

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

5G IP HOLDINGS LLC,

PLAINTIFF,

v.

**SAMSUNG ELECTRONICS CO. LTD.;
SAMSUNG ELECTRONICS AMERICA,
INC.; AND SAMSUNG RESEARCH
AMERICA**

DEFENDANTS.

Case No. _____

JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff 5G IP Holdings LLC (“5GIP”) files this complaint for patent infringement against Defendants Samsung Electronics Co. Ltd.; Samsung Electronics America, Inc.; and Samsung Research America. (collectively, “Defendants,” “Samsung”), and asserts as follows:

BACKGROUND

1. Since the advent of cellular networks, telecommunications companies have consistently sought ways to improve the performance and reliability of those networks. To advance this technology, they formed an industry standard setting consortium known as the 3rd Generation Partnership Project (“3GPP”) in 1998. 3GPP began working on cellular standards, starting with the third generation cellular network standard. Most recently, 3GPP developed the fifth generation technology standard for cellular networks (“the 5G Standard”). The 5G Standard is the newest telecommunications standard for cellular networks and is currently being implemented around the world.

2. In 2019, companies began deploying networks that implemented the 5G Standard. 5G networks provide greater bandwidth and higher download speeds over their predecessor 4G networks, among other advancements. Because of these benefits, cellular phones, tablets, and other devices compatible with 5G networks have seen increased performance, including the ability to support new applications and download and stream large files.

3. 5GIP is an intellectual property company that owns patents on core technologies related to the 5G Standard. The original assignee of the patents asserted here, FG Innovation Company Ltd. (“FGI”), is an innovator in the telecommunications space, having developed numerous technologies that are core aspects of the 5G Standard. As one example, FGI’s technology reduces latency and overhead by allowing a connection with a user device to quickly resume if it’s lost. Another example is how FGI’s technology reduces overhead by using indexing messages to refer to certain configurations instead of separately specifying the parameters. These technological breakthroughs helped deliver on the 5G Standard’s promise of increased bandwidth and lowered latency. FGI’s technology is necessary to practice the 5G Standard. That’s why FGI has declared several of its patents essential to the 5G Standard, including the patents asserted here.

THE PARTIES AND PRODUCTS

4. 5GIP is a limited liability company organized and existing under the laws of the State of Texas, with its principal place of business at 5900 S. Lake Forest Drive, Suite 300, McKinney, Texas 75070.

5. 5GIP is the owner of the entire right, title, and interest in U.S. Patent Nos. 10,624,150; 10,813,163; and 10,868,649 (collectively “the Asserted Patents”).

6. On information and belief, Defendant Samsung Electronics Co. Ltd. (“SEC”) is a corporation organized and existing under the laws of the Republic of Korea, with its principal

place of business at 129 Samsung-ro, Maetan-3dong, Yeongtong-gu Suwon-si, Gyeonggi-do 16677, Suwon-Shi, Korea.

7. On information and belief, Defendant Samsung Electronics America, Inc. (“SEA”) is a New York corporation having its principal place of business at 85 Challenger Road, Ridgefield Park, New Jersey 07660, and maintains a place of business in this District at 6625 Excellence Way, Plano, Texas 75023.

8. On information and belief, Samsung Research America (“SRA”) is a California corporation having a principal place of business at 645 Clyde Avenue, Mountain View, California 94043, and maintains a place of business in this District at 6625 Excellence Way, Plano, Texas 75023.

9. On information and belief, SEC is the parent company of SEA and SRA.

10. On information and belief, Samsung makes, uses, sells, and offers for sale products that implement and support the 5G Standard (“Samsung 5G cell phones and tablets”). These products include, but are not limited to: Galaxy S21 Ultra 5G, Galaxy S21+ 5G, Galaxy S21, Galaxy S20 FE 5G, Galaxy S20 FE 5G UW, Galaxy Note20 Ultra 5G, Galaxy Note20 5G, Galaxy Z Fold2 5G, Galaxy Z Flip 5G, Galaxy A71 5G, Galaxy A71 5G UW, Galaxy A52 5G, Galaxy A51, Galaxy A51 5G UW, Galaxy A42 5G, Galaxy A32 5G, Galaxy S20 Ultra 5G, Galaxy S20+ 5G, Galaxy S20 5G, Galaxy S10, Galaxy Note 10+ 5G, Galaxy Tab S7 5G, and Galaxy Tab S7+ 5G.

11. On information and belief, each of these Samsung products implements and supports the 5G Standard, including but not limited to 3GPP TS 38.213, 38.304, 38.321, and 38.331.

JURISDICTION AND VENUE

12. This is a complaint for patent infringement that arises under the laws of the United States, Title 35 of the United States Code.

13. This Court has subject-matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338.

14. This Court has personal jurisdiction over Samsung in this action because Samsung has committed acts within the Eastern District of Texas giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over Samsung would not offend traditional notions of fair play and substantial justice. Samsung knowingly sells, offers for sale, makes, uses, and/or imports in this District products that infringe the Asserted Patents, including the Samsung 5G cell phones and tablets.

15. This Court has personal jurisdiction over Defendant SEC in this action because SEC has committed acts within this District giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over SEC would not offend traditional notions of fair play and substantial justice. Defendant SEC, directly and through subsidiaries or intermediaries (including distributors, resellers, and others), has committed and continues to commit acts of infringement in this District by, among other things, offering to sell, using, and selling products that infringe the Asserted Patents, including the Samsung 5G cell phones and tablets.

16. This Court has personal jurisdiction over Defendant SEA in this action because SEA has committed acts within the Eastern District of Texas giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over SEA would not offend traditional notions of fair play and substantial justice. Defendant SEA, directly and through subsidiaries or intermediaries (including distributors, resellers, and others), has

committed and continues to commit acts of infringement in this District by, among other things, offering to sell, using, and selling products that infringe the Asserted Patents including the Samsung 5G cell phones and tablets. SEA is registered to do business in Texas and is in good standing for its franchise tax certification. On information and belief, SEA maintains a place of business at 6625 Excellence Way, Plano, Texas 75023. And SEA's registered agent for service of process is CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

17. This Court has personal jurisdiction over Defendant SRA in this action because SRA has committed acts within the Eastern District of Texas giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over SRA would not offend traditional notions of fair play and substantial justice. Defendant SRA, directly and through subsidiaries or intermediaries (including distributors, resellers, and others), has committed and continues to commit acts of infringement in this District by, among other things, designing and using products that infringe the Asserted Patents including the Samsung 5G cell phones and tablets. On information and belief, SRA maintains a place of business at 6625 Excellence Way, Plano, Texas 75023. On information and belief, employees at this place of business attend standardization meetings and work on research and development related to cellular standards such as the 5G Standard. On information and belief, employees at this place of business work on research and development related to products implementing the 5G Standard, including smartphones and other mobile devices. SRA's registered agent for service of process is National Registered Agents, Inc., 330 North Brand Boulevard, Glendale, California 91203.

18. Further, Samsung has committed patent infringement in this District; solicits and induces customers/users in this District; and has customers/users residing in this District who purchase, acquire, and/or use Samsung's infringing products in this District.

19. Based on the above, venue is proper in the Eastern District of Texas under 28 U.S.C. §§ 1391(b)–(c) and 1400. Upon information and belief, Defendants SEA and SRA maintain places of business in this District, and Defendant SEC is a foreign company with no place of business in the United States.

20. Joinder of the Defendants is also proper under 35 U.S.C. § 299 because 5GIP asserts its right to relief against Defendants jointly, severally, or in the alternative with respect to or arising out of the same transaction, occurrence, or series of transactions or occurrences relating to the making, using, importing into the United States, offering for sale, or selling of the same accused products or processes, including Samsung 5G cell phones and tablets; and questions of fact common to all Defendants will arise in the action.

COUNT ONE
INFRINGEMENT OF U.S. PATENT NO. 10,624,150 (“the ’150 Patent”)

21. 5GIP re-alleges and incorporates by reference paragraphs 1–20 above.

22. On April 14, 2020, the United States Patent and Trademark Office (“USPTO”) duly and legally issued U.S. Patent No. 10,624,150, entitled “Radio Resource Control Connection Resume Method of Wireless Communication System.”

23. 5GIP is the owner of the ’150 Patent, a true and correct copy of which is attached hereto as Exhibit A.

24. The ’150 Patent is valid and enforceable under the United States patent laws.

25. FGI declared the ’150 Patent as a standard essential patent (“SEP”) on June 18, 2020 to 3GPP TS 38.304 and 38.331.

Technical Description

26. The ’150 Patent generally is directed to providing and implementing a procedure for radio resource control (“RRC”) resumption for a Narrow-Band Internet of Things. The ’150

Patent claims are generally directed to technical improvements for the latency and overhead issues found in prior art wireless communications systems. *E.g.*, '150 Patent at 1:23-2:43. As an example, the '150 Patent provides that when a user equipment ("UE") receives a RRC suspend message from a first base station, the UE performs a resume procedure with a second base station, which returns a RRC resume response back to the UE. The RRC suspend message comprises target cell information and target radio access technology information comprising numerology information. Because the serving base station retains the UE context, the UE can quickly send a RRC Resume message and resume an RRC connection for data/control transmission, reducing latency and radio access overhead. *Id.* at 2:47-3:9. For instance, the '150 Patent claims generally recite the interactions between the UE and the wireless communications system and also include the content of messages received by the UE.

Direct/Indirect Infringement

27. Defendant Samsung has infringed and is infringing, either literally or under the doctrine of equivalents, at least claim 1 of the '150 Patent in violation of 35 U.S.C. § 271 *et seq.*, directly and/or indirectly, by, using, offering for sale, or selling in the United States, and/or importing into the United States without authority or license, products that implement and support the 5G Standard including but not limited to 3GPP TS 38.304 and 38.331. Samsung has and continues to indirectly infringe one or more claims of the '150 Patent by knowingly and intentionally inducing others, including Samsung customers, resellers, distributors, retailers, and end-users, to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States products that include infringing technology, such as Samsung 5G phones and tablets.

28. As just one non-limiting example, Samsung 5G phones and tablets, including but not limited to the Galaxy S21 Ultra 5G, Galaxy S21+ 5G, Galaxy S21, Galaxy S20 FE 5G,

Galaxy S20 FE 5G UW, Galaxy Note20 Ultra 5G, Galaxy Note20 5G, Galaxy Z Fold2 5G, Galaxy Z Flip 5G, Galaxy A71 5G, Galaxy A71 5G UW, Galaxy A52 5G, Galaxy A51, Galaxy A51 5G UW, Galaxy A42 5G, Galaxy A32 5G, Galaxy S20 Ultra 5G, Galaxy S20+ 5G, Galaxy S20 5G, Galaxy S10, Galaxy Note 10+ 5G, Galaxy Tab S7 5G, Galaxy Tab S7+ 5G and other similar products, infringe at least claim 1 of the '150 Patent.

29. For example, Samsung's Galaxy S21 Ultra 5G is a non-limiting example of an apparatus that meets the limitations of claim 1 of the '150 Patent by implementing the 5G Standard, including but not limited to 3GPP TS 38.304 and 38.331. As shown in the exemplary excerpts below of 3GPP TS 38.331, the 5G Standard includes, for example, a radio resource control (RRC) connection resume method involving receiving RRC suspend messages from a first base station and performing an RRC resume procedure with a second base station in response to the RRC suspend message.

1 Scope

The present document specifies the Radio Resource Control protocol for the radio interface between UE and NG-RAN.

The scope of the present document also includes:

- the radio related information transported in a transparent container between source gNB and target gNB upon inter gNB handover;
- the radio related information transported in a transparent container between a source or target gNB and another system upon inter RAT handover.
- the radio related information transported in a transparent container between a source eNB and target gNB during E-UTRA-NR Dual Connectivity.

3GPP TS 38.331 V15.13.0 38.331 (2021-03), p. 16.

5.3 Connection control

5.3.1 Introduction

5.3.1.1 RRC connection control

RRC connection establishment involves the establishment of SRB1. The network completes RRC connection establishment prior to completing the establishment of the NG connection, i.e. prior to receiving the UE context information from the 5GC. Consequently, AS security is not activated during the initial phase of the RRC connection. During this initial phase of the RRC connection, the network may configure the UE to perform measurement reporting, but the UE only sends the corresponding measurement reports after successful AS security activation. However, the UE only accepts a re-configuration with sync message when AS security has been activated.

Upon receiving the UE context from the 5GC, the RAN activates AS security (both ciphering and integrity protection) using the initial AS security activation procedure. The RRC messages to activate AS security (command and successful response) are integrity protected, while ciphering is started only after completion of the procedure. That is, the response to the message used to activate AS security is not ciphered, while the subsequent messages (e.g. used to establish SRB2 and DRBs) are both integrity protected and ciphered. After having initiated the initial AS security activation procedure, the network may initiate the establishment of SRB2 and DRBs, i.e. the network may do this prior to receiving the confirmation of the initial AS security activation from the UE. In any case, the network will apply both ciphering and integrity protection for the RRC reconfiguration messages used to establish SRB2 and DRBs. The network should release the RRC connection if the initial AS security activation and/ or the radio bearer establishment fails. A configuration with SRB2 without DRB or with DRB without SRB2 is not supported (i.e., SRB2 and at least one DRB must be configured in the same RRC Reconfiguration message, and it is not allowed to release all the DRBs without releasing the RRC Connection).

The release of the RRC connection normally is initiated by the network. The procedure may be used to re-direct the UE to an NR frequency or an E-UTRA carrier frequency.

The suspension of the RRC connection is initiated by the network. When the RRC connection is suspended, the UE stores the UE Inactive AS context and any configuration received from the network, and transits to RRC_INACTIVE state. If the UE is configured with SCG, the UE releases the SCG configuration upon initiating a RRC Connection Resume procedure. The RRC message to suspend the RRC connection is integrity protected and ciphered.

3GPP TS 38.331 V15.13.0 38.331 (2021-03), p. 37.

5.3.3 RRC connection establishment

5.3.3.1 General

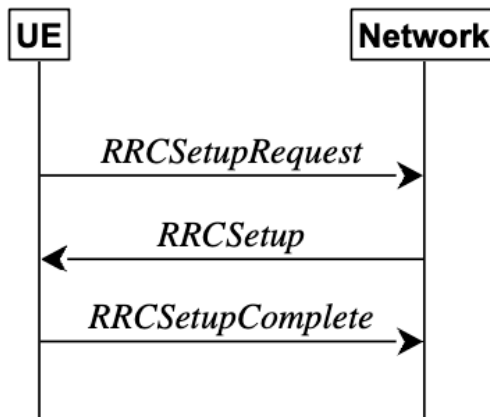


Figure 5.3.3.1-1: RRC connection establishment, successful

3GPP TS 38.331 V15.13.0 38.331 (2021-03), p. 40.

Release 15

67

3GPP TS 38.331 V15.13.0 (2021-03)

5.3.8 RRC connection release

5.3.8.1 General

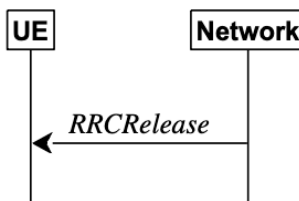


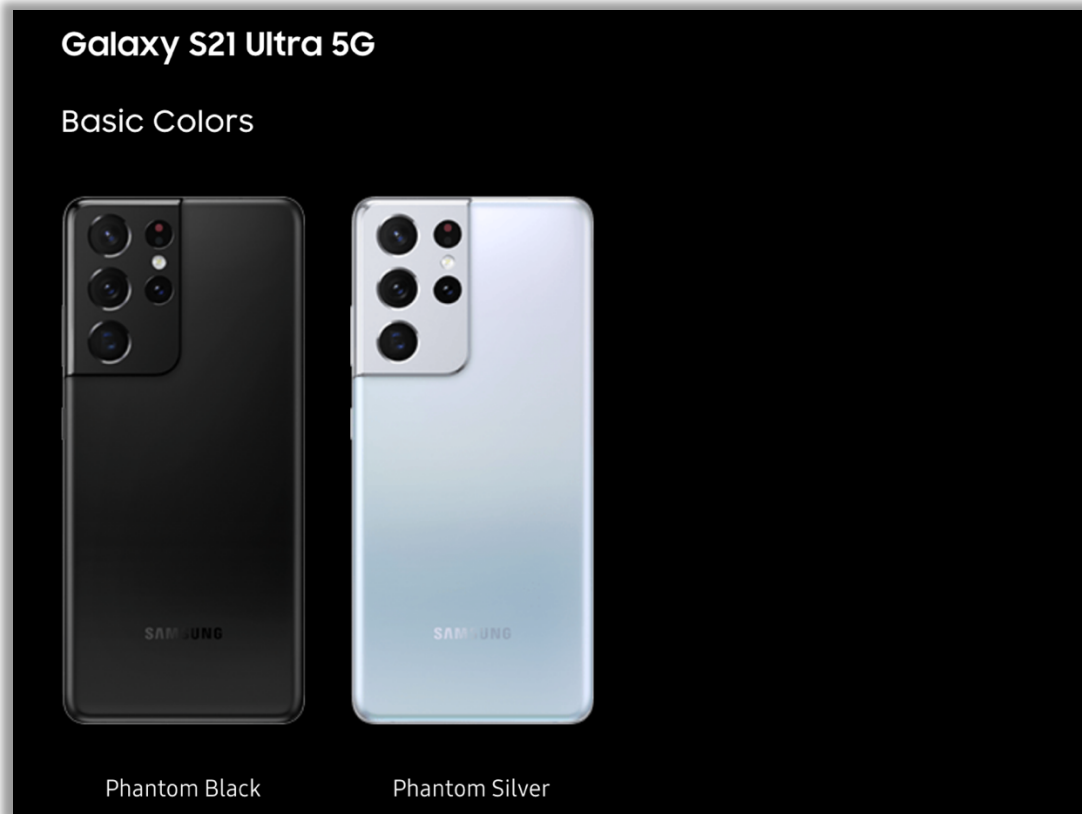
Figure 5.3.8.1-1: RRC connection release, successful

The purpose of this procedure is:

- to release the RRC connection, which includes the release of the established radio bearers as well as all radio resources; or
- to suspend the RRC connection only if SRB2 and at least one DRB are setup, which includes the suspension of the established radio bearers.

3GPP TS 38.331 V15.13.0 38.331 (2021-03), p. 67.

30. Samsung's marketing and advertising confirms that the Samsung 5G cell phones and tablets, including the Samsung Galaxy S21 Ultra 5G, comply with the 5G Standard.



Network & Connectivity	Galaxy S21 5G and S21+ 5G	Galaxy S21 Ultra 5G
	5G 5G Non-Standalone (NSA), Standalone (SA), Sub6 / mmWave	5G 5G Non-Standalone (NSA), Standalone (SA), Sub6 / mmWave
	LTE Enhanced 4x4 MIMO, Up to 7CA, LTE Cat.20 Up to 2.0Gbps Download / Up to 200Mbps Upload	LTE Enhanced 4x4 MIMO, Up to 7CA, LTE Cat.20 Up to 2.0Gbps Download / Up to 200Mbps Upload
	Wi-Fi Wi-Fi 802.11 a/b/g/n/ac/ax 2.4G+5GHz, HE80, MIMO, 1024-QAM Up to 1.2Gbps Download / Up to 1.2Gbps Upload	Wi-Fi Wi-Fi 802.11 a/b/g/n/ac/ax 2.4G+5GHz+6GHz, HE160, MIMO, 1024-QAM Up to 2.4Gbps Download / Up to 2.4Gbps Upload
	Bluetooth Bluetooth® v 5.0, USB type-C, NFC, Location (GPS, Galileo, Glonass, BeiDou)	Bluetooth Bluetooth® v 5.2, USB type-C, NFC, Location (GPS, Galileo, Glonass, BeiDou)

<https://www.samsung.com/global/galaxy/galaxy-s21-ultra-5g/specs/>

Willful Infringement

31. Samsung has had actual knowledge of the '150 Patent and its infringement of the '150 Patent.

32. Samsung was heavily involved in the development of the 5G Standard. And FGI unambiguously declared the '150 Patent as standard essential to the 5G Standard. Thus, Samsung knew or should have known of the '150 Patent and of its infringement. And Samsung also had actual knowledge of the '150 Patent and its infringement through the filing and service of this Complaint.

33. And notwithstanding this knowledge, Samsung has knowingly or with reckless disregard willfully infringed the '150 Patent. Samsung continues to commit acts of infringement despite being on notice of an objectively high likelihood that its actions constituted infringement of 5GIP's valid patent rights, either literally or equivalently. Thus, 5GIP seeks enhanced damages pursuant to 35 U.S.C. §§ 284 and 285.

34. 5GIP has been, and continues to be, damaged by Samsung's infringement of the '150 Patent.

**COUNT TWO
INFRINGEMENT OF U.S. PATENT NO. 10,813,163 ("the '163 Patent")**

35. 5GIP re-alleges and incorporates by reference paragraphs 1–20 above.

36. On October 20, 2020, the USPTO duly and legally issued U.S. Patent No. 10,813,163, entitled "Devices and Methods for Controlling Discontinuous Reception in New Radio."

37. 5GIP is the owner of the '163 Patent, a true and correct copy of which is attached hereto as Exhibit B.

38. The '163 Patent is valid and enforceable under the United States patent laws.

39. FGI declared the '163 Patent as a SEP on May 21, 2019 and again on April 13, 2020 to 3GPP TS 38.321 and 38.331, respectively.

Technical Description

40. The '163 Patent generally is directed to a method and apparatus for controlling discontinuous reception ("DRX") in New Radio ("NR"). The '163 Patent claims are generally directed to a technical improvement to prior art wireless communications systems to accommodate a more flexible frame structure. *E.g.*, '163 Patent at 1:24-1:48. For instance, the '163 Patent provides that a UE receives an RRC message having a DRX Start Offset (*drx-StartOffset*) and a DRX Slot Offset (*drxStartOffset_slot*) to determine the start subframe and start time in the start subframe. This helps accommodate a variety of communication configurations while maintaining reliability, high data rate, and low latency. As an example, the '163 Patent claims generally recite the contents of the message the UE receives and the calculations the UE performs to allow for a frame structure without a fixed time unit.

Direct/Indirect Infringement

41. Defendant Samsung has infringed and is infringing, either literally or under the doctrine of equivalents, at least claim 1 of the '163 Patent in violation of 35 U.S.C. § 271 *et seq.*, directly and/or indirectly, by, using, offering for sale, or selling in the United States, and/or importing into the United States without authority or license, products that implement and support the 5G Standard including but not limited to 3GPP TS 38.321 and 38.331. Samsung has and continues to indirectly infringe one or more claims of the '163 Patent by knowingly and intentionally inducing others, including Samsung customers, resellers, distributors, retailers, and end-users, to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States products that include infringing technology, such as Samsung 5G phones and tablets.

42. As just one non-limiting example, Samsung 5G phones and tablets, including but not limited to the Galaxy S21 Ultra 5G, Galaxy S21+ 5G, Galaxy S21, Galaxy S20 FE 5G, Galaxy S20 FE 5G UW, Galaxy Note20 Ultra 5G, Galaxy Note20 5G, Galaxy Z Fold2 5G, Galaxy Z Flip 5G, Galaxy A71 5G, Galaxy A71 5G UW, Galaxy A52 5G, Galaxy A51, Galaxy A51 5G UW, Galaxy A42 5G, Galaxy A32 5G, Galaxy S20 Ultra 5G, Galaxy S20+ 5G, Galaxy S20 5G, Galaxy S10, Galaxy Note 10+ 5G, Galaxy Tab S7 5G, Galaxy Tab S7+ 5G and other similar products, infringe at least claim 1 of the '163 Patent.

43. For example, Samsung's Galaxy S20 Ultra 5G is a non-limiting example of an apparatus that meets the limitations of claim 1 of the '163 Patent by implementing the 5G Standard, including but not limited to 3GPP TS 38.321 and 38.331. As shown in the exemplary excerpts below of 3GPP TS 38.321, the 5G standard includes, for example, a method for discontinuous reception (DRX) where the UE receives an RRC message, the UE determines a start subframe and start time based on the RRC message values.

5.7 Discontinuous Reception (DRX)

The MAC entity may be configured by RRC with a DRX functionality that controls the UE's PDCCH monitoring activity for the MAC entity's C-RNTI, CS-RNTI, INT-RNTI, SFI-RNTI, SP-CRNTI, TPC-PUCCH-RNTI, TPC-PUSCH-RNTI, and TPC-SRS-RNTI. When using DRX operation, the MAC entity shall also monitor PDCCH according to requirements found in other clauses of this specification. When in RRC_CONNECTED, if DRX is configured, for all the activated Serving Cells, the MAC entity may monitor the PDCCH discontinuously using the DRX operation specified in this clause; otherwise the MAC entity shall monitor the PDCCH as specified in TS 38.213 [6].

3GPP TS 38.321 V15.12.0 38.321 (2021-03), pp. 38-39.

RRC controls DRX operation by configuring the following parameters:

- *drx-onDurationTimer*: the duration at the beginning of a DRX Cycle;
- *drx-SlotOffset*: the delay before starting the *drx-onDurationTimer*;
- *drx-InactivityTimer*: the duration after the PDCCH occasion in which a PDCCH indicates a new UL or DL transmission for the MAC entity;
- *drx-RetransmissionTimerDL* (per DL HARQ process except for the broadcast process): the maximum duration until a DL retransmission is received;

Release 15

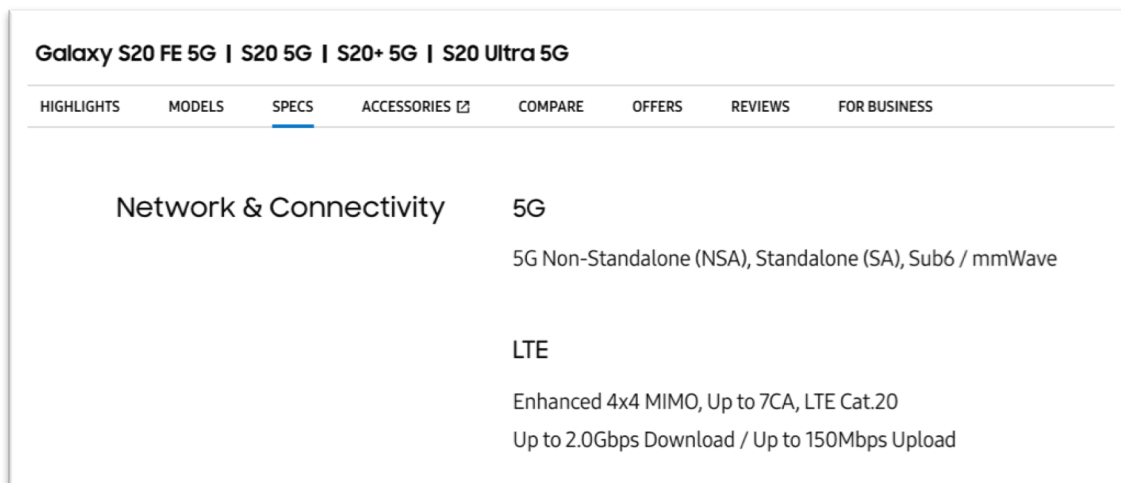
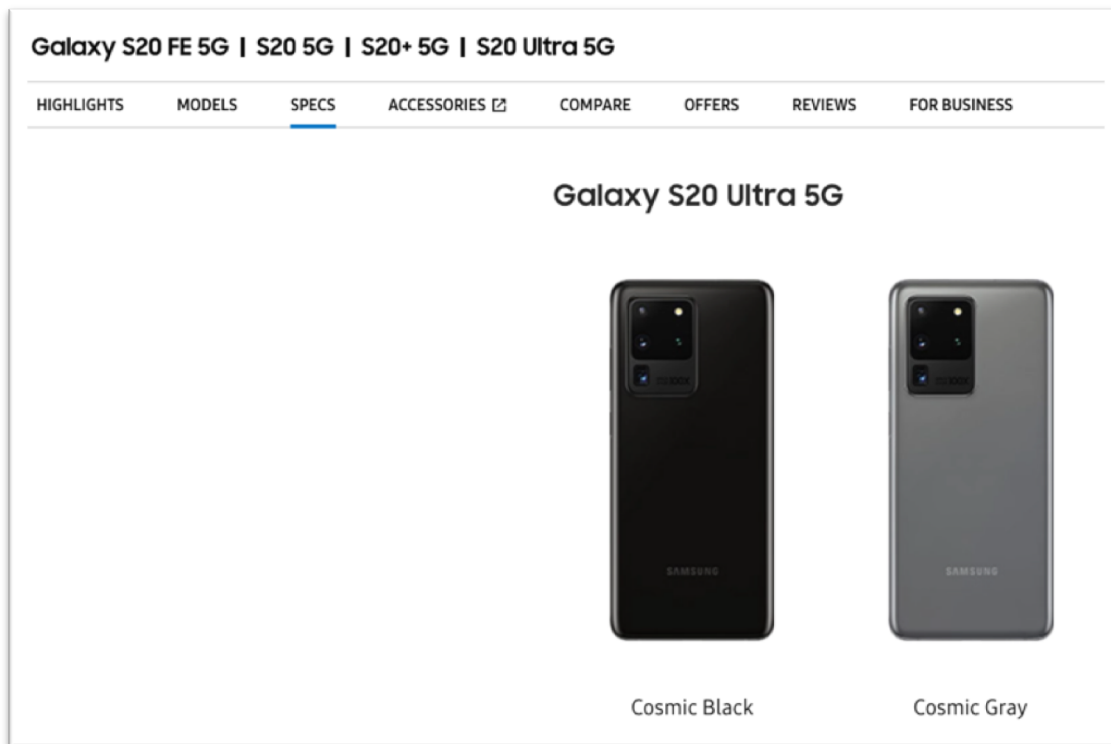
39

3GPP TS 38.321 V15.12.0 (2021-03)

- *drx-RetransmissionTimerUL* (per UL HARQ process): the maximum duration until a grant for UL retransmission is received;
- *drx-LongCycleStartOffset*: the Long DRX cycle and *drx-StartOffset* which defines the subframe where the Long and Short DRX Cycle starts;
- *drx-ShortCycle* (optional): the Short DRX cycle;
- *drx-ShortCycleTimer* (optional): the duration the UE shall follow the Short DRX cycle;
- *drx-HARQ-RTT-TimerDL* (per DL HARQ process except for the broadcast process): the minimum duration before a DL assignment for HARQ retransmission is expected by the MAC entity;
- *drx-HARQ-RTT-TimerUL* (per UL HARQ process): the minimum duration before a UL HARQ retransmission grant is expected by the MAC entity.

3GPP TS 38.321 V15.12.0 38.321 (2021-03), pp. 38-39.

44. And Samsung's marketing and advertising confirms that the Samsung 5G cell phones and tablets, including the Samsung Galaxy S20 Ultra 5G, comply with the 5G Standard.



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

Willful Infringement

45. Samsung has had actual knowledge of the '163 Patent and its infringement of the '163 Patent.

46. Samsung was heavily involved in the development of the 5G Standard. And FGI unambiguously declared the '163 Patent as standard essential to the 5G Standard. Thus, Samsung knew or should have known of the '163 Patent and of its infringement. And Samsung also had actual knowledge of the '163 Patent and its infringement through the filing and service of this Complaint.

47. And notwithstanding this knowledge, Samsung has knowingly or with reckless disregard willfully infringed the '163 Patent. Samsung continues to commit acts of infringement despite being on notice of an objectively high likelihood that its actions constituted infringement of 5GIP's valid patent rights, either literally or equivalently. Thus, 5GIP seeks enhanced damages pursuant to 35 U.S.C. §§ 284 and 285.

48. 5GIP has been, and continues to be, damaged by Samsung's infringement of the '163 Patent.

COUNT THREE
INFRINGEMENT OF U.S. PATENT NO. 10,868,649 (“the '649 Patent”)

49. 5GIP re-alleges and incorporates by reference paragraphs 1–20 above.

50. On December 15, 2020, the USPTO duly and legally issued U.S. Patent No. 10,868,649, entitled “Method for Signaling Bandwidth Part (BWP) indicators and Radio Communication Equipment Using the Same.”

51. 5GIP is the owner of the '649 Patent, a true and correct copy of which is attached hereto as Exhibit C.

52. The '649 Patent is valid and enforceable under the United States patent laws.

53. FGI declared the '649 Patent as a SEP on May 29, 2019 to 3GPP TS 38.213 and 38.331, respectively.

Technical Description

54. The '649 patent is generally directed to a method and apparatus for signaling bandwidth part ("BWP") indices in wireless communications. The '649 Patent claims are generally directed to a technical improvement over prior art wireless communications systems to accommodate a variety of communications configurations. *E.g.*, '649 Patent at 1:19-50. Radio Access Network ("RAN") profile, or RAN slicing, allows a cell to adaptively configure parameters of the physical layer to accommodate communication between the base station and the UE. Dynamic configuration is desirable, but there existed significant signaling overhead each time a UE communicates with a base station. The '649 Patent helps solve this issue, by, for instance, describing RAN profile indexing messages with BWP indices that correspond to BWP configurations. These BWP configurations are paired to different physical layer compositions and, by including BWP indices in the RAN frames, promote flexible use of different PHY compositions. Transmitting a BWP index corresponding to a particular set of RAN parameters, which corresponds to a particular physical layer ("PHY") composition, reduces overhead from cells while also accommodating communication between the base station and UE. Consequently, the UE experiences faster transmission speeds when practicing the patent. For example, the '649 Patent claims recite the interactions between the UE and the wireless communications system including first cells operating on a first component carrier, and also specifically recite the content of messages received by the UE.

Direct/Indirect Infringement

55. Defendant Samsung has infringed and is infringing, either literally or under the doctrine of equivalents, at least claim 16 of the '649 Patent in violation of 35 U.S.C. § 271 *et seq.*, directly and/or indirectly, by, offering for sale, or selling in the United States, and/or importing into the United States without authority or license, products that implement and

support aspects of the 5G Standard including but not limited to 3GPP TS 38.212, 38.213, and 38.331. Samsung has and continues to indirectly infringe one or more claims of the '649 Patent by knowingly and intentionally inducing others, including Samsung customers, distributors, resellers, retailers, and end-users, to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States products that include infringing technology, such as Samsung 5G phones and tablets.

56. As just one non-limiting example, Samsung 5G phones and tablets, including but not limited to the Galaxy S21 Ultra 5G, Galaxy S21+ 5G, Galaxy S21, Galaxy S20 FE 5G, Galaxy S20 FE 5G UW, Galaxy Note20 Ultra 5G, Galaxy Note20 5G, Galaxy Z Fold2 5G, Galaxy Z Flip 5G, Galaxy A71 5G, Galaxy A71 5G UW, Galaxy A52 5G, Galaxy A51, Galaxy A51 5G UW, Galaxy A42 5G, Galaxy A32 5G, Galaxy S20 Ultra 5G, Galaxy S20+ 5G, Galaxy S20 5G, Galaxy S10, Galaxy Note 10+ 5G, Galaxy Tab S7 5G, Galaxy Tab S7+ 5G and other similar products, infringe at least claim 16 of the '649 Patent.

57. For example, Samsung's Galaxy Note20 Ultra is a non-limiting example of an apparatus that meets the limitations of at least claim 16 of the '649 Patent by implementing the 5G Standard network, including but not limited to 3GPP TS 38.212, 38.213, and 38.331. As the exemplary excerpts below of 3GPP TS 38.213 show, the 5G standard includes, for example, receiving a RAN profile indexing message comprising Bandwidth Part (BWP) indices corresponding to BWP configurations. The BWP configurations include a BWP index associated with the corresponding BWP configuration, a frequency location of the corresponding BWP configuration, a bandwidth in the frequency domain, a transmission type, and one or more periodic resource allocations associated with the transmission type.

A UE configured for operation in bandwidth parts (BWPs) of a serving cell, is configured by higher layers for the serving cell a set of at most four bandwidth parts (BWPs) for receptions by the UE (DL BWP set) in a DL bandwidth by parameter *BWP-Downlink* or by parameter *initialDownlinkBWP* with a set of parameters configured by *BWP-DownlinkCommon* and *BWP-DownlinkDedicated*, and a set of at most four BWPs for transmissions by the UE (UL BWP set) in an UL bandwidth by parameter *BWP-Uplink* or by parameter *initialUplinkBWP* with a set of parameters configured by *BWP-UplinkCommon* and *BWP-UplinkDedicated*.

If a UE is not provided *initialDownlinkBWP*, an initial DL BWP is defined by a location and number of contiguous PRBs, starting from a PRB with the lowest index and ending at a PRB with the highest index among PRBs of a CORESET for Type0-PDCCH CSS set, and a SCS and a cyclic prefix for PDCCH reception in the CORESET for Type0-PDCCH CSS set; otherwise, the initial DL BWP is provided by *initialDownlinkBWP*. For operation on the primary cell or on a secondary cell, a UE is provided an initial UL BWP by *initialUplinkBWP*. If the UE is configured with a supplementary UL carrier, the UE can be provided an initial UL BWP on the supplementary UL carrier by *initialUplinkBWP*.

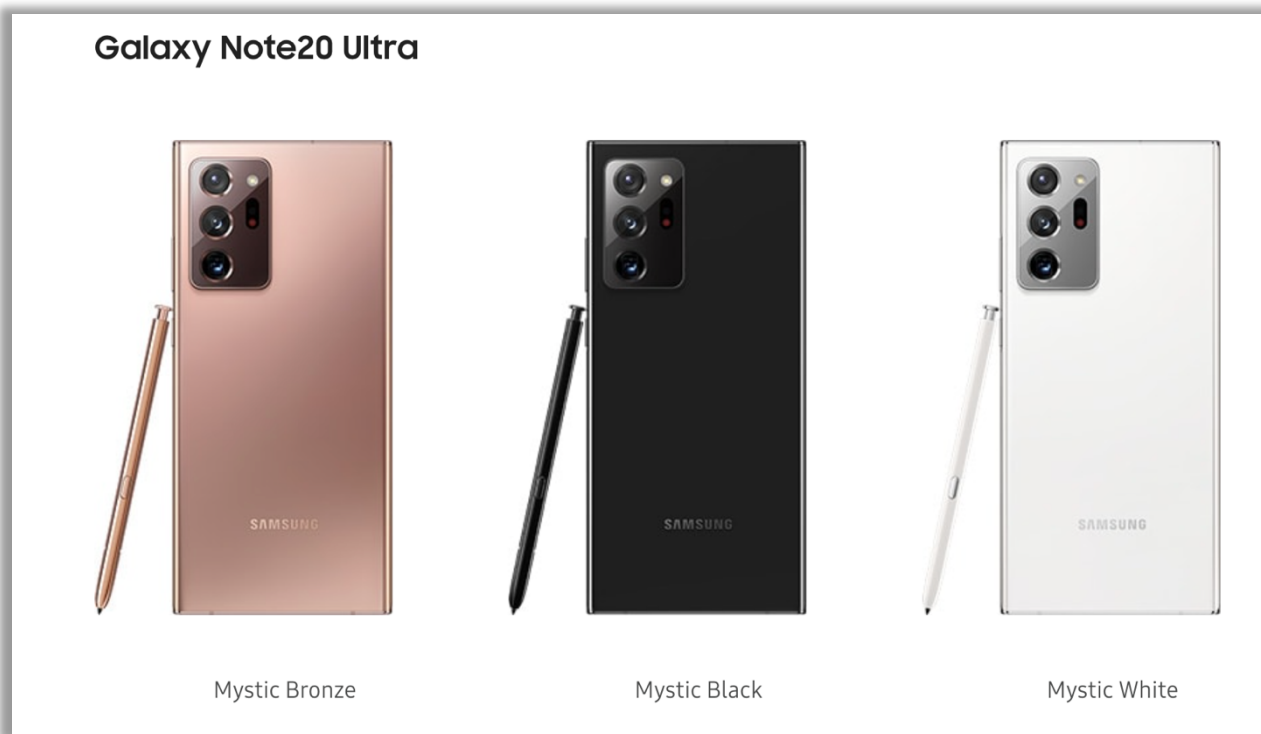
3GPP TS 38.213 V16.1.0 (2020-03), p. 129.

If a bandwidth part indicator field is configured in DCI format 1_1, the bandwidth part indicator field value indicates the active DL BWP, from the configured DL BWP set, for DL receptions as described in [5, TS 38.212]. If a bandwidth part indicator field is configured in DCI format 0_1, the bandwidth part indicator field value indicates the active UL BWP, from the configured UL BWP set, for UL transmissions as described in [5, TS 38.212]. If a bandwidth part indicator field is configured in DCI format 0_1 or DCI format 1_1 and indicates an UL BWP or a DL BWP different from the active UL BWP or DL BWP, respectively, the UE shall

- for each information field in the received DCI format 0_1 or DCI format 1_1
 - if the size of the information field is smaller than the one required for the DCI format 0_1 or DCI format 1_1 interpretation for the UL BWP or DL BWP that is indicated by the bandwidth part indicator, respectively, the UE prepends zeros to the information field until its size is the one required for the interpretation of the information field for the UL BWP or DL BWP prior to interpreting the DCI format 0_1 or DCI format 1_1 information fields, respectively
 - if the size of the information field is larger than the one required for the DCI format 0_1 or DCI format 1_1 interpretation for the UL BWP or DL BWP that is indicated by the bandwidth part indicator, respectively, the UE uses a number of least significant bits of DCI format 0_1 or DCI format 1_1 equal to the one required for the UL BWP or DL BWP indicated by bandwidth part indicator prior to interpreting the DCI format 0_1 or DCI format 1_1 information fields, respectively
- set the active UL BWP or DL BWP to the UL BWP or DL BWP indicated by the bandwidth part indicator in the DCI format 0_1 or DCI format 1_1, respectively

3GPP TS 38.213 V16.1.0 (2020-03), p. 130.

58. And Samsung's marketing and advertising confirms that the Samsung 5G cell phones and tablets, including the Samsung Galaxy Note20 Ultra, comply with the 5G Standard.



AP

7nm 64-bit Octa-Core Processor * 3.0GHz (Maximum Clock Speed) + 2.4GHz + 1.8GHz

*May vary depending on country and carrier.

Memory

Galaxy Note20

Galaxy Note20 Ultra

5G

8GB RAM (LPDDR5) with 128GB internal storage

5G

12GB RAM (LPDDR5) with 512GB internal storage
12GB RAM (LPDDR5) with 128GB internal storage

*Actual storage available may vary depending on pre-installed software.

<https://www.samsung.com/us/smartphones/galaxy-note20-5g/specs/>

Willful Infringement

59. Samsung has had actual knowledge of the '649 Patent and its infringement of the '649 Patent.

60. Samsung was heavily involved in the development of the 5G Standard. And FGI unambiguously declared the '649 Patent as standard essential to the 5G Standard. Thus, Samsung knew or should have known of the '649 Patent and of its infringement. And Samsung knew about the '649 Patent during the prosecution of at least two of its own patents. Specifically, in Samsung's U.S. Patent Application 16/798,045, Samsung identified the '649 Patent in its September 4, 2020 Information Disclosure Statement. And in Samsung's PCT Patent No. WO 2020/091520, published on May 7, 2020, the '649 Patent was identified as a document considered to be relevant in the international search report. Further, Samsung also had actual knowledge of the '649 Patent and its infringement through the filing and service of this Complaint.

61. And notwithstanding this knowledge, Samsung has knowingly or with reckless disregard willfully infringed the '649 Patent. Samsung continues to commit acts of infringement despite being on notice of an objectively high likelihood that its actions constituted infringement of 5GIP's valid patent rights, either literally or equivalently. Thus, 5GIP seeks enhanced damages pursuant to 35 U.S.C. §§ 284 and 285.

62. 5GIP has been, and continues to be, damaged by Samsung's infringement of the '649 Patent.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff 5GIP demands judgment against Defendants, including their affiliates, officers, agents, servants, employees, and all persons in active concert or participation with them, as follows:

A. An award to Plaintiff 5GIP of such damages under 35 U.S.C. § 284 as proven against Defendants for infringement of the '150 Patent, '163 Patent, and '649 Patent, together with pre-judgment and post-judgment interest;

B. A declaration that Defendants have willfully infringed the '150 Patent, '163 Patent, and '649 Patent;

C. Under 35 U.S.C. § 284, an increase in the award of damages to Plaintiff 5GIP up to three times the amount of its actual damages for Defendants' willful infringement;

D. Under 35 U.S.C. § 285, an award to Plaintiff 5GIP of its reasonable attorney's fees and the costs of this action; and

E. Such other and further relief as this Court deems just and appropriate.

JURY DEMAND

Under Federal Rule of Civil Procedure 38(b), Plaintiff 5GIP demands a trial by jury.

Dated: August 6, 2021

Respectfully submitted,

/s/ Alan M. Fisch

Alan M. Fisch (*admitted in E.D. Tex.*)

Lead Attorney

D.C. Bar No. 453068

alan.fisch@fischllp.com

R. William Sigler (*pro hac vice pending*)

D.C. Bar No. 490957

bill.sigler@fischllp.com

Jeffrey M. Saltman (*pro hac vice pending*)

D.C. Bar No. 979812

jeffrey.saltman@fischllp.com

Adam A. Allgood

Texas Bar No. 24059403

adam.allgood@fischllp.com

Kyle K. Tsui (*pro hac vice pending*)

D.C. Bar No. 1673602

kyle.tsui@fischllp.com

FISCH SIGLER LLP

5301 Wisconsin Avenue NW

Fourth Floor

Washington, DC 20015

202.362.3500

Ken K. Fung (*admitted in E.D. Tex.*)

California Bar No. 283854

ken.fung@fischllp.com

FISCH SIGLER LLP

400 Concar Drive

San Mateo, CA 94402

650.362.8200

Attorneys for Plaintiff

5G IP HOLDINGS LLC