belief, the Plano Facility employs over 1,000 employees and is Samsung's mobile headquarters, overseeing certain engineering activities relating to smartphones, in the U.S. On information and belief, Samsung America employs persons who reside in the Eastern District of Texas to conduct certain development activities relating to Samsung smartphones and certain Samsung tablets, including some or all the Accused Products (described below). Further, Samsung recently opened its Networks Innovation Center, in Plano, that is focused on its research, development and showcasing of Samsung's advanced 5G network solutions.

9. Samsung has committed and continues to commit acts of infringement in this District directly and through third parties by, among other things, making, selling, advertising (including through websites), offering to sell, distributing, and/or importing products and/or services that infringe the Asserted Patents as defined below.

10. Each Defendant has, directly or through its distribution network, purposefully and voluntarily placed infringing products in the stream of commerce knowing and expecting them to be purchased and used by consumers in Texas.

11. Each Defendant has committed direct infringement in Texas.

12. Each Defendant has committed indirect infringement based on acts of direct infringement in Texas.

13. Each Defendant has transacted, and as of the time of filing of the Complaint, continues to transact business within this District.

14. Samsung derives substantial revenues from its infringing acts in this District, including from its manufacture and sale of infringing products in the United States.

15. Venue is proper against Samsung Electronics in this District pursuant to 28 U.S.C. § 1391(c)(3) because Samsung Electronics is a foreign corporation not resident in the United States and venue is proper in any district against a foreign corporation.

16. Venue is proper against Samsung America in this District pursuant to 28 U.S.C. § 1400(b) because each has committed acts of infringement in this District and each maintains a regular and established place of business in this District, including at least at Samsung's Plano Facility.

## III. FACTUAL ALLEGATIONS

### The Asserted Patents

17. Hannibal is the owner by assignment of United States Patent No. 11,057,896, titled "Methods and Apparatuses of Determining Quasi Co-Location (QCL) Assumptions for Beam Operations" (the "'896 Patent"). A true and correct copy of the '896 Patent is attached as Exhibit 1.

18. Hannibal is the owner by assignment of United States Patent No. 11,641,661, titled "Methods and Apparatuses of Determining Quasi Co-Location (QCL) Assumptions for Beam Operations" (the "'661 Patent"). A true and correct copy of the '661 Patent is attached as Exhibit 2.

19. Hannibal is the owner by assignment of United States Patent No. 11,272,535, titled "Method and Apparatus for LBT Failure Detection" (the "'535 Patent"). A true and correct copy of the '535 Patent is attached as Exhibit 3.

20. Hannibal is the owner by assignment of United States Patent No. 11,368,911, titled "Method of Physical Downlink Control Channel Monitoring and Related Device" (the "'911 Patent"). A true and correct copy of the '911 Patent is attached as Exhibit 4.

21. Hannibal is the sole and exclusive owner of all right, title, and interest in the '896 Patent, the '661 Patent, the '535 Patent, and the '911 Patent (collectively, the "Asserted Patents") and holds the exclusive right to take all actions necessary to enforce its rights to the Asserted Patents, including the filing of this patent infringement lawsuit. Hannibal also has the right to recover all damages for past, present, and future infringement of the Asserted Patents.

**The Accused Products**

22. Samsung has imported/exported into/from the United States, manufactured, used, marketed, offered for sale, and/or sold in the United States, smartphones, tablets, notebooks, and other smart devices that infringe the Asserted Patents. Samsung's Accused Products, which infringe one or more claims of the Asserted Patents, include all Samsung products capable of supporting and implementing the 3GPP 5G Standard. These products include, but not necessarily limited to, all 5G capable models in Samsung's Galaxy 5G product line. As shown below, Samsung advertises that its devices support the 5G standard:

**It's all possible with 5G[1]**

Game, stream, shop and work all at once with unique Samsung 5G devices that elevate every day, like the new AI-powered Galaxy Z Fold6 and Galaxy Z Flip6.

https://www.samsung.com/us/mobile/5g/#see-our-latest. For example, the Accused Products include, but are not limited to, the Galaxy A13 5G, Galaxy A22 5G, Galaxy A32 5G, Galaxy A33 5G, Galaxy A42 5G, Galaxy A51 5G, Galaxy A52 5G, Galaxy A52s 5G, Galaxy A53 5G, Galaxy A71 5G, Galaxy A73 5G, Galaxy A90 5G, Galaxy Book Go 5G, Galaxy Book Pro 360 5G, Galaxy F42 5G, Galaxy F52 5G, Galaxy Fold 5G, Galaxy M32 5G, Galaxy M42 5G, Galaxy M52 5G, Galaxy Note 10 5G, Galaxy Note 10+ 5G, Galaxy Note 20 5G, Galaxy Note 20 Ultra 5G, Galaxy Quantum 2, Galaxy S10 5G, Galaxy S20 5G, Galaxy S20 FE 5G, Galaxy S20 Ultra 5G, Galaxy S20 UW, Galaxy S20+ 5G, Galaxy S21 5G, Galaxy S21 Ultra 5G, Galaxy S21+ 5G, Galaxy S22, Galaxy S22 5G, Galaxy S22 Ultra, Galaxy S22+, Galaxy S23, Galaxy S23 FE, Galaxy S23 Ultra, Galaxy S23+, Galaxy S24, Galaxy S24 Ultra, Galaxy S24+, Galaxy S25, Galaxy S25 Ultra, Galaxy S25+, Galaxy Tab S7 5G, Galaxy Tab S7 FE 5G, Galaxy Tab S7+ 5G, Galaxy Tab S8+ 5G, Galaxy Z Flip 5G, Galaxy Z Flip3 5G, Galaxy Z Flip4, Galaxy Z Fold 2 5G, Galaxy Z Fold3 5G, and the Galaxy Z Fold4.

23. Samsung has and continues to directly and indirectly infringe each of the Asserted Patents by engaging in acts constituting infringement under 35 U.S.C. § 271(a), (b), and/or (c), including but not necessarily limited to one or more of making, using, selling and offering to sell, in this District and elsewhere in the United States, and importing into and exporting from the

United States, the Samsung Accused Products or components thereof, and inducing its customers to infringe the Asserted Patents.

24. Samsung provides instruction manuals that instruct the users of the Accused Products to use the Accused Products in a manner that infringes the Asserted Patents. For example, Samsung advertises the compatibility of the Accused Products with 5G and how to connect its products to the 5G network to use the claimed technologies.

25. Further, Samsung tests each of the Accused Products in the United States and thereby directly performs the claimed method and/or uses the claimed apparatus, thus infringing the Asserted Patents. For example, Samsung's Networks Innovation Center in Plano, Texas includes an on-site testing lab.

26. Further, the Accused Products are capable of infringing the Asserted Patents because they fully support the 3GPP Standard and the claimed functions or capabilities. Further, the claimed inventions that have been adopted by the 3GPP Standard have been implemented by major 5G networks in the United States. For example, at least Verzion has deployed the functionalities described in Release 16 of the 3GPP Standard, including the claimed functionalities.

27. Samsung's acts of infringement have caused damage to Hannibal. Hannibal is entitled to recover from Samsung the damages sustained by Hannibal because of Samsung's wrongful acts in an amount subject to proof at trial.

28. Samsung's infringement of the Asserted Patents is willful. Since at least June 8, 2022, Samsung has known of one or more of the Asserted Patents as well as Hannibal's contentions of infringement of such Asserted Patents, yet Samsung continues to commit acts of infringement despite a high likelihood that its actions constitute infringement. And Samsung knew or should

have known that its actions constituted an unjustifiably high risk of infringement by Samsung and/or customers or end-users of the Accused Devices.

## IV. FIRST CLAIM FOR RELIEF - INFRINGEMENT OF THE '896 PATENT

29. Hannibal incorporates paragraphs 1 through 28 as though fully set forth herein.

30. The '896 Patent includes nineteen (19) claims.

31. Samsung infringes, contributes to the infringement of, and/or induces infringement of the '896 Patent by making, using, selling, offering for sale, exporting from, and/or importing into the United States products and/or methods covered by one or more claims of the '896 Patent including, but not limited to, the Accused Products.

32. As shown below, the Accused Products infringe at least claim 1 of the '896 patent by virtue of their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to 3GPP TS 38.214 version 15.12.0 "Physical layer procedures for data."

33. For example, and to the extent the preamble is limiting, each of the Accused Products, such as smartphones, notebooks, and tablets, are "user equipment (UE)" as described by the 3GPP 5G Standard.

34. The Accused Products comprise "one or more non-transitory computer-readable media having computer-executable instructions embodied thereon." For example, Samsung's Galaxy S25 Ultra smartphone includes a Snapdragon 8 Elite Mobile Platform that includes an Oryon CPU and X80 5G Modem-RF System. Further, Samsung's Galaxy S25 Ultra smartphone includes onboard and/or off board non-transitory memory for storing data and computer-executable instructions. As shown below, Samsung's website confirms that the Galaxy S25 Ultra includes such memory:

Storage

| Internal Storage | Available Storage (GB) | RAM Size (GB) |
|---|---|---|
| 512GB | 481.6GB | 12GB |

https://www.samsung.com/us/smartphones/galaxy-s25-ultra/buy/galaxy-s25-ultra-512gb-unlocked-sm-s938uzkexaa/.

35. The Accused Products further comprise "at least one processor coupled to the one or more non-transitory computer-readable media, and configured to execute the computer-executable instructions." For example, Samsung's Galaxy S25 Ultra smartphone includes a Snapdragon 8 Elite Mobile Platform that includes an Oryon CPU and X80 5G Modem-RF System. As shown below, Samsung's website confirms that the Galaxy S25 Ultra includes a processor.

Processor

| CPU Type | CPU Speed |
|---|---|
| Octa-Core | 4.47GHz,3.5GHz |

https://www.samsung.com/us/smartphones/galaxy-s25-ultra/buy/galaxy-s25-ultra-512gb-unlocked-sm-s938uzkexaa/.

36. The Accused Products further comprise the functionality to "monitor at least one of a plurality of Control Resource Sets (CORESETs) configured for the UE within an active Bandwidth Part (BWP) of a serving cell in a time slot" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.214 version 15.13.0:

5.1.5 Antenna ports quasi co-location

...

For both the cases when *tci-PresentInDCI* is set to 'enabled' and *tci-PresentInDCI* is not configured in RRC connected mode, if the offset between the reception of the DL DCI and the corresponding PDSCH is less than the threshold *timeDurationForQCL*, the UE may assume that the DM-RS ports of PDSCH of a serving cell are quasi co-located with the RS(s) with respect to the QCL parameter(s) used for PDCCH quasi co-location indication of the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored by the UE. In this case, if the 'QCL-TypeD' of the

3GPP 5G Standard 38.214 version 15.13.0.

37. Each of the Accused Products further comprise the functionality to "apply a first Quasi Co-Location (QCL) assumption of a first CORESET of a set of one or more monitored CORESETs to receive an aperiodic Channel Status Information-Reference Signal (CSI-RS), wherein the first CORESET is associated with a monitored search space configured with a lowest CORESET Identity (ID) among the set of one or more monitored CORESETs" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.214 version 15.13.0:

5.2.1.5.1 Aperiodic CSI Reporting/Aperiodic CSI-RS

...

- For each aperiodic CSI-RS resource in a CSI-RS resource set associated with each CSI triggering state, the UE is indicated the quasi co-location configuration of quasi co-location RS source(s) and quasi co-location type(s), as described in Clause 5.1.5, through higher layer signaling of *qcl-info* which contains a list of references to *TCI-*

...

- If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources in a *NZP-CSI-RS-ResourceSet* configured without higher layer parameter *trs-Info* and without the higher layer parameter *repetition* is smaller than the UE reported threshold

...

- if there is any other DL signal with an indicated TCI state in the same symbols as the CSI-RS, the UE applies the QCL assumption of the other DL signal also when receiving the aperiodic CSI-RS. The other

...

- else, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored.

3GPP 5G Standard 38.214 version 15.13.0.

38. Thus, as just illustrated above, the Accused Products directly infringe one or more claims of the '896 Patent. Samsung makes, uses, sells, offers for sale, exports, and/or imports, in this District and/or elsewhere in the United States, these devices and thus directly infringes the '896 Patent.

39. Samsung has had knowledge and notice of the '896 Patent since at least June 8, 2022.

40. Samsung indirectly infringes the '896 patent, as provided in 35 U.S.C. §271(b), by inducing infringement by others, such as Samsung's customers and end-users, in this District and

elsewhere in the United States. For example, Samsung's customers and end-users directly infringe through their use of the inventions claimed in the '896 Patent. Samsung induces this direct infringement through its affirmative acts of manufacturing, selling, distributing, and/or otherwise making available the Accused Products, and providing instructions, documentation, and other information to customers and end-users suggesting they use the Accused Products in an infringing manner, including in-store technical support, online technical support, marketing, product manuals, advertisements, and online documentation. As a result of Samsung's inducement, Samsung's customers and end-users use the Accused Products in the way Samsung intends and directly infringe the '896 Patent. Samsung performs these affirmative acts with knowledge of the '896 Patent and with the intent, or willful blindness, that the induced acts directly infringe the '896 Patent.

41. Samsung also indirectly infringes the '896 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement committed by others, such as customers and end users, in this District and elsewhere in the United States. Samsung's affirmative acts of selling and offering to sell, in this District and elsewhere in the United States, the Accused Products and causing the Accused Products to be manufactured, used, sold, and offered for sale contribute to Samsung's customers and end-users use of the Accused Products, such that the '896 Patent is directly infringed. The accused components within the Accused Products are material to the invention of the '896 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by Samsung to be especially made or adapted for use in the infringement of the '896 Patent. Samsung performs these affirmative acts with knowledge of the '896 Patent and with intent, or willful blindness, that Samsung causes the direct infringement of the '896 Patent.

42. Samsung's infringement of the '896 Patent has damaged and will continue to damage Hannibal.

43. Moreover, Samsung's risk of infringement of the Asserted Patents was either known or was so obvious that it should have been known to Samsung.

44. Notwithstanding this knowledge, Samsung has knowingly or with reckless disregard willfully infringed the '896 Patent. Samsung continues to infringe despite knowledge of Hannibal's Asserted Patents. Samsung has thus had actual notice of infringement of the '896 Patent and acted despite an objectively high likelihood that its actions constituted infringement of Hannibal's valid patent rights, either literally or equivalently.

45. This objective risk was either known or so obvious that it should have been known to Samsung. Accordingly, Plaintiff seeks enhanced damages pursuant to 35 U.S.C. §§ 284 and 285.

## V. SECOND CLAIM FOR RELIEF - INFRINGEMENT OF THE '661 PATENT

46. Hannibal incorporates paragraphs 1 through 45 as though fully set forth herein.

47. The '661 Patent includes sixteen (16) claims.

48. Samsung infringes, contributes to the infringement of, and/or induces infringement of the '661 Patent by making, using, selling, offering for sale, exporting from, and/or importing into the United States products and/or methods covered by one or more claims of the '661 Patent including, but not limited to, at least the Accused Products.

49. As shown below, the Accused Products infringe at least claim 1 of the '661 patent by virtue of their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to 3GPP TS 38.214 version 15.12.0 "Physical layer procedures for data."

50. For example, and to the extent the preamble is limiting, each of the Accused Products, such as smartphones, notebooks, and tablets, would be "user equipment (UE)" as defined in the 3GPP 5G Standard.

51. Each of the Accused Products further comprises "one or more non-transitory computer-readable media having computer-executable instructions embodied thereon." For example, Samsung's Galaxy S25 Ultra smartphone includes a Snapdragon 8 Elite Mobile Platform that includes an Oryon CPU and X80 5G Modem-RF System. Further, Samsung's Galaxy S25 Ultra smartphone includes onboard and/or off board non-transitory memory for storing data and computer-executable instructions. As shown below, Samsung's website confirms that the Galaxy S25 Ultra includes such memory:

Storage

| Internal Storage | Available Storage (GB) | RAM Size (GB) |
|---|---|---|
| 512GB | 481.6GB | 12GB |

https://www.samsung.com/us/smartphones/galaxy-s25-ultra/buy/galaxy-s25-ultra-512gb-unlocked-sm-s938uzkexaa/.

52. Each of the Accused Products further comprise "at least one processor coupled to the one or more non-transitory computer-readable media, and configured to execute the computer-executable instructions." For example, Samsung's Galaxy S25 Ultra smartphone includes a processor. As shown below, Samsung's website confirms that the Galaxy S25 Ultra includes a processor:

Processor

| CPU Type | CPU Speed |
|---|---|
| Octa-Core | 4.47GHz,3.5GHz |

https://www.samsung.com/us/smartphones/galaxy-s25-ultra/buy/galaxy-s25-ultra-512gb-unlocked-sm-s938uzkexaa/.

53. Each of the Accused Products further comprise the functionality to "monitor at least one of a plurality of Control Resource Sets (CORESETs) configured for the UE within an active Bandwidth Part (BWP) of a serving cell in a time slot" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.214 version 15.13.0:

> 5.1.5 Antenna ports quasi co-location
>
> ...
>
> For both the cases when *tci-PresentInDCI* is set to 'enabled' and *tci-PresentInDCI* is not configured in RRC connected mode, if the offset between the reception of the DL DCI and the corresponding PDSCH is less than the threshold *timeDurationForQCL*, the UE may assume that the DM-RS ports of PDSCH of a serving cell are quasi co-located with the RS(s) with respect to the QCL parameter(s) used for PDCCH quasi co-location indication of the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored by the UE. In this case, if the 'QCL-TypeD' of the

3GPP 5G Standard 38.214 version 15.13.0.

54. Each of the Accused Products further comprise the functionality to "receive Downlink Control Information (DCI) scheduling a Downlink (DL) Reference Signal (RS), wherein a scheduling offset between an end of a last symbol of a Physical Downlink Control Channel (PDCCH) carrying the DCI and a beginning of a first symbol of a resource carrying the DL RS is less than a threshold" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.214 version 15.13.0:

5.2.1.5.1 Aperiodic CSI Reporting/Aperiodic CSI-RS

...

- For each aperiodic CSI-RS resource in a CSI-RS resource set associated with each CSI triggering state, the UE is indicated the quasi co-location configuration of quasi co-location RS source(s) and quasi co-location type(s), as described in Clause 5.1.5, through higher layer signaling of *qcl-info* which contains a list of references to *TCI-*

...

- If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources in a *NZP-CSI-RS-ResourceSet* configured without higher layer parameter *trs-Info* and without the higher layer parameter *repetition* is smaller than the UE reported threshold

...

- if there is any other DL signal with an indicated TCI state in the same symbols as the CSI-RS, the UE applies the QCL assumption of the other DL signal also when receiving the aperiodic CSI-RS. The other

...

- else, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored.

3GPP 5G Standard 38.214 version 15.13.0.

55. Each of the Accused Products further comprise the functionality to "apply a first Quasi Co-Location (QCL) assumption of a first CORESET of a set of one or more of the monitored at least one of a plurality of CORESETs to receive a DL-RS, wherein the first CORESET is associated with a monitored search space configured with a lowest CORESET Identity (ID) among the set of one or more of the monitored at least one of the plurality of CORESETs" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.214 version 15.13.0:

5.2.1.5.1 Aperiodic CSI Reporting/Aperiodic CSI-RS

...

- For each aperiodic CSI-RS resource in a CSI-RS resource set associated with each CSI triggering state, the UE is indicated the quasi co-location configuration of quasi co-location RS source(s) and quasi co-location type(s), as described in Clause 5.1.5, through higher layer signaling of *qcl-info* which contains a list of references to *TCI-*

...

- If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources in a *NZP-CSI-RS-ResourceSet* configured without higher layer parameter *trs-Info* and without the higher layer parameter *repetition* is smaller than the UE reported threshold

...

- if there is any other DL signal with an indicated TCI state in the same symbols as the CSI-RS, the UE applies the QCL assumption of the other DL signal also when receiving the aperiodic CSI-RS. The other

...

- else, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored.

3GPP 5G Standard 38.214 version 15.13.0.

56. Thus, as just illustrated above, the Accused Products directly infringe one or more claims of the ’661 Patent. Samsung makes, uses, sells, offers for sale, exports, and/or imports, in this District and/or elsewhere in the United States, these devices and thus directly infringes the ’661 Patent.

57. Samsung has had knowledge and notice of the ’661 Patent since at least the filing and service of this Complaint.

58. Samsung indirectly infringes the ’661 patent, as provided in 35 U.S.C. §271(b), by inducing infringement by others, such as Samsung’s customers and end-users, in this District and elsewhere in the United States. For example, Samsung’s customers and end-users directly infringe through their use of the inventions claimed in the ’661 Patent. Samsung induces this direct infringement through its affirmative acts of manufacturing, selling, distributing, and/or otherwise making available the Accused Products, and providing instructions, documentation, and other information to customers and end-users suggesting they use the Accused Products in an infringing manner, including in-store technical support, online technical support, marketing, product manuals, advertisements, and online documentation. As a result of Samsung’s inducement, Samsung’s customers and end-users use the Accused Products in the way Samsung intends and directly infringe the ’661 Patent. Samsung performs these affirmative acts with knowledge of the ’661 Patent and with the intent, or willful blindness, that the induced acts directly infringe the ’661 Patent.

59. Samsung also indirectly infringes the ’661 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement committed by others, such as customers and end users, in this District and elsewhere in the United States. Samsung’s affirmative acts of selling and offering to sell, in this District and elsewhere in the United States, the Accused Products and

causing the Accused Products to be manufactured, used, sold, and offered for sale contribute to Samsung's customers and end-users use of the Accused Products, such that the '661 Patent is directly infringed. The accused components within the Accused Products are material to the invention of the '661 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by Samsung to be especially made or adapted for use in the infringement of the '661 Patent. Samsung performs these affirmative acts with knowledge of the '661 Patent and with intent, or willful blindness, that Samsung causes the direct infringement of the '661 Patent.

60. Samsung's infringement of the '661 Patent has damaged and will continue to damage Hannibal.

61. Moreover, Samsung's risk of infringement of the Asserted Patents was either known or was so obvious that it should have been known to Samsung.

62. Notwithstanding this knowledge, Samsung has knowingly or with reckless disregard willfully infringed the '661 Patent. Samsung continues to infringe despite knowledge of Hannibal's Asserted Patents. Samsung has thus had actual notice of infringement of the '661 Patent and acted despite an objectively high likelihood that its actions constituted infringement of Hannibal's valid patent rights, either literally or equivalently.

63. This objective risk was either known or so obvious that it should have been known to Samsung. Accordingly, Plaintiff seeks enhanced damages pursuant to 35 U.S.C. §§ 284 and 285.

## VI. THIRD CLAIM FOR RELIEF - INFRINGEMENT OF THE '535 PATENT

64. Hannibal incorporates paragraphs 1 through 63 as though fully set forth herein.

65. The '535 Patent includes twenty (20) claims.

66. Samsung infringes, contributes to the infringement of, and/or induces infringement of the ’535 Patent by making, using, selling, offering for sale, exporting from, and/or importing into the United States products and/or methods covered by one or more claims of the ’535 Patent including, but not limited to, at least the Accused Products.

67. As shown below, the Accused Products infringe at least claim 1 of the ’535 patent by virtue of their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to 3GPP TS 38.321 version 16.3.0 “Medium Access Control (MAC) protocol specification.”

68. For example, the Samsung Galaxy S25 Ultra is a wireless device that comprises one or more processors and memory storing instructions executed by the one or more processors, such as the Qualcomm Snapdragon Elite 8 Mobile Platform, which implements at least Release 16 of the 3GPP 5G Standard, and advertised to support and implement up to Release 18.

69. For example, and to the extent the preamble is limiting, each of the Accused Products, such as smartphones, notebooks, and tablets, would be “user equipment (UE)” as defined in the 3GPP 5G Standard.

70. Each of the Accused Products further comprises “one or more non-transitory computer-readable media having computer-executable instructions embodied thereon.” For example, Samsung’s Galaxy S25 Ultra smartphone includes a Snapdragon 8 Elite Mobile Platform that includes an Oryon CPU and X80 5G Modem-RF System. Further, Samsung’s Galaxy S25 Ultra smartphone includes onboard and/or off board non-transitory memory for storing data and computer-executable instructions. As shown below, Samsung’s website confirms that the Galaxy S25 Ultra includes such memory:

Storage

| Internal Storage | Available Storage (GB) | RAM Size (GB) |
|---|---|---|
| 512GB | 481.6GB | 12GB |

https://www.samsung.com/us/smartphones/galaxy-s25-ultra/buy/galaxy-s25-ultra-512gb-unlocked-sm-s938uzkexaa/.

71. Each of the Accused Products further comprise "at least one processor coupled to the one or more non-transitory computer-readable media, the at least one processor is configured to execute the computer-executable instructions." For example, Samsung's Galaxy S25 Ultra smartphone includes a Snapdragon 8 Elite Mobile Platform that includes an Oryon CPU and X80 5G Modem-RF System. As shown below, Samsung's website confirms that the Galaxy S25 Ultra includes a processor:

Processor

| CPU Type | CPU Speed |
|---|---|
| Octa-Core | 4.47GHz,3.5GHz |

https://www.samsung.com/us/smartphones/galaxy-s25-ultra/buy/galaxy-s25-ultra-512gb-unlocked-sm-s938uzkexaa/.

72. Each of the Accused Products further comprise the functionality to "receive, by a Medium Access Control (MAC) entity of the UE, a Listen-Before-Talk (LBT) failure indication from a lower layer of the UE for all uplink (UL) transmissions" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.321 version 16.3.0:

> **5.21.2 LBT failure detection and recovery procedure**
>
> The MAC entity may be configured by RRC with a consistent LBT failure recovery procedure. Consistent LBT failure is detected per UL BWP by counting LBT failure indications, for all UL transmissions, from the lower layers to the MAC entity.
>
> RRC configures the following parameters in the *lbt-FailureRecoveryConfig*:
>
> - *lbt-FailureInstanceMaxCount* for the consistent LBT failure detection;
> - *lbt-FailureDetectionTimer* for the consistent LBT failure detection;
>
> The following UE variable is used for the consistent LBT failure detection procedure:
>
> - *LBT_COUNTER* (per Serving Cell): counter for LBT failure indication which is initially set to 0.
>
> For each activated Serving Cell configured with *lbt-FailureRecoveryConfig*, the MAC entity shall:
>
> 1> if LBT failure indication has been received from lower layers:

3GPP TS 38.321 version 16.3.0.

73. Each of the Accused Products further comprise the functionality to "increase an LBT failure counter when the MAC entity receives the LBT failure indication" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.321 version 16.3.0:

> **5.21.2 LBT failure detection and recovery procedure**
>
> The MAC entity may be configured by RRC with a consistent LBT failure recovery procedure. Consistent LBT failure is detected per UL BWP by counting LBT failure indications, for all UL transmissions, from the lower layers to the MAC entity.
>
> RRC configures the following parameters in the *lbt-FailureRecoveryConfig*:
>
> - *lbt-FailureInstanceMaxCount* for the consistent LBT failure detection;
> - *lbt-FailureDetectionTimer* for the consistent LBT failure detection;
>
> The following UE variable is used for the consistent LBT failure detection procedure:
>
> - *LBT_COUNTER* (per Serving Cell): counter for LBT failure indication which is initially set to 0.
>
> For each activated Serving Cell configured with *lbt-FailureRecoveryConfig*, the MAC entity shall:
>
> 1> if LBT failure indication has been received from lower layers:
>
> 2> start or restart the *lbt-FailureDetectionTimer*;
>
> 2> increment *LBT_COUNTER* by 1;

3GPP TS 38.321 version 16.3.0.

74. Each of the Accused Products further comprise the functionality to "determine that an LBT failure event has occurred when the LBT failure counter is greater than or equal to a threshold" based on their compatibility with and practice of the 3GPP 5G Standard. As shown

below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.321 version 16.3.0:

> **5.21.2 LBT failure detection and recovery procedure**
>
> The MAC entity may be configured by RRC with a consistent LBT failure recovery procedure. Consistent LBT failure is detected per UL BWP by counting LBT failure indications, for all UL transmissions, from the lower layers to the MAC entity.
>
> RRC configures the following parameters in the *lbt-FailureRecoveryConfig*:
>
> - *lbt-FailureInstanceMaxCount* for the consistent LBT failure detection;
> - *lbt-FailureDetectionTimer* for the consistent LBT failure detection;
>
> The following UE variable is used for the consistent LBT failure detection procedure:
>
> - *LBT_COUNTER* (per Serving Cell): counter for LBT failure indication which is initially set to 0.
>
> For each activated Serving Cell configured with *lbt-FailureRecoveryConfig*, the MAC entity shall:
>
> 1> if LBT failure indication has been received from lower layers:
>
> 2> start or restart the *lbt-FailureDetectionTimer*;
>
> 2> increment *LBT_COUNTER* by 1;
>
> 2> if *LBT_COUNTER* >= *lbt-FailureInstanceMaxCount*:
>
> 3> trigger consistent LBT failure for the active UL BWP in this Serving Cell;

3GPP TS 38.321 version 16.3.0.

75. Each of the Accused Products further comprise the functionality to "reset the LBT failure counter when a reset of the MAC entity is requested by an upper layer of the UE" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.321 version 16.3.0:

> **5.12 MAC Reset**
>
> If a reset of the MAC entity is requested by upper layers, the MAC entity shall:
>
> 1> initialize *Bj* for each logical channel to zero;
>
> ...
>
> 1> release, if any, Temporary C-RNTI;
>
> 1> reset all *BFI_COUNTER*s;
>
> 1> reset all *LBT_COUNTER*s.

3GPP TS 38.321 version 16.3.0.

76. Thus, as just illustrated above, the Accused Products directly infringe one or more claims of the '535 Patent. Samsung makes, uses, sells, offers for sale, exports, and/or imports, in

this District and/or elsewhere in the United States, these devices and thus directly infringes the ’535 Patent.

77. Samsung has had knowledge and notice of the ’535 Patent since at least November 6, 2023.

78. Samsung indirectly infringes the ’535 patent, as provided in 35 U.S.C. §271(b), by inducing infringement by others, such as Samsung’s customers and end-users, in this District and elsewhere in the United States. For example, Samsung’s customers and end-users directly infringe through their use of the inventions claimed in the ’535 Patent. Samsung induces this direct infringement through its affirmative acts of manufacturing, selling, distributing, and/or otherwise making available the Accused Products, and providing instructions, documentation, and other information to customers and end-users suggesting they use the Accused Products in an infringing manner, including in-store technical support, online technical support, marketing, product manuals, advertisements, and online documentation. As a result of Samsung’s inducement, Samsung’s customers and end-users use the Accused Products in the way Samsung intends and directly infringe the ’535 Patent. Samsung performs these affirmative acts with knowledge of the ’535 Patent and with the intent, or willful blindness, that the induced acts directly infringe the ’535 Patent.

79. Samsung also indirectly infringes the ’535 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement committed by others, such as customers and end users, in this District and elsewhere in the United States. Samsung’s affirmative acts of selling and offering to sell, in this District and elsewhere in the United States, the Accused Products and causing the Accused Products to be manufactured, used, sold, and offered for sale contribute to Samsung’s customers and end-users use of the Accused Products, such that the ’535 Patent is

directly infringed. The accused components within the Accused Products are material to the invention of the ’535 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by Samsung to be especially made or adapted for use in the infringement of the ’535 Patent. Samsung performs these affirmative acts with knowledge of the ’535 Patent and with intent, or willful blindness, that Samsung causes the direct infringement of the ’535 Patent.

80. Samsung’s infringement of the ’535 Patent has damaged and will continue to damage Hannibal.

81. Moreover, Samsung’s risk of infringement of the Asserted Patents was either known or was so obvious that it should have been known to Samsung.

82. Notwithstanding this knowledge, Samsung has knowingly or with reckless disregard willfully infringed the ’535 Patent. Samsung continues to infringe despite knowledge of Hannibal’s Asserted Patents. Samsung has thus had actual notice of infringement of the ’535 Patent and acted despite an objectively high likelihood that its actions constituted infringement of Hannibal’s valid patent rights, either literally or equivalently.

83. This objective risk was either known or so obvious that it should have been known to Samsung. Accordingly, Plaintiff seeks enhanced damages pursuant to 35 U.S.C. §§ 284 and 285.

## VII. FOURTH CLAIM FOR RELIEF - INFRINGEMENT OF THE ’911 PATENT

84. Hannibal incorporates paragraphs 1 through 83 as though fully set forth herein.

85. The ’911 Patent includes eighteen (18) claims.

86. Samsung infringes, contributes to the infringement of, and/or induces infringement of the ’911 Patent by making, using, selling, offering for sale, exporting from, and/or importing

into the United States products and/or methods covered by one or more claims of the ’911 Patent including, but not limited to, at least the Accused Products.

87. As shown below, Samsung and its Accused Products infringe at least claim 1 of the ’911 patent by virtue of their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to 3GPP TS 36.212 version 16.6.0 “Multiplexing and channel coding,” 3GPP TS 38.213 version 16.5.0 “Physical layer procedures for control,” 3GPP TS 38.331 version 16.3.0 “Radio Resource Control (RRC),” and “3GPP TS 38.321 version 16.3.0 “Medium Access Control (MAC) protocol specification.”

88. For example, and to the extent the preamble is limiting, each of the Accused Products, such as smartphones and tablets, are “user equipment (UE)” that “monitor[s] a physical downlink control channel (PDCCH).” As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.213 version 16.5.0:

> **10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells**
>
> A UE configured with DRX mode operation [11, TS 38.321] can be provided the following for detection of a DCI format 2_6 in a PDCCH reception on the PCell or on the SpCell [12, TS 38.331]

3GPP TS 38.213 version 16.5.0.

89. Each of the Accused Products further comprise the functionality for “receiving a first configuration from a base station to configure the UE with a first search space of the PDCCH, wherein the first search space is used for monitoring a scheduling signal used for indicating scheduling information” based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.331 version 16.3.0:

5.3.5.5.1 General

The network configures the UE with Master Cell Group (MCG), and zero or one Secondary Cell Group (SCG). In (NG)EN-DC, the MCG is configured as specified in TS 36.331 [10], and for NE-DC, the SCG is configured as specified in TS 36.331 [10]. The network provides the configuration parameters for a cell group in the *CellGroupConfig* IE.

...

1> if the *CellGroupConfig* contains the *spCellConfig*:

2> configure the SpCell as specified in 5.3.5.5.7;

...

```
SpCellConfig ::=                          SEQUENCE {
...
  spCellConfigDedicated                   ServingCellConfig
  ...
    ServingCellConfig ::=                 SEQUENCE {
      tdd-UL-DL-ConfigurationDedicated    TDD-UL-DL-ConfigDedicated
      initialDownlinkBWP                  BWP-DownlinkDedicated

        BWP-DownlinkDedicated ::=         SEQUENCE {
          pdcch-Config                      SetupRelease { PDCCH-Config }
```

3GPP TS 38.331 version 16.3.0.

– *PDCCH-Config*

The IE *PDCCH-Config* is used to configure UE specific PDCCH parameters such as control resource sets (CORESET), search spaces and additional parameters for acquiring the PDCCH. If this IE is used for the scheduled cell in case of cross carrier scheduling, the fields other than *searchSpacesToAddModList* and *searchSpacesToReleaseList* are absent. If the IE is used for a dormant BWP, the fields other than *controlResourceSetToAddModList* and *controlResourceSetToReleaseList* are absent.

```
...
PDCCH-Config ::=                          SEQUENCE {
    controlResourceSetToAddModList        SEQUENCE(SIZE (1..3)) OF ControlResourceSet
    controlResourceSetToReleaseList       SEQUENCE(SIZE (1..3)) OF ControlResourceSetId
    searchSpacesToAddModList              SEQUENCE(SIZE (1..10)) OF SearchSpace
```

– *SearchSpace*

The IE *SearchSpace* defines how/where to search for PDCCH candidates. Each search space is associated with one *ControlResourceSet*. For a scheduled cell in the case of cross carrier scheduling, except for *nrofCandidates*, all the optional fields are absent (regardless of their presence conditions).

```
...
SearchSpace ::=                           SEQUENCE {
  ...  ue-Specific
          dci-Formats       ENUMERATED {formats0-0-And-1-0, formats0-1-And-1-1},
...
```

***dci-Formats***

Indicates whether the UE monitors in this USS for DCI formats 0-0 and 1-0 or for formats 0-1 and 1-1.

3GPP TS 38.331 version 16.3.0.

## 7.3.1 DCI formats

The DCI formats defined in table 7.3.1-1 are supported.

**Table 7.3.1-1: DCI formats**

| DCI format | Usage |
|---|---|
| 0_0 | Scheduling of PUSCH in one cell |
| 0_1 | Scheduling of one or multiple PUSCH in one cell, or indicating downlink feedback information for configured grant PUSCH (CG-DFI) |
| 0_2 | Scheduling of PUSCH in one cell |
| 1_0 | Scheduling of PDSCH in one cell |
| 1_1 | Scheduling of PDSCH in one cell, and/or triggering one shot HARQ-ACK codebook feedback |

3GPP TS 38.331 version 16.3.0.

90. Each of the Accused Products further comprise the functionality for "receiving a second configuration from the base station to configure the UE with a second search space of the PDCCH, wherein the second search space is used for monitoring a power saving signal used for indicating wake-up information associated with a Discontinuous Reception (DRX) functionality" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.331 version 16.3.0, TS 38.212 version 16.6.0, and TS 38.213 version 16.5.0:

5.3.5.5.1 General

The network configures the UE with Master Cell Group (MCG), and zero or one Secondary Cell Group (SCG). In (NG)EN-DC, the MCG is configured as specified in TS 36.331 [10], and for NE-DC, the SCG is configured as specified in TS 36.331 [10]. The network provides the configuration parameters for a cell group in the *CellGroupConfig* IE.

...

1> if the *CellGroupConfig* contains the *spCellConfig*:

2> configure the SpCell as specified in 5.3.5.5.7;

...

```
SpCellConfig ::=                          SEQUENCE {
...
  spCellConfigDedicated                   ServingCellConfig
  ...
    ServingCellConfig ::=                 SEQUENCE {
      tdd-UL-DL-ConfigurationDedicated      TDD-UL-DL-ConfigDedicated
      initialDownlinkBWP                    BWP-DownlinkDedicated

        BWP-DownlinkDedicated ::=         SEQUENCE {
          pdcch-Config                      SetupRelease { PDCCH-Config }
```

3GPP TS 38.331 version 16.3.0.

– *PDCCH-Config*

The IE *PDCCH-Config* is used to configure UE specific PDCCH parameters such as control resource sets (CORESET), search spaces and additional parameters for acquiring the PDCCH. If this IE is used for the scheduled cell in case of cross carrier scheduling, the fields other than *searchSpacesToAddModList* and *searchSpacesToReleaseList* are absent. If the IE is used for a dormant BWP, the fields other than *controlResourceSetToAddModList* and *controlResourceSetToReleaseList* are absent.

...

```
PDCCH-Config ::=                          SEQUENCE {
...
  searchSpacesToAddModListExt-r16         SEQUENCE(SIZE (1..10)) OF SearchSpaceExt-r16
```

– *SearchSpace*

The IE *SearchSpace* defines how/where to search for PDCCH candidates. Each search space is associated with one *ControlResourceSet*. For a scheduled cell in the case of cross carrier scheduling, except for *nrofCandidates*, all the optional fields are absent (regardless of their presence conditions).

...

```
SearchSpaceExt-r16 ::=                    SEQUENCE {
...
  dci-Format2-6-r16                         SEQUENCE {
```

***dci-Format2-6***
If configured, UE monitors the DCI format 2_6 according to TS 38.213 [13], clause 10.1, 11.5. DCI format 2_6 can only be configured on the SpCell.

3GPP TS 38.331 version 16.3.0.

7.3.1.3.7 Format 2_6

DCI format 2_6 is used for notifying the power saving information outside DRX Active Time for one or more UEs.

The following information is transmitted by means of the DCI format 2_6 with CRC scrambled by PS-RNTI:

3GPP TS 38.212 version 16.6.0.

10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells

A UE configured with DRX mode operation [11, TS 38.321] can be provided the following for detection of a DCI format 2_6 in a PDCCH reception on the PCell or on the SpCell [12, TS 38.331]

- a PS-RNTI for DCI format 2_6 by *ps-RNTI*
- a number of search space sets, by *dci-Format2-6*, to monitor PDCCH for detection of DCI format 2_6 on the active DL BWP of the PCell or of the SpCell according to a common search space as described in Clause 10.1
- a payload size for DCI format 2_6 by *sizeDCI_2-6*
- a location in DCI format 2_6 of a Wake-up indication bit by *psPositionDCI-2-6*
  - a '0' value for the Wake-up indication bit, when reported to higher layers, indicates to not start the *drx-onDurationTimer* for the next long DRX cycle [11, TS 38.321]
  - a '1' value for the Wake-up indication bit, when reported to higher layers, indicates to start the *drx-onDurationTimer* for the next long DRX cycle [11, TS 38.321]

3GPP TS 38.213 version 16.5.0.

91. Each of the Accused Products further comprise the functionality that "in response to not receiving the power saving signal while monitoring the second search space, starting a DRX on-duration timer of the DRX functionality" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.321 version 16.3.0:

3.2 Abbreviations

...

DCP DCI with CRC scrambled by PS-RNTI

5.7 Discontinuous Reception (DRX)

...

- *drx-onDurationTimer*: the duration at the beginning of a DRX cycle;

...

2> if DCP monitoring is configured for the active DL BWP as specified in TS 38.213 [6], clause 10.3:

...

3> if *ps-Wakeup* is configured with value *true* and DCP indication associated with the current DRX cycle has not been received from lower layers:

4> start *drx-onDurationTimer* after *drx-SlotOffset* from the beginning of the subframe.

3GPP TS 38.321 version 16.3.0.

92. Each of the Accused Products further comprise the functionality for "monitoring the first search space in response to the UE being in a DRX active time of the DRX functionality, wherein the DRX active time is a time during which the UE monitors the PDCCH" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.213 version 16.5.0 and TS 38.321 version 16.3.0:

10.1 UE procedure for determining physical downlink control channel assignment

A set of PDCCH candidates for a UE to monitor is defined in terms of PDCCH search space sets. A search space set can be a CSS set or a USS set. A UE monitors PDCCH candidates in one or more of the following search spaces sets

...

- a USS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType = ue-Specific* for DCI formats with CRC scrambled by C-RNTI, MCS-C-RNTI, SP-CSI-RNTI, CS-RNTI(s), SL-RNTI, SL-CS-RNTI, or SL-L-CS-RNTI.
- if search space set *s* is a USS set, an indication by *dci-Formats* to monitor PDCCH candidates either for DCI format 0_0 and DCI format 1_0, or for DCI format 0_1 and DCI format 1_1, or an indication by *dci-Formats-*

3GPP TS 38.213 version 16.5.0.

> **5.7 Discontinuous Reception (DRX)**
>
> ...
>
> When a DRX cycle is configured, the Active Time for Serving Cells in a DRX group includes the time while:
>
> - *drx-onDurationTimer* or *drx-InactivityTimer* configured for the DRX group is running; or
>
> ...
>
> 1> if a DRX group is in Active Time:
>
> 2> monitor the PDCCH on the Serving Cells in this DRX group as specified in TS 38.213 [6];

3GPP TS 38.321 version 16.3.0.

93. Each of the Accused Products further comprise the functionality that "not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality" based on their compatibility with and practice of the 3GPP 5G Standard. As shown below, this functionality is described in the 3GPP 5G Standard, including but not limited to TS 38.213 version 16.5.0 and TS 38.321 version 16.3.0:

> **10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells**
>
> ...
>
> The UE does not monitor PDCCH for detecting DCI format 2_6 during Active Time [11, TS 38.321].

3GPP TS 38.213 version 16.5.0.

> **5.7 Discontinuous Reception (DRX)**
>
> ...
>
> When a DRX cycle is configured, the Active Time for Serving Cells in a DRX group includes the time while:
>
> - *drx-onDurationTimer* or *drx-InactivityTimer* configured for the DRX group is running; or

3GPP TS 38.321 version 16.3.0.

94. Thus, as just illustrated above, the Accused Products directly infringe one or more claims of the '911 Patent. Samsung makes, uses, sells, offers for sale, exports, and/or imports, in this District and/or elsewhere in the United States, these devices and thus directly infringes the '911 Patent.

95. Samsung has had knowledge and notice of the ’911 Patent since at least November 6, 2023.

96. Samsung indirectly infringes the ’911 patent, as provided in 35 U.S.C. §271(b), by inducing infringement by others, such as Samsung’s customers and end-users, in this District and elsewhere in the United States. For example, Samsung’s customers and end-users directly infringe through their use of the inventions claimed in the ’911 Patent. Samsung induces this direct infringement through its affirmative acts of manufacturing, selling, distributing, and/or otherwise making available the Accused Products, and providing instructions, documentation, and other information to customers and end-users suggesting they use the Accused Products in an infringing manner, including in-store technical support, online technical support, marketing, product manuals, advertisements, and online documentation. As a result of Samsung’s inducement, Samsung’s customers and end-users use the Accused Products in the way Samsung intends and directly infringe the ’911 Patent. Samsung performs these affirmative acts with knowledge of the ’911 Patent and with the intent, or willful blindness, that the induced acts directly infringe the ’911 Patent.

97. Samsung also indirectly infringes the ’911 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement committed by others, such as customers and end users, in this District and elsewhere in the United States. Samsung’s affirmative acts of selling and offering to sell, in this District and elsewhere in the United States, the Accused Products and causing the Accused Products to be manufactured, used, sold, and offered for sale contribute to Samsung’s customers and end-users use of the Accused Products, such that the ’911 Patent is directly infringed. The accused components within the Accused Products are material to the invention of the ’911 Patent, are not staple articles or commodities of commerce, have no

substantial non-infringing uses, and are known by Samsung to be especially made or adapted for use in the infringement of the ’911 Patent. Samsung performs these affirmative acts with knowledge of the ’911 Patent and with intent, or willful blindness, that Samsung causes the direct infringement of the ’911 Patent.

98. Samsung’s infringement of the ’911 Patent has damaged and will continue to damage Hannibal.

99. Moreover, Samsung’s risk of infringement of the Asserted Patents was either known or was so obvious that it should have been known to Samsung.

100. Notwithstanding this knowledge, Samsung has knowingly or with reckless disregard willfully infringed the ’911 Patent. Samsung continues to infringe despite knowledge of Hannibal’s Asserted Patents. Samsung has thus had actual notice of infringement of the ’911 Patent and acted despite an objectively high likelihood that its actions constituted infringement of Hannibal’s valid patent rights, either literally or equivalently.

101. This objective risk was either known or so obvious that it should have been known to Samsung. Accordingly, Plaintiff seeks enhanced damages pursuant to 35 U.S.C. §§ 284 and 285.

## VIII. NOTICE

102. Hannibal has complied with the notice requirement of 35 U.S.C. § 287 and does not currently distribute, sell, offer for sale, or make products embodying the Asserted Patents. This notice requirement has been complied with by all relevant persons at all relevant times.

103. Samsung has had actual knowledge of the Asserted Patents and its infringement thereof at least as of receipt of Plaintiff’s notice letter dated June 8, 2022 and November 6, 2023. Alternatively, Samsung has had actual knowledge of the Asserted Patents at least as of the date of

Samsung's receipt of charts comparing the claims of the Asserted Patents to the 5G standard and/or through service of this Complaint.

## IX. COMPLIANCE WITH FRAND

104. Hannibal is the assignee of numerous patents, originally assigned to FG Innovation Company Limited, that are, and remain, essential to practicing the 3GPP 5G Standard.

105. At least the '896, '535, and '911 Patents were declared to the European Telecommunications Standards Institute ("ETSI"), by its original assignee, through an IPR Information Statement and Licensing Declaration. The '661 Patent is a continuation of the '896 Patent.

106. In conformance with ESTI's IPR Policy, Hannibal informed Samsung that it is prepared to grant Samsung an irrevocable license to Hannibal's standard essential patents, including the Asserted Patents, on FRAND terms.

107. Through numerous meetings and correspondence, Hannibal presented, in good faith, technical details evidencing the essentiality of Hannibal's patents.

108. Hannibal also provided Samsung with FRAND and better-than-FRAND offers to license Hannibal's patents.

109. Accordingly, Hannibal has complied with its FRAND obligations in accordance with ESTI's IPR Policy.

## X. JURY DEMAND

110. Plaintiff Hannibal demands a trial by jury of all matters to which it is entitled to trial by jury, pursuant to Fed. R. Civ. P. 38.

## XI. REQUEST FOR RELIEF

Hannibal respectfully requests that judgment be entered as follows:

A. A declaration that the claims of the Asserted Patents are valid and enforceable;

B. A declaration that one or more claims of the Asserted Patents is infringed by Samsung, literally and/or under the doctrine of equivalents;

C. A declaration that one or more claims of the Asserted Patents is indirectly infringed by each of the Defendants;

D. That the Court award damages adequate to compensate Hannibal for the patent infringement that has occurred, together with prejudgment and post-judgment interest and costs, and an ongoing royalty for continued infringement;

E. That the Court award any other equitable relief which may be requested and to which Hannibal is entitled;

F. That the Court find this case to be exceptional pursuant to 35 U.S.C. § 285;

G. That the Court determine that Samsung's acts of infringement were willful;

H. That the Court award enhanced damages against Samsung pursuant to 35 U.S.C. § 284;

I. That the Court award reasonable attorneys' fees; and

J. That the Court award such other relief to Hannibal as the Court deems just and proper.

Dated: February 27, 2025

Respectfully submitted,

*/s/ Vishal H. Patel*
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