

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

ACTIVE WIRELESS TECHNOLOGIES LLC,	§	Case No.
	§	
Plaintiff,	§	<u>JURY TRIAL DEMANDED</u>
	§	
v.	§	
	§	
T-MOBILE USA, INC. and T-MOBILE US, INC.,	§	
	§	
Defendants.	§	
	§	

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Active Wireless Technologies LLC (“AWT” or “Plaintiff”) files this original Complaint against Defendants T-Mobile USA, Inc. and T-Mobile US, Inc. (collectively “T-Mobile” or “Defendants”), for patent infringement under 35 U.S.C. § 271 and alleges as follows:

THE PARTIES

1. AWT is a limited liability company, organized and existing under the laws of the State of Texas, with its principal place of business located at 104 East Houston Street, Suite 140, Marshall, Texas 75670.

2. Defendant T-Mobile, USA, Inc. is a Washington corporation and maintains its principal place of business at 12920 SE 38th Street, Bellevue, Washington 98006, and may be served with process via its registered agent, Corporation Service Company at 211 E. 7th Street, Suite 620, Austin, Texas 78701. Upon information and belief, T-Mobile USA, Inc. does business in Texas, directly or through intermediaries, and offers its products and/or services, including those

accused herein of infringement, to customers and potential customers located in Texas, including in the judicial Eastern District of Texas.

3. Defendant T-Mobile US, Inc. is a Delaware corporation with its principal place of business as 12920 SE 38th Street, Bellevue, Washington 98006. T-Mobile US, Inc., is the parent corporation of T-Mobile USA, Inc. and was formerly known as MetroPCS Communications, Inc. T-Mobile US, Inc. was formed in 2013 through the business combination between T-Mobile USA and MetroPCS Communications, Inc. Upon information and belief, T-Mobile US, Inc. may be served with process through Corporation Service Company at 211 E. 7th Street Suite 620, Austin, Texas, 78701. Upon information and belief, T-Mobile US, Inc. does business in Texas, directly or through intermediaries, and offers its products and/or services, including those accused herein of infringement, to customers and potential customers located in Texas, including in the judicial Eastern District of Texas.

JURISDICTION

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

5. This Court has personal jurisdiction over T-Mobile in this action because T-Mobile 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 T-Mobile would not offend traditional notions of fair play and substantial justice. T-Mobile conducts business and has committed acts of patent infringement and/or has induced acts of patent infringement by others in this Judicial District and/or has contributed to patent infringement by

others in this Judicial District, the State of Texas, and elsewhere in the United States by, among other things, offering to sell and selling products and/or services that infringe the Patents-in-Suit.

6. Venue is proper in this Judicial District pursuant to 28 U.S.C. §§ 1391 and 1400(b). T-Mobile is registered to do business in Texas and, upon information and belief, T-Mobile has transacted business in the Eastern District of Texas and has committed acts of direct and indirect infringement in the Eastern District of Texas. T-Mobile US, Inc. maintains a corporate office at 2250 Lakeside Boulevard, Richardson, Texas 75082 and T-Mobile USA, Inc. maintains a Network Operations Center at 7668 Warren Parkway, Frisco, Texas 75034, both of which are located within this Judicial District. T-Mobile also has regular and established places of business in this Judicial District, including at least its retail stores located at 900 East End Boulevard N, #100B, Marshall, TX 75670; 1806 East End Boulevard N, Suite 100, Marshall, TX 75670; 222 East End Boulevard S, Apt. C, Marshall, TX 75670; 1209 E. Marshall Avenue, Longview, TX 75601; 2108 Gilmer Road, Longview, TX 75604; 530 E. Loop 281, Suite #101, Longview, TX 75605; 1110 East Parker Road, Suite C, Plano, TX 75074; 3131 Custer Road, Suite #125, Plano, TX 75075; 2408 Preston Road, Suite 704B, Plano, TX 75093; 7000 Independence Parkway, Suite 168, Plano, TX 75025; 5976 W. Parker Road, Suite 304, Plano, TX 75093; 601 W. 15th Street, Suite 102, Plano, TX 75075; 5800 S. Legacy Drive, Suite C-9, Plano, TX 75024; 3311 Preston Road, Ste 6, Frisco, TX 75034; 2601 Preston Road, Space #2200, Frisco, TX 75034; 8910 TX-121, Suite 200, McKinney, TX 75070; 1332 South Plano Road, #114, Richardson, TX 75081; 524 W. Belt Line Road, #15, Richardson, TX 75080; 2004 St. Michael Drive, Texarkana, TX 75503; 2700 Richmond Road, Texarkana, TX 75503; 3741 Mall Drive, Texarkana, TX 75501; and 2808 New Boston Road, Suite D, Texarkana, TX 75501.



Fig. 1: Depicting T-Mobile office at 7668 Warren Parkway, Frisco, TX.



Fig. 2: Depicting T-Mobile Store at 1806 E. End Blvd., Ste. 100 (E. End Blvd. N. and Lawson Street), Marshall, TX 75670.



Fig. 3: Depicting T-Mobile Store at 900 E. End Blvd N., # 100B, Marshall, TX 75670 (N. East End Blvd. and Karnak Hwy.), Marshall, TX 75670.

7. T-Mobile operates and sells access to a mobile network that provides telecommunication, Internet service, and other services to customers via cellular base stations located in this District and throughout the United States, in infringement of the asserted patents. T-Mobile's network coverage extends to cities in this District, including within the Marshall division, according to T-Mobile's website. *See, e.g.*, T-Mobile's Answer and Counterclaims filed in *Cobblestone Wireless, LLC v. T-Mobile USA, Inc.*, Case No. 2:22-cv-00477-JRG-RSP (Lead Case), Dkt. 22 (E.D. Tex. Feb. 24, 2023), ¶¶ 14-15 ("T-Mobile admits that T-Mobile USA, Inc. operates a wireless telecommunications network that provides services to customers within the Eastern District of Texas. . . .").

PATENTS-IN-SUIT

8. On January 7, 2020, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 10,531,443 (the "'443 Patent") entitled "Physical Uplink Control Channel (PUCCH) Format Adaptation for 5th Generation (5G) New Radio (NR)." A true and correct copy of the '443 Patent is attached as Exhibit 1.

9. On May 25, 2021, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 11,019,557 (the "'557 Patent") entitled "Apparatus and Method for Acquisition of Periodically Broadcasted System Information in Wireless Communication." A true and correct copy of the '557 Patent is attached as Exhibit 2.

10. On September 22, 2020, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 10,785,764 (the "'764 Patent") entitled "Information Change Transmission Method and Device for Single-Cell Multicast Service." A true and correct copy of the '764 Patent is attached as Exhibit 3.

11. On March 24, 2020, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 10,601,566 (the “’566 Patent”) entitled “Multiple Slot Long Physical Uplink Control Channel (PUCCH) Design for 5th Generation (5G) New Radio (NR).” A true and correct copy of the ’566 Patent is attached as Exhibit 4.

12. AWT is the sole and exclusive owner of all right, title, and interest in the ’443 Patent, the ’557 Patent, the ’764 Patent, and the ’566 Patent (collectively, the “Patents-in-Suit”) and holds the exclusive right to take all actions necessary to enforce its rights to the Patents-in-Suit, including the filing of this patent infringement lawsuit. AWT also has the right to recover all damages for past, present, and future infringement of the Patents-in-Suit.

THE INFRINGING INSTRUMENTALITIES

13. T-Mobile operates cellular wireless networks employing several wireless communication technologies including, but not limited to, 5G and NB-IoT technologies. T-Mobile also sells and offers for sale a variety of devices that make use of these same wireless communication technologies.

14. For its wireless communication technologies, T-Mobile generally advertises its plans to enter the market and deploy related cellular wireless networks, and associated equipment and services. For example, in September of 2017, T-Mobile “announced plans to light up the first nationwide Narrowband-IoT (NB-IoT) network in 2018.” *See, e.g.*, Exhibit 5, available at <https://www.t-mobile.com/news/press/narrowband-iot-network>. T-Mobile has since followed with more deployments for its NB-IoT network. *Id.*

15. Similarly, in September of 2020, T-Mobile unveiled mid-band 5G noting that T-Mobile was the “first and largest nationwide 5G network” with “nationwide 5G since [2019].” *See, e.g.*, Exhibit 6, available at <https://www.t-mobile.com/news/network/5g-speeds-supercharged-for->

millions-more-people. T-Mobile has since followed with more deployments for its 5G network. *Id.*

16. Upon information and belief, T-Mobile owns, leases, maintains and/or operates cellular base stations in this District that provide at least NB-IoT and 5G data services to T-Mobile customers in this District, including numerous cell tower locations in Tyler, Texas; Longview, Texas; and Marshall, Texas. T-Mobile offers at least NB-IoT and 5G data coverage to customers in this District and within the Marshall division. According to its website, T-Mobile also offers and provides at least NB-IoT and 5G services and equipment to customers in this District.

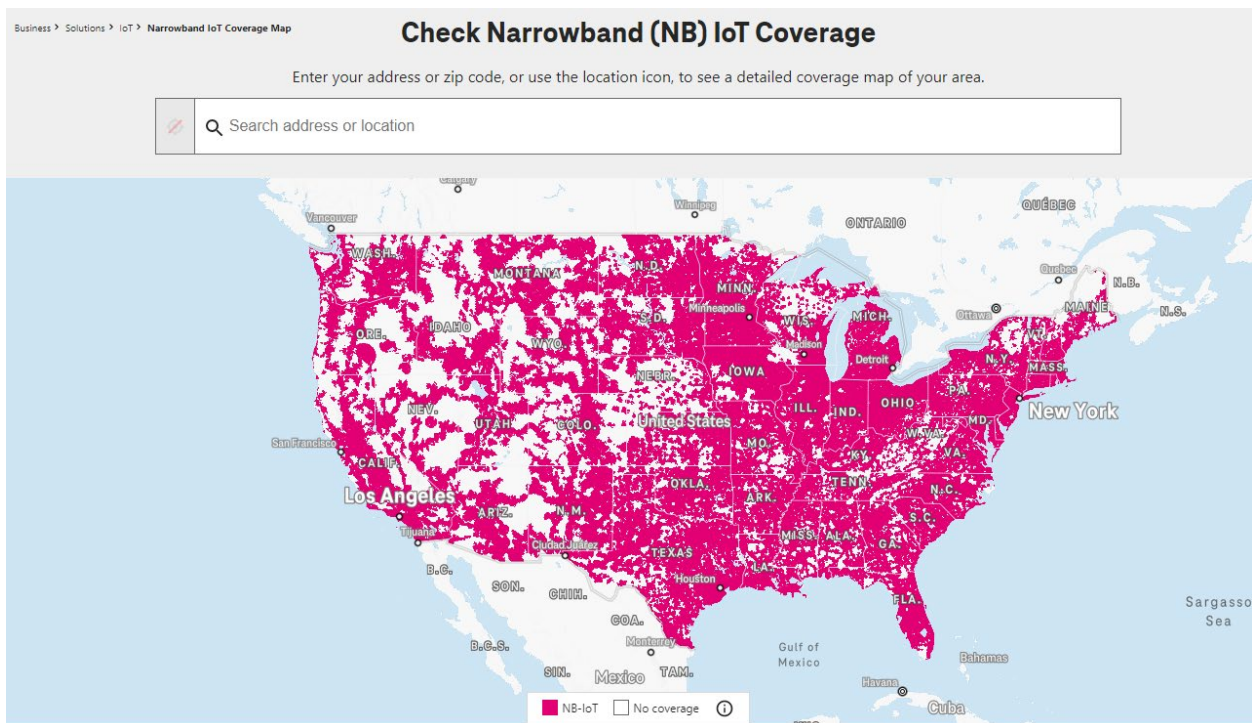


Exhibit 7, available at <https://www.t-mobile.com/business/solutions/iot/nb-iot-coverage-map>

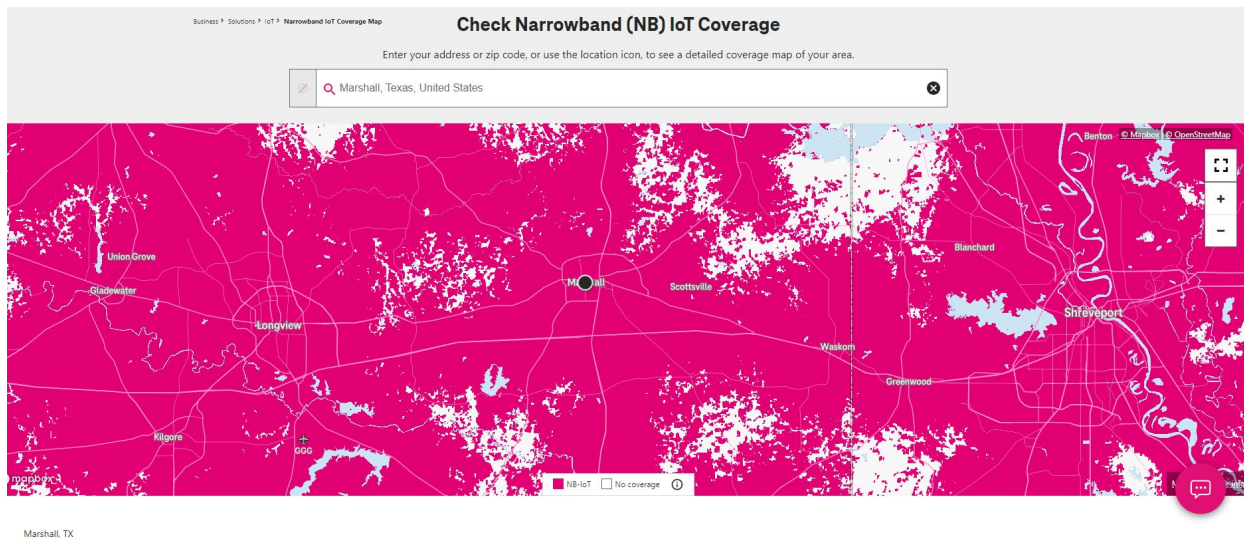
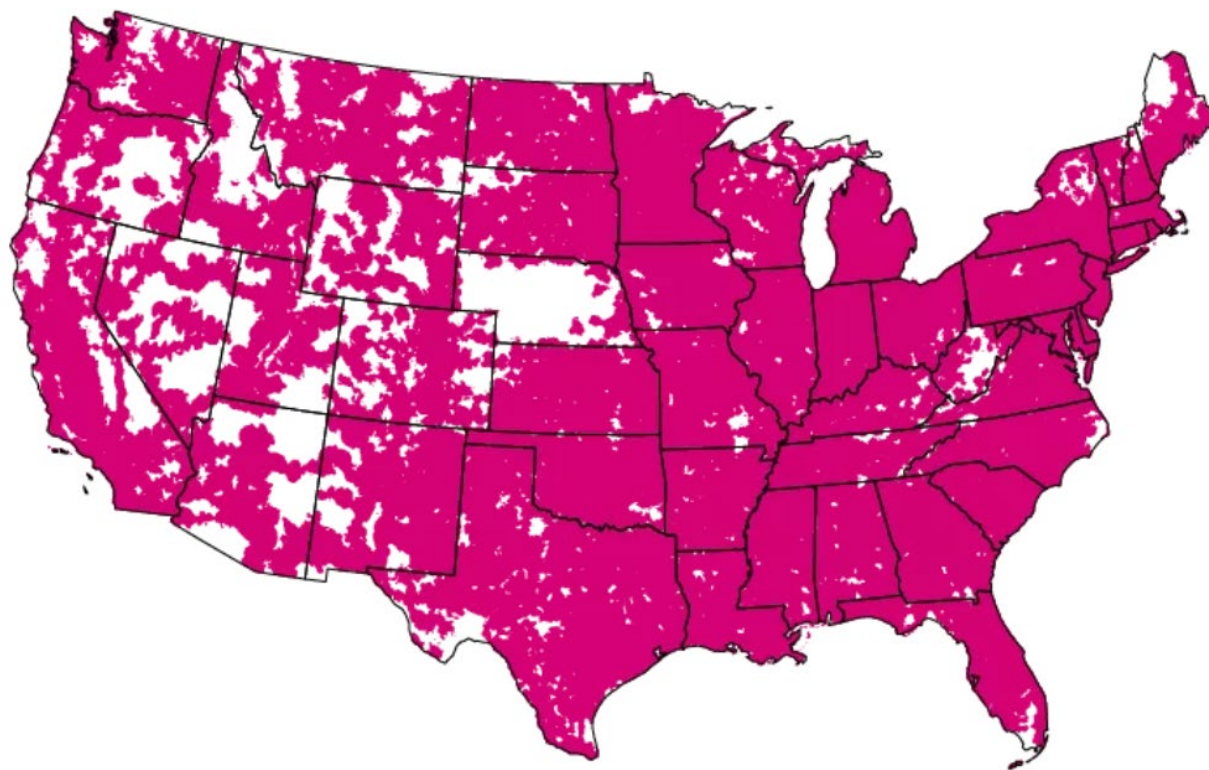


Exhibit 8, available at <https://www.t-mobile.com/business/solutions/iot/nb-iot-coverage-map>



T-Mobile 5G coverage

Exhibit 9, available at <https://www.t-mobile.com/coverage/4g-lte-5g-networks>

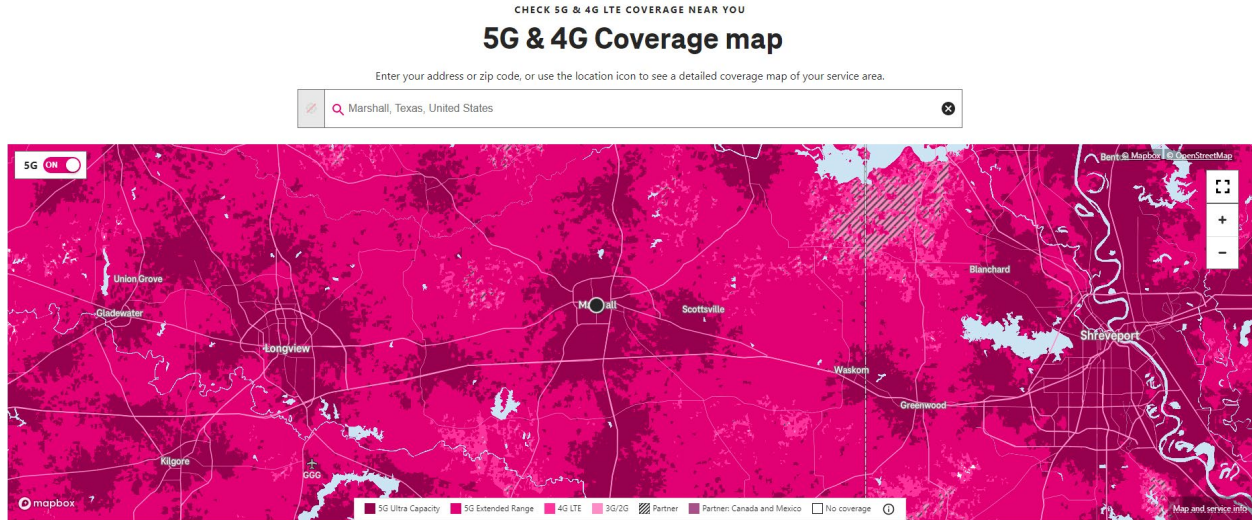


Exhibit 10, available at https://www.t-mobile.com/coverage/coverage-map?icid=MGPO_TMO_P_5GNETWORK_1Q1203I5JTEV42AG30718

17. The products accused of infringing the Patents-in-Suit include, but are not limited to, at least Defendants’ NB-IoT cellular stations, 5G cellular base stations (including Extended Range (XR) 5G and Ultra Capacity (UC) 5G base stations), 5G New Radio (NR) hardware, software, radio units, and baseband units, and associated equipment (*e.g.*, IoT Access packs) and services (*e.g.*, T-Mobile Connect) (collectively, the “Accused Products”).

18. Upon information and belief, each of these Accused Products is 3GPP-compliant.

COUNT I **(Infringement of the ’443 Patent)**

19. Paragraphs 1 through 18 are incorporated by reference as if fully set forth herein.

20. AWT has not licensed or otherwise authorized Defendants to make, use, offer for sale, sell, or import any products that embody the inventions of the ’443 Patent.



21. Defendants have and continue to directly infringe the ’443 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each

and every limitation of one or more claims of the '443 Patent. Such products include at least the Accused Products.

22. For example, upon information and belief, Defendants have and continue to directly infringe at least claim 3 of the '443 Patent by making, using, offering to sell, selling, and/or importing into the United States products and services that operate with at least phones, tablets, and hotspot devices that implement 3GPP standards (*e.g.*, 3GPP TS 38.213 V15.14.0), such as the Accused Products which include a base station (gNB), comprising: sending circuitry configured to send a physical downlink shared channel (PDSCH) that includes code block groups (CBGs) of a transport block; and receiving circuitry configured to receive CBG based HARQ-ACK, wherein for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS), the receiving circuitry is configured to receive one HARQ-ACK bit for the transport block, for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a UE-specific search space (USS), the receiving circuitry is configured to receive HARQ-ACK bits of all CBGs.

23. For example, upon information and belief, each Accused Product comprises a base station compliant with the 3GPP TS 38.213 V15.14.0 standard.

2023-05-30 3GPP MEMBERSHIP

New Query

Selected categories:

- Organizational Partners
- Individual Members (all partners)
- Market Representatives
- Observers
- Guests

Selected filters: Organization Name contains "T-MOBILE USA"

Choose csv separator: [export to csv file](#)

● ORGANIZATIONAL PARTNERS ●

No Organizational Partner matching the request

● INDIVIDUAL MEMBERS ●

Organization	Country	ETSI
T-Mobile USA (T-Mobile USA, Inc.)	UNITED STATES	ETSI
T-Mobile USA Inc. (T-Mobile USA Inc.)	UNITED STATES	ATIS

Total: 2 Individual Members

Exhibit 11, available at <https://webapp.etsi.org/3gppmembership/Results.asp?SortMember=Name&DirMember=ASC&SortPartner=Name&DirPartner=ASC&SortMarket=Name&DirMarket=ASC&SortObserver=Name&DirObserver=ASC&SortGuest=Name&DirGuest=ASC&Name=t-mobile+usa&search=Search>

- **Sept 2018:** First multi-vendor 3GPP based [5G data call](#) using commercial radios and Intel's mmWave RF chip
- **Sept 2018:** First U.S. mobile-to-mobile [5G New Radio \(NR\) video call](#)
- **Jul 2018:** America's first [nationwide NB-IoT](#) network live
- **Jun 2018:** Nation's first bi-directional over-the-air [5G data session](#) on a 3GPP-compliant 5G New Radio system

Exhibit 12, available at <https://www.t-mobile.com/news/un-carrier-network-list-of-firsts>

T-Mobile USA

"This is an important moment and a crucial development toward making 5G NR happen," said Neville Ray, Chief Technology Officer for T-Mobile US. "At T-Mobile, we're committed to drive a 5G rollout across the US in 2020, and the efforts of 3GPP will help us to realize this great win for our customers."

Exhibit 13, available at <https://www.3gpp.org/news-events/3gpp-news/industry-pr-5g>

24. By way of example, each Accused Product comprises sending circuitry configured to send a physical downlink shared channel (PDSCH) that includes code block groups (CBGs) of a transport block and receiving circuitry configured to receive CBG based HARQ-ACK.

9.1.1 CBG-based HARQ-ACK codebook determination

If a UE is provided *PDSCH-CodeBlockGroupTransmission* for a serving cell, the UE receives a PDSCH scheduled by DCI format 1_1, that includes code block groups (CBGs) of a transport block. The UE is also provided *maxCodeBlockGroupsPerTransportBlock* indicating a maximum number $N_{\text{HARQ-ACK}}^{\text{CBG-TB,max}}$ of CBGs for generating respective HARQ-ACK information bits for a transport block reception for the serving cell.

For a number of C code blocks (CBs) in a transport block, the UE determines a number of CBGs M according to Clause 5.1.7.1 of [6, TS 38.214] and determines a number of HARQ-ACK bits for the transport block as $N_{\text{HARQ-ACK}}^{\text{CBG-TB}} = M$.

The UE generates an ACK for the HARQ-ACK information bit of a CBG if the UE correctly received all code blocks of the CBG and generates a NACK for the HARQ-ACK information bit of a CBG if the UE incorrectly received at least one code block of the CBG. If the UE receives two transport blocks, the UE concatenates the HARQ-ACK information bits for CBGs of the second transport block after the HARQ-ACK information bits for CBGs of the first transport block.

The HARQ-ACK codebook includes the $N_{\text{HARQ-ACK}}^{\text{CBG-TB,max}}$ HARQ-ACK information bits and, if $N_{\text{HARQ-ACK}}^{\text{CBG-TB}} < N_{\text{HARQ-ACK}}^{\text{CBG-TB,max}}$ for a transport block, the UE generates a NACK value for the last $N_{\text{HARQ-ACK}}^{\text{CBG-TB,max}} - N_{\text{HARQ-ACK}}^{\text{CBG-TB}}$ HARQ-ACK information bits for the transport block in the HARQ-ACK codebook.

If the UE generates a HARQ-ACK codebook in response to a retransmission of a transport block, corresponding to a same HARQ process as a previous transmission of the transport block, the UE generates an ACK for each CBG that the UE correctly decoded in a previous transmission of the transport block.

If a UE correctly detects each of the $N_{\text{HARQ-ACK}}^{\text{CBG-TB}}$ CBGs and does not correctly detect the transport block for the $N_{\text{HARQ-ACK}}^{\text{CBG-TB}}$ CBGs, the UE generates a NACK value for each of the $N_{\text{HARQ-ACK}}^{\text{CBG-TB}}$ CBGs.

Exhibit 14 (“3GPP TS 38.213 version 15.14.0 Release 15”), at 40-41, available at https://www.etsi.org/deliver/etsi_ts/138200_138299/138213/15.14.00_60/ts_138213v151400p.pdf.

25. By further way of example, each Accused Product comprises receiving circuitry configured to receive one HARQ-ACK bit for the transport block for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS).

9.1 HARQ-ACK codebook determination

If a UE receives a PDSCH without receiving a corresponding PDCCH, or if the UE receives a PDCCH indicating a SPS PDSCH release, the UE generates one corresponding HARQ-ACK information bit.

If a UE is not provided *PDSCH-CodeBlockGroupTransmission*, the UE generates one HARQ-ACK information bit per transport block.

For a HARQ-ACK information bit, a UE generates an ACK if the UE detects a DCI format 1_0 that provides a SPS PDSCH release or correctly decodes a transport block, and generates a NACK if the UE does not correctly decode the transport block.

A UE does not expect to be indicated to transmit HARQ-ACK information for more than one SPS PDSCH receptions in a same PUCCH.

In the following, the CRC for DCI format 1_0 or DCI format 1_1 is scrambled with a C-RNTI, an MCS-C-RNTI, or a CS-RNTI.

Id. at 40.

The UE generates an ACK for the HARQ-ACK information bit of a CBG if the UE correctly received all code blocks of the CBG and generates a NACK for the HARQ-ACK information bit of a CBG if the UE incorrectly received at least one code block of the CBG. If the UE receives two transport blocks, the UE concatenates the HARQ-ACK information bits for CBGs of the second transport block after the HARQ-ACK information bits for CBGs of the first transport block.

The HARQ-ACK codebook includes the $N_{\text{HARQ-ACK}}^{\text{CBG-TB,max}}$ HARQ-ACK information bits and, if $N_{\text{HARQ-ACK}}^{\text{CBG-TB}} < N_{\text{HARQ-ACK}}^{\text{CBG-TB,max}}$ for a transport block, the UE generates a NACK value for the last $N_{\text{HARQ-ACK}}^{\text{CBG-TB,max}} - N_{\text{HARQ-ACK}}^{\text{CBG-TB}}$ HARQ-ACK information bits for the transport block in the HARQ-ACK codebook.

If the UE generates a HARQ-ACK codebook in response to a retransmission of a transport block, corresponding to a same HARQ process as a previous transmission of the transport block, the UE generates an ACK for each CBG that the UE correctly decoded in a previous transmission of the transport block.

If a UE correctly detects each of the $N_{\text{HARQ-ACK}}^{\text{CBG-TB}}$ CBGs and does not correctly detect the transport block for the $N_{\text{HARQ-ACK}}^{\text{CBG-TB}}$ CBGs, the UE generates a NACK value for each of the $N_{\text{HARQ-ACK}}^{\text{CBG-TB}}$ CBGs.

Id. at 41.

If a UE receives a SPS PDSCH, or a SPS PDSCH release, or a PDSCH that is scheduled by a DCI format 1_0 and if

- the UE is configured with one serving cell, and
- $\mathcal{C}(M_{A,c})=1$, and
- *PDSCH-CodeBlockGroupTransmission* is provided to the UE

the UE generates HARQ-ACK information only for the transport block in the PDSCH or only for the SPS PDSCH release.

Id. at 44.

For each DL BWP configured to a UE in a serving cell, the UE is provided by higher layers with $S \leq 10$ search space sets where, for each search space set from the S search space sets, the UE is provided the following by *SearchSpace*:

- a search space set index s , $0 < s < 40$, by *searchSpaceId*
- an association between the search space set s and a CORESET p by *controlResourceSetId*
- a PDCCH monitoring periodicity of k_s slots and a PDCCH monitoring offset of O_s slots, by *monitoringSlotPeriodicityAndOffset*
- a PDCCH monitoring pattern within a slot, indicating first symbol(s) of the CORESET within a slot for PDCCH monitoring, by *monitoringSymbolsWithinSlot*
- a duration of $T_s < k_s$ slots indicating a number of slots that the search space set s exists by *duration*
- a number of PDCCH candidates $M_s^{(L)}$ per CCE aggregation level L by *aggregationLevel1*, *aggregationLevel2*, *aggregationLevel4*, *aggregationLevel8*, and *aggregationLevel16*, for CCE aggregation level 1, CCE aggregation level 2, CCE aggregation level 4, CCE aggregation level 8, and CCE aggregation level 16, respectively
- an indication that search space set s is either a CSS set or a USS set by *searchSpaceType*
- if search space set s is a CSS set
 - an indication by *dci-Format0-0-AndFormat1-0* to monitor PDCCH candidates for DCI format 0_0 and DCI format 1_0
 - an indication by *dci-Format2-0* to monitor one or two PDCCH candidates for DCI format 2_0 and a corresponding CCE aggregation level
 - an indication by *dci-Format2-1* to monitor PDCCH candidates for DCI format 2_1
 - an indication by *dci-Format2-2* to monitor PDCCH candidates for DCI format 2_2
 - an indication by *dci-Format2-3* to monitor PDCCH candidates for DCI format 2_3
- 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

Id. at 78-79.

26. By further way of example, each Accused Product comprises receiving circuitry configured to receive HARQ-ACK bits of all CBG for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a UE-specific search space (USS).

9.1.1 CBG-based HARQ-ACK codebook determination

If a UE is provided *PDSCH-CodeBlockGroupTransmission* for a serving cell, the UE receives a PDSCH scheduled by DCI format 1_1, that includes code block groups (CBGs) of a transport block. The UE is also provided *maxCodeBlockGroupsPerTransportBlock* indicating a maximum number $N_{\text{HARQ-ACK}}^{\text{CBG/TB,max}}$ of CBGs for generating respective HARQ-ACK information bits for a transport block reception for the serving cell.

For a number of C code blocks (CBs) in a transport block, the UE determines a number of CBGs M according to Clause 5.1.7.1 of [6, TS 38.214] and determines a number of HARQ-ACK bits for the transport block as $N_{\text{HARQ-ACK}}^{\text{CBG/TB}} = M$.

Id. at 40.

If $O_{\text{ACK}} + O_{\text{SR}} + O_{\text{CSI}} \leq 11$, the UE determines a number of HARQ-ACK information bits $n_{\text{HARQ-ACK}}$ for obtaining a

transmission power for a PUCCH, as described in Clause 7.2.1, as $n_{\text{HARQ-ACK}} = \sum_{c=0}^{N_{\text{cells}}^{\text{DL}}-1} \sum_{m=0}^{M_c-1} N_{m,c}^{\text{received}} + \sum_{c=0}^{N_{\text{cells}}^{\text{DL}}-1} \sum_{m=0}^{M_c-1} N_{m,c}^{\text{received,CBG}}$

where

- $N_{m,c}^{\text{received}}$ is the number of transport blocks the UE receives in PDSCH reception occasion m for serving cell c if *harq-ACK-SpatialBundlingPUCCH* and *PDSCH-CodeBlockGroupTransmission* are not provided, or the number of transport blocks the UE receives in PDSCH reception occasion m for serving cell c if *PDSCH-CodeBlockGroupTransmission* is provided and the PDSCH reception is scheduled by a DCI format 1_0, or the number of PDSCH receptions if *harq-ACK-SpatialBundlingPUCCH* is provided or SPS PDSCH release in PDSCH reception occasion m for serving cell c and the UE reports corresponding HARQ-ACK information in the PUCCH.
- $N_{m,c}^{\text{received,CBG}}$ is the number of CBGs the UE receives in a PDSCH reception occasion m for serving cell c if *PDSCH-CodeBlockGroupTransmission* is provided and the PDSCH reception is scheduled by a DCI format 1_1 and the UE reports corresponding HARQ-ACK information in the PUCCH.

Id. at 46.

For each DL BWP configured to a UE in a serving cell, the UE is provided by higher layers with $S \leq 10$ search space sets where, for each search space set from the S search space sets, the UE is provided the following by *SearchSpace*:

- a search space set index s , $0 < s < 40$, by *searchSpaceId*
- an association between the search space set s and a CORESET p by *controlResourceSetId*
- a PDCCH monitoring periodicity of k_s slots and a PDCCH monitoring offset of o_s slots, by *monitoringSlotPeriodicityAndOffset*
- a PDCCH monitoring pattern within a slot, indicating first symbol(s) of the CORESET within a slot for PDCCH monitoring, by *monitoringSymbolsWithinSlot*
- a duration of $T_s < k_s$ slots indicating a number of slots that the search space set s exists by *duration*
- a number of PDCCH candidates $M_s^{(L)}$ per CCE aggregation level L by *aggregationLevel1*, *aggregationLevel2*, *aggregationLevel4*, *aggregationLevel8*, and *aggregationLevel16*, for CCE aggregation level 1, CCE aggregation level 2, CCE aggregation level 4, CCE aggregation level 8, and CCE aggregation level 16, respectively
- an indication that search space set s is either a CSS set or a USS set by *searchSpaceType*
- if search space set s is a CSS set
 - an indication by *dci-Format0-0-AndFormat1-0* to monitor PDCCH candidates for DCI format 0_0 and DCI format 1_0
 - an indication by *dci-Format2-0* to monitor one or two PDCCH candidates for DCI format 2_0 and a corresponding CCE aggregation level
 - an indication by *dci-Format2-1* to monitor PDCCH candidates for DCI format 2_1
 - an indication by *dci-Format2-2* to monitor PDCCH candidates for DCI format 2_2
 - an indication by *dci-Format2-3* to monitor PDCCH candidates for DCI format 2_3
- 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

Id. at 78-79.

27. T-Mobile has indirectly infringed and continues to indirectly infringe one or more claims of the '443 Patent, as provided by 35 U.S.C. § 271(b), by inducing infringement by others, such as T-Mobile's partners, customers, clients, and end-users, in this District and elsewhere in the United States. For example, T-Mobile's partners, customers, clients, and end-users directly infringe, either literally or under the doctrine of equivalents, through their use of the inventions claimed in the '443 Patent. T-Mobile 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 partners, customers, clients, and end-users suggesting that they use the Accused Products in an infringing manner, including technical support, marketing, product manuals, advertisements, and online documentation related to the Accused Products. Because of T-Mobile's inducement, T-Mobile's partners, customers, clients, and end-users use the Accused Products in a way T-Mobile intends and they directly infringe the '443 Patent. T-Mobile performs these affirmative acts with knowledge of the '443 Patent and with the intent, or willful blindness, that the induced acts directly infringe the '443 Patent.

28. T-Mobile has indirectly infringed and continues to indirectly infringe one or more claims of the '443 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement by others, such as partners, customers, clients, and end-users, in this District and elsewhere in the United States. T-Mobile's affirmative acts of selling and offering to sell the Accused Products in this District and elsewhere in the United States and causing the Accused Products to be manufactured, used, sold, and offered for sale contribute to others' use and manufacture of the Accused Products such that the '443 Patent is directly infringed by others. The accused components within the Accused Products are material to the invention of the '443 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by T-Mobile to be especially made or adapted for use in the infringement of the '443 Patent. T-Mobile performs these affirmative acts with knowledge of the '443 Patent and with intent, or willful blindness, that they cause the direct infringement of the '443 Patent.

29. AWT has suffered damages as a result of Defendants' direct and indirect infringement of the '443 Patent in an amount to be proved at trial.

COUNT II
(Infringement of the '557 Patent)

30. Paragraphs 1 through 18 are incorporated by reference as if fully set forth herein.

31. AWT has not licensed or otherwise authorized Defendants to make, use, offer for sale, sell, or import any products that embody the inventions of the '557 Patent.

32. Defendants have and continue to directly infringe the '557 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '557 Patent. Such products include at least the Accused Products.

33. For example, Defendants have and continue to directly infringe at least claim 9 of the '557 Patent by making, using, offering to sell, selling, and/or importing into the United States products and services that operate with at least phones, tablets, and hotspot devices that implement 3GPP standards (*e.g.*, 3GPP TS 38.331 version 15.13.0 Release 15), such as the Accused Products, which include a base station apparatus of a radio access network (RAN) that communicates over a radio interface with a user equipment, the base station apparatus comprising: transmitting circuitry configured to transmit a first type system information block (SIB), the first type SIB comprising: scheduling information of a system information (SI) message, the SI message comprising at least one second type SIB, the scheduling information configuring SI windows, the SI windows comprising periodically occurring time windows in which the SI message is transmitted; a parameter associated with a condition for determination of a failure of an SI message acquisition process; and an indication of broadcast status for the SI message, the indication indicating broadcasting; and processor circuitry configured to cause the transmitting circuitry to broadcast the SI message; wherein: the first type SIB is re-acquired by the user equipment upon

the user equipment failing on the SI message acquisition process in at least one of the SI windows to receive the SI message, the base station apparatus is a current serving access node of the user equipment.

34. For example, upon information and belief, each Accused Product comprises a base station apparatus of a radio access network (RAN) that communicates over a radio interface with a user equipment and is a current serving access node of the user equipment, which is compliant with the 3GPP TS 38.331 V15.13.0 standard.

2023-05-30 3GPP MEMBERSHIP

[?](#) [i](#)

New Query

Selected categories:

- Organizational Partners
- Individual Members (all partners)
- Market Representatives
- Observers
- Guests

Selected filters:

Organization Name contains "T-MOBILE USA"

Choose csv separator: [export to csv file](#)

● ORGANIZATIONAL PARTNERS ●

No Organizational Partner matching the request

● INDIVIDUAL MEMBERS ●

Organization Name	Country	Standard
T-Mobile USA (T-Mobile USA, Inc.)	UNITED STATES	ETSI
T-Mobile USA Inc. (T-Mobile USA Inc.)	UNITED STATES	ATIS

Total : 2 Individual Members

Exhibit 11, available at <https://webapp.etsi.org/3gppmembership/Results.asp?SortMember=Name&DirMember=ASC&SortPartner=Name&DirPartner=ASC&SortMarket=Name&DirMarket=ASC&SortObserver=Name&DirObserver=ASC&SortGuest=Name&DirGuest=ASC&Name=t-mobile+usa&search=Search>

- **Sept 2018:** First multi-vendor 3GPP based [5G data call](#) using commercial radios and Intel's mmWave RF chip
- **Sept 2018:** First U.S. mobile-to-mobile [5G New Radio \(NR\) video call](#)
- **Jul 2018:** America's first [nationwide NB-IoT](#) network live
- **Jun 2018:** Nation's first bi-directional over-the-air [5G data session](#) on a 3GPP-compliant 5G New Radio system

Exhibit 12, available at <https://www.t-mobile.com/news/un-carrier-network-list-of-firsts>

T-Mobile USA

"This is an important moment and a crucial development toward making 5G NR happen," said Neville Ray, Chief Technology Officer for T-Mobile US. "At T-Mobile, we're committed to drive a 5G rollout across the US in 2020, and the efforts of 3GPP will help us to realize this great win for our customers."

Exhibit 13, available at <https://www.3gpp.org/news-events/3gpp-news/industry-pr-5g>

35. By way of example, each Accused Product comprises transmitting circuitry configured to transmit a first type system information block (SIB) comprising scheduling information of a system information (SI) message, the SI message comprising at least one second type SIB, the scheduling information configuring SI windows, the SI windows comprising periodically occurring time windows in which the SI message is transmitted.

5.2 System information

5.2.1 Introduction

System Information (SI) is divided into the *MIB* and a number of SIBs where:

- the *SIB1* is transmitted on the DL-SCH with a periodicity of 160 ms and variable transmission repetition periodicity within 160 ms as specified in TS 38.213 [13], clause 13. The default transmission repetition periodicity of *SIB1* is 20 ms but the actual transmission repetition periodicity is up to network implementation. For SSB and CORESET multiplexing pattern 1, *SIB1* repetition transmission period is 20 ms. For SSB and CORESET multiplexing pattern 2/3, *SIB1* transmission repetition period is the same as the SSB period (TS 38.213 [13], clause 13). *SIB1* includes information regarding the availability and scheduling (e.g. mapping of SIBs to SI message, periodicity, SI-window size) of other SIBs with an indication whether one or more SIBs are only provided on-demand and, in that case, the configuration needed by the UE to perform the SI request. *SIB1* is cell-specific SIB;
- SIBs other than *SIB1* are carried in *SystemInformation* (SI) messages, which are transmitted on the DL-SCH. Only SIBs having the same periodicity can be mapped to the same SI message. Each SI message is transmitted within periodically occurring time domain windows (referred to as SI-windows) with same length for all SI messages). Each SI message is associated with an SI-window and the SI-windows of different SI messages do not overlap. That is, within one SI-window only the corresponding SI message is transmitted. An SI message may be transmitted a number of times within the SI-window. Any SIB except *SIB1* can be configured to be cell specific or area specific, using an indication in *SIB1*. The cell specific SIB is applicable only within a cell that provides the SIB while the area specific SIB is applicable within an area referred to as SI area, which consists of one or several cells and is identified by *systemInformationAreaID*;

Exhibit 15 ("3GPP TS 38.331 version 15.13.0 Release 15"), at 25-26, available at https://www.etsi.org/deliver/etsi_ts/138300_138399/138331/15.13.00_60/ts_138331v151300p.pdf

5.2.2.3 Acquisition of System Information

5.2.2.3.1 Acquisition of *MIB* and *SIB1*

The UE shall:

- 1> apply the specified BCCH configuration defined in 9.1.1.1;
- 1> if the UE is in RRC_IDLE or in RRC_INACTIVE; or
- 1> if the UE is in RRC_CONNECTED while T311 is running:
 - 2> acquire the *MIB*, which is scheduled as specified in TS 38.213 [13];
 - 2> if the UE is unable to acquire the *MIB*;
 - 3> perform the actions as specified in clause 5.2.2.5;
 - 2> else:
 - 3> perform the actions specified in clause 5.2.2.4.1.
- 1> if the UE is in RRC_CONNECTED with an active BWP with common search space configured by *searchSpaceSIB1* and *pagingSearchSpace* and has received an indication about change of system information; or
- 1> if the UE is in RRC_IDLE or in RRC_INACTIVE; or
- 1> if the UE is in RRC_CONNECTED while T311 is running:
 - 2> if *ssb-SubcarrierOffset* indicates *SIB1* is transmitted in the cell (TS 38.213 [13]) and if *SIB1* acquisition is required for the UE:
 - 3> acquire the *SIB1*, which is scheduled as specified in TS 38.213 [13];
 - 3> if the UE is unable to acquire the *SIB1*:
 - 4> perform the actions as specified in clause 5.2.2.5;

Id. at 28.

5.2.2.4.2 Actions upon reception of the *SIB1*

Upon receiving the *SIB1* the UE shall:

- 4> if the UE has not stored a valid version of a SIB, in accordance with sub-clause 5.2.2.2.1, of one or several required SIB(s), in accordance with sub-clause 5.2.2.1:
- 5> for the SI message(s) that, according to the *si-SchedulingInfo*, contain at least one required SIB and for which *si-BroadcastStatus* is set to broadcasting;
- 6> acquire the SI message(s) as defined in sub-clause 5.2.2.3.2;

Id. at 31-32.

– *SIB1*

SIB1 contains information relevant when evaluating if a UE is allowed to access a cell and defines the scheduling of other system information. It also contains radio resource configuration information that is common for all UEs and barring information applied to the unified access control.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channels: BCCH

Direction: Network to UE

SIB1 message

```

-- ASN1START
-- TAG-SIB1-START

SIB1 ::= SEQUENCE {
  cellSelectionInfo          SEQUENCE {
    q-RxLevMin                Q-RxLevMin,
    q-RxLevMinOffset          INTEGER (1..8)                OPTIONAL, -- Need S
    q-RxLevMinSUL             Q-RxLevMin                OPTIONAL, -- Need R
    q-QualMin                 Q-QualMin                OPTIONAL, -- Need S
  }
  q-QualMinOffset            INTEGER (1..8)                OPTIONAL -- Need S
}
cellAccessRelatedInfo      CellAccessRelatedInfo,
connEstFailureControl       ConnEstFailureControl
si-SchedulingInfo         SI-SchedulingInfo                OPTIONAL, -- Need R
servingCellConfigCommon    ServingCellConfigCommonSIB  OPTIONAL, -- Need R
ims-EmergencySupport       ENUMERATED {true}                OPTIONAL, -- Need R
eCallOverIMS-Support       ENUMERATED {true}                OPTIONAL, -- Cond Absent
ue-TimersAndConstants      UE-TimersAndConstants          OPTIONAL, -- Need R

uac-BarringInfo            SEQUENCE {
  uac-BarringForCommon      UAC-BarringPerCatList          OPTIONAL, -- Need S
  uac-BarringPerPLMN-List   UAC-BarringPerPLMN-List        OPTIONAL, -- Need S
  uac-BarringInfoSetList    UAC-BarringInfoSetList,
  uac-AccessCategory1-SelectionAssistanceInfo CHOICE {
    plmnCommon              UAC-AccessCategory1-SelectionAssistanceInfo,
    individualPLMNList      SEQUENCE (SIZE (2..maxPLMN)) OF UAC-AccessCategory1-SelectionAssistanceInfo
  }
}
}
}
OPTIONAL, -- Need S
OPTIONAL, -- Need R

```

Id. at 167-169.

– *SI-SchedulingInfo*

The IE *SI-SchedulingInfo* contains information needed for acquisition of SI messages.

SI-SchedulingInfo information element

```

-- ASN1START
-- TAG-SI-SCHEDULINGINFO-START

SI-SchedulingInfo ::= SEQUENCE {
  schedulingInfoList        SEQUENCE (SIZE (1..maxSI-Message)) OF SchedulingInfo,
  si-WindowLength           ENUMERATED {s5, s10, s20, s40, s80, s160, s320, s640, s1280},
  si-RequestConfig          SI-RequestConfig                OPTIONAL, -- Cond MSG-1
  si-RequestConfigSUL       SI-RequestConfig                OPTIONAL, -- Cond SUL-MSG-1
  systemInformationAreaID   BIT STRING (SIZE (24))          OPTIONAL, -- Need R
  ...
}

SchedulingInfo ::= SEQUENCE {
  si-BroadcastStatus        ENUMERATED {broadcasting, notBroadcasting},
  si-Periodicity            ENUMERATED {rf8, rf16, rf32, rf64, rf128, rf256, rf512},
  sib-MappingInfo           SIB-Mapping
}

SIB-Mapping ::= SEQUENCE (SIZE (1..maxSIB)) OF SIB-TypeInfo

SIB-TypeInfo ::= SEQUENCE {
  type                      ENUMERATED {sibType2, sibType3, sibType4, sibType5, sibType6, sibType7, sibType8, sibType9,
    spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1, ... },
  valueTag                  INTEGER (0..31)                OPTIONAL, -- Cond SIB-TYPE
  areaScope                 ENUMERATED {true}              OPTIONAL -- Need S
}

```

Id. at 363-64.

36. By further way of example, in each of the Accused Products, a parameter associated with a condition for determination of a failure of an SI message acquisition process.

5.2.2.2 SIB validity and need to (re)-acquire SIB

5.2.2.2.1 SIB validity

The UE shall apply the SI acquisition procedure as defined in clause 5.2.2.3 upon cell selection (e.g. upon power on), cell-reselection, return from out of coverage, after reconfiguration with sync completion, after entering the network from another RAT, upon receiving an indication that the system information has changed, upon receiving a PWS notification; and whenever the UE does not have a valid version of a stored SIB.

When the UE acquires a *MIB* or a *SIB1* or an SI message in a serving cell as described in clause 5.2.2.3, and if the UE stores the acquired SIB, then the UE shall store the associated *areaScope*, if present, the first *PLMN-Identity* in the *PLMN-IdentityInfoList*, the *cellIdentity*, the *systemInformationAreaID*, if present, and the *valueTag* if present, as indicated in the *si-SchedulingInfo* for the SIB. The UE may use a valid stored version of the SI except *MIB*, *SIB1*, *SIB6*, *SIB7* or *SIB8* e.g. after cell re-selection, upon return from out of coverage or after the reception of SI change indication.

NOTE: The storage and management of the stored SIBs in addition to the SIBs valid for the current serving cell is left to UE implementation.

The UE shall:

- 1> delete any stored version of a SIB after 3 hours from the moment it was successfully confirmed as valid;
- 1> for each stored version of a SIB:
 - 2> if the *areaScope* is associated and its value for the stored version of the SIB is the same as the value received in the *si-SchedulingInfo* for that SIB from the serving cell:
 - 3> if the first *PLMN-Identity* included in the *PLMN-IdentityInfoList*, the *systemInformationAreaID* and the *valueTag* that are included in the *si-SchedulingInfo* for the SIB received from the serving cell are identical to the *PLMN-Identity*, the *systemInformationAreaID* and the *valueTag* associated with the stored version of that SIB:
 - 4> consider the stored SIB as valid for the cell;

Id. at 27.

37. By further way of example, each Accused Product comprises an indication of broadcast status for the SI message, the indication indicating broadcasting.

5.2.2.4.2 Actions upon reception of the *SIB1*

Upon receiving the *SIB1* the UE shall:

- 4> if the UE has not stored a valid version of a SIB, in accordance with sub-clause 5.2.2.2.1, of one or several required SIB(s), in accordance with sub-clause 5.2.2.1:
 - 5> for the SI message(s) that, according to the *si-SchedulingInfo*, contain at least one required SIB and for which *si-BroadcastStatus* is set to broadcasting;
 - 6> acquire the SI message(s) as defined in sub-clause 5.2.2.3.2;

Id. at 31-32.

– *SI-SchedulingInfo*

The IE *SI-SchedulingInfo* contains information needed for acquisition of SI messages.

***SI-SchedulingInfo* information element**

```
-- ASN1START
-- TAG-SI-SCHEDULINGINFO-START

SI-SchedulingInfo ::= SEQUENCE {
    schedulingInfoList      SEQUENCE (SIZE (1..maxSI-Message)) OF SchedulingInfo,
    si-WindowLength        ENUMERATED {s5, s10, s20, s40, s80, s160, s320, s640, s1280},
    si-RequestConfig        SI-RequestConfig                               OPTIONAL, -- Cond MSG-1
    si-RequestConfigSUL     SI-RequestConfig                               OPTIONAL, -- Cond SUL-MSG-1
    systemInformationAreaID BIT STRING (SIZE (24))                        OPTIONAL, -- Need R
    ...
}

SchedulingInfo ::= SEQUENCE {
    si-BroadcastStatus      ENUMERATED {broadcasting, notBroadcasting},
    si-Periodicity          ENUMERATED {rf8, rf16, rf32, rf64, rf128, rf256, rf512},
    sib-MappingInfo        SIB-Mapping
}

SIB-Mapping ::= SEQUENCE (SIZE (1..maxSIB)) OF SIB-TypeInfo

SIB-TypeInfo ::= SEQUENCE {
    type                    ENUMERATED {sibType2, sibType3, sibType4, sibType5, sibType6, sibType7, sibType8, sibType9,
    spare4, spare3, spare2, spare1, ... },
    valueTag                INTEGER (0..31)                               OPTIONAL, -- Cond SIB-TYPE
    areaScope                ENUMERATED {true}                            OPTIONAL -- Need S
}

```

Id. at 363-64.

38. By further way of example, each Accused Product comprises processor circuitry configured to cause the transmitting circuitry to broadcast the SI message.

5.2.2.4.2 Actions upon reception of the *SIB1*

Upon receiving the *SIB1* the UE shall:

4> if the UE has not stored a valid version of a SIB, in accordance with sub-clause 5.2.2.2.1, of one or several required SIB(s), in accordance with sub-clause 5.2.2.1:

5> for the SI message(s) that, according to the *si-SchedulingInfo*, contain at least one required SIB and for which *si-BroadcastStatus* is set to broadcasting:

6> acquire the SI message(s) defined in sub-clause 5.2.2.3.2;

Id. at 31-32.

- SIBs other than *SIB1* are carried in *SystemInformation* (SI) messages, which are transmitted on the DL-SCH. Only SIBs having the same periodicity can be mapped to the same SI message. Each SI message is transmitted within periodically occurring time domain windows, referred to as SI-windows with same length for all SI messages). Each SI message is associated with an SI-window and the SI-windows of different SI messages do not overlap. That is, within one SI-window only the corresponding SI message is transmitted. An SI message may be transmitted a number of times within the SI-window. Any SIB except *SIB1* can be configured to be cell specific or area specific, using an indication in *SIB1*. The cell specific SIB is applicable only within a cell that provides the SIB while the area specific SIB is applicable within an area referred to as SI area, which consists of one or several cells and is identified by *systemInformationAreaID*;

Id. at 26.

39. By further way of example, in the Accused Products, the first type SIB is re-acquired by the user equipment upon the user equipment failing on the SI message acquisition process in at least one of the SI windows to receive the SI message.

5.2.2.2 SIB validity and need to (re)-acquire SIB

5.2.2.2.1 SIB validity

The UE shall apply the SI acquisition procedure as defined in clause 5.2.2.3 upon cell selection (e.g. upon power on), cell-reselection, return from out of coverage, after reconfiguration with sync completion, after entering the network from another RAT, upon receiving an indication that the system information has changed, upon receiving a PWS notification; and whenever the UE does not have a valid version of a stored SIB.

When the UE acquires a *MIB* or a *SIB1* or an SI message in a serving cell as described in clause 5.2.2.3, and if the UE stores the acquired SIB, then the UE shall store the associated *areaScope*, if present, the first *PLMN-Identity* in the *PLMN-IdentityInfoList*, the *cellIdentity*, the *systemInformationAreaID*, if present, and the *valueTag*, if present, as indicated in the *si-SchedulingInfo* for the SIB. The UE may use a valid stored version of the SI except *MIB*, *SIB1*, *SIB6*, *SIB7* or *SIB8* e.g. after cell re-selection, upon return from out of coverage or after the reception of SI change indication.

NOTE: The storage and management of the stored SIBs in addition to the SIBs valid for the current serving cell is left to UE implementation.

Id. at 27.

40. T-Mobile has indirectly infringed and continues to indirectly infringe one or more claims of the '557 Patent, as provided by 35 U.S.C. § 271(b), by inducing infringement by others, such as T-Mobile's partners, customers, clients, and end-users, in this District and elsewhere in the United States. For example, T-Mobile's partners, customers, clients, and end-users directly infringe, either literally or under the doctrine of equivalents, through their use of the inventions claimed in the '557 Patent. T-Mobile 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 partners, customers, clients, and end-users suggesting that they use the Accused Products in an infringing manner, including technical support, marketing, product manuals, advertisements, and online documentation related to the Accused Products. Because of T-Mobile's inducement, T-Mobile's partners, customers, clients, and end-users use the Accused Products in a way T-Mobile intends and they directly infringe the '557 Patent. T-Mobile performs these affirmative acts with knowledge of the '557

Patent and with the intent, or willful blindness, that the induced acts directly infringe the '557 Patent.

41. T-Mobile has indirectly infringed and continues to indirectly infringe one or more claims of the '557 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement by others, such as partners, customers, clients, and end-users, in this District and elsewhere in the United States. T-Mobile's affirmative acts of selling and offering to sell the Accused Products in this District and elsewhere in the United States and causing the Accused Products to be manufactured, used, sold, and offered for sale contribute to others' use and manufacture of the Accused Products such that the '557 Patent is directly infringed by others. The accused components within the Accused Products are material to the invention of the '557 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by T-Mobile to be especially made or adapted for use in the infringement of the '557 Patent. T-Mobile performs these affirmative acts with knowledge of the '557 Patent and with intent, or willful blindness, that they cause the direct infringement of the '557 Patent.

42. AWT has suffered damages as a result of Defendants' direct and indirect infringement of the '557 Patent in an amount to be proved at trial.

COUNT III
(Infringement of the '764 Patent)

43. Paragraphs 1 through 18 are incorporated by reference as if fully set forth herein.

44. AWT has not licensed or otherwise authorized Defendants to make, use, offer for sale, sell, or import any products that embody the inventions of the '764 Patent.



45. Defendants have and continue to directly infringe the '764 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each

and every limitation of one or more claims of the '764 Patent. Such products include at least the Accused Products.

46. For example, Defendants have and continue to directly infringe at least claim 3 of the '764 Patent by making, using, offering to sell, selling, and/or importing into the United States products and services that operate with at least smart meters, industrial sensors, fleet management solutions, asset trackers, security cameras, and agricultural monitors that implement 3GPP standards (*e.g.*, 3GPP TS 36.331 V14.16.0, TS 36.213 V14.17.0 and TS 36.212 version 14.16.0), such as the Accused Products, which include a base station comprising: transmitting circuitry configured to transmit Single-Cell Multicast Control Channel (SC-MCCH) information; and generating circuitry configured to generate a second downlink control information (DCI) format indicating an SC-MCCH information change notification, wherein the transmitting circuitry is configured to transmit, in more than one second subframe, the second DCI format carried on a second narrowband physical downlink control channel (NPDCCH), the generating circuitry configured to generate a first DCI format indicating a resource for a transmission of another SC-MCCH information, the transmitting circuitry is configured to transmit, in more than one first subframe, the first DCI format carried on a first NPDDCH, a period of the more than one first subframe is different from a period of the more than one second subframe, and the transmitting circuitry is configured to transmit the another SC-MCCH information with use of the resource indicated by the first DCI format and in accordance with the second DCI format.

47. For example, upon information and belief, the Accused Products include a base station compliant with the 3GPP TS 36.331 V14.16.0, TS 36.213 V14.17.0 and TS 36.212 version 14.16.0 standards.

2023-05-30 3GPP MEMBERSHIP

New Query

Selected categories:

- Organizational Partners
- Individual Members (all partners)
- Market Representatives
- Observers
- Guests

Selected filters: Organization Name contains "T-MOBILE USA"

Choose csv separator: [export to csv file](#)

● ORGANIZATIONAL PARTNERS ●

No Organizational Partner matching the request

● INDIVIDUAL MEMBERS ●

Organization	Country	Category
T-Mobile USA (T-Mobile USA, Inc.)	UNITED STATES	ETSI
T-Mobile USA Inc. (T-Mobile USA Inc.)	UNITED STATES	ATIS

Total: 2 Individual Members

Exhibit 11, available at <https://webapp.etsi.org/3gppmembership/Results.asp?SortMember=Name&DirMember=ASC&SortPartner=Name&DirPartner=ASC&SortMarket=Name&DirMarket=ASC&SortObserver=Name&DirObserver=ASC&SortGuest=Name&DirGuest=ASC&Name=t-mobile+usa&search=Search>

Built on the 3GPP standard, NB-IoT is an LTE-Advanced technology. NB-IoT provides a pathway to 5G IoT and offers many comparable benefits like low power usage, long battery life and support for more connections per cell site. With NB-IoT, T-Mobile is laying the foundation for the future and giving customers peace of mind that their solutions are future proof.

Exhibit 16, available at <https://www.t-mobile.com/news/press/americas-first-narrowband-iot-network>.

Because NB-IoT is built on the 3GPP industry standard and existing LTE infrastructure, it provides IoT developers with a flexible bridge on the road to 5G. The Un-carrier will use a portion of its mother lode of 600 MHz spectrum – which is already being deployed for LTE with 5G-ready technology ahead of schedule – to deliver a 5G network from coast to coast by 2020.

Exhibit 17, available at <https://www.t-mobile.com/news/press/narrowband-iot-network>

48. By way of example, each Accused Product comprises a base station with transmitting circuitry configured to transmit Single-Cell Multicast Control Channel (SC-MCCH) information.

5.8a.1.2 SC-MCCH scheduling

The SC-MCCH information (i.e. information transmitted in messages sent over SC-MCCH) is transmitted periodically using a configurable repetition period. SC-MCCH transmissions (and the associated radio resources and MCS) are indicated on PDCCH.

5.8a.1.3 SC-MCCH information validity and notification of changes

Change of SC-MCCH information only occurs at specific radio frames, i.e. the concept of a modification period is used. Within a modification period, the same SC-MCCH information may be transmitted a number of times, as defined by its scheduling (which is based on a repetition period). The modification period boundaries are defined by SFN values for which $\text{SFN} \bmod m = 0$, where m is the number of radio frames comprising the modification period. The modification period is configured by means of *SystemInformationBlockType20* (*SystemInformationBlockType20-NB* in NB-IoT). If H-SFN is provided in *SystemInformationBlockType1-BR*, modification period boundaries for BL UEs or UEs in CE are defined by SFN values for which $(\text{H-SFN} * 1024 + \text{SFN}) \bmod m = 0$. The modification period boundaries for NB-IoT UEs are defined by SFN values for which $(\text{H-SFN} * 1024 + \text{SFN}) \bmod m = 0$.

When the network changes (some of) the SC-MCCH information, it notifies the UEs, other than BL UEs, UEs in CE or NB-IoT UEs, about the change in the first subframe which can be used for SC-MCCH transmission in a repetition period. LSB bit in 8-bit bitmap when set to '1' indicates the change in SC-MCCH. Upon receiving a change notification, a UE interested to receive MBMS services transmitted using SC-PTM acquires the new SC-MCCH information starting from the same subframe. The UE applies the previously acquired SC-MCCH information until the UE acquires the new SC-MCCH information.

When the network changes (some of) the SC-MCCH information for start of new MBMS service(s) transmitted using SC-PTM, it notifies BL UEs, UEs in CE or NB-IoT UEs about the change in every PDCCH which schedules the first SC-MCCH in a repetition period in the current modification period. The notification is transmitted with 1 bit. The bit, when set to '1', indicates the start of new MBMS service(s), see TS 36.212 [22, 5.3.3.1.14 & 6.4.3.3]. Upon receiving a change notification, a BL UE, UE in CE or NB-IoT UE interested to receive MBMS services transmitted using SC-PTM acquires the new SC-MCCH information scheduled by the PDCCH. The BL UE, UE in CE or NB-IoT UE applies the previously acquired SC-MCCH information until the BL UE, UE in CE or NB-IoT UE acquires the new SC-MCCH information.

Exhibit 18 (“3GPP TS 36.331 version 14.16.0 Release 14”), at 209-210, available at

https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/14.16.00_60/ts_136331v141600p.pdf

49. By further way of example, each Accused Product comprises generating circuitry configured to generate a second downlink control information (DCI) format indicating an SC-MCCH information change notification.

6.4.3.2 DCI Format N1

DCI format N1 is used for the scheduling of one NPDSCH codeword in one cell, random access procedure initiated by a NPDCCH order, and notifying SC-MCCH change. The DCI corresponding to a NPDCCH order is carried by NPDCCH.

The following information is transmitted by means of the DCI format N1:

- If the format N1 CRC is scrambled by C-RNTI or RA-RNTI:
 - Flag for format N0/format N1 differentiation – 1 bit, where value 0 indicates format N0 and value 1 indicates format N1
 - NPDCCH order indicator – 1 bit
- Else if the format N1 CRC is scrambled by a G-RNTI:
 - Information for SC-MCCH change notification – 2 bits as defined in clause 5.8a of [6]

Exhibit 19 (“3GPP TS 36.212 version 14.16.0 Release 14”), at 199, available at

https://www.etsi.org/deliver/etsi_ts/136200_136299/136212/14.16.00_60/ts_136212v141600p.pdf

50. By further way of example, each Accused Product comprises transmitting circuitry configured to transmit, in more than one second subframe, the second DCI format carried on a second narrowband physical downlink control channel (NPDCCH).

16.4.1 UE procedure for receiving the narrowband physical downlink shared channel

A UE shall upon detection on a given serving cell of a NPDCCH with DCI format N1, N2 ending in subframe n intended for the UE, decode, starting in $n+5$ DL subframe, the corresponding NPDSCH transmission in N consecutive NB-IoT DL subframe(s) n_i with $i = 0, 1, \dots, N-1$ according to the NPDCCH information, where

- subframe n is the last subframe in which the NPDCCH is transmitted and is determined from the starting subframe of NPDCCH transmission and the DCI subframe repetition number field in the corresponding DCI;
- subframe(s) n_i with $i=0, 1, \dots, N-1$ are N consecutive NB-IoT DL subframe(s) excluding subframes used for SI messages where, $n_0 < n_1 < \dots, n_{N-1}$;
- $N = N_{\text{Rep}} N_{\text{SF}}$, where the value of N_{Rep} is determined by the repetition number field in the corresponding DCI (see Subclause 16.4.1.3), and the value of N_{SF} is determined by the resource assignment field in the corresponding DCI (see Subclause 16.4.1.3), and
- k_0 is the number of NB-IoT DL subframe(s) starting in DL subframe $n+5$ until DL subframe n_0 , where k_0 is determined by the scheduling delay field (I_{Delay}) for DCI format N1, and $k_0 = 0$ for DCI format N2. For DCI CRC scrambled by G-RNTI, k_0 is determined by the scheduling delay field (I_{Delay}) according to Table 16.4.1-1a, otherwise k_0 is determined by the scheduling delay field (I_{Delay}) according to Table 16.4.1-1. The value of R_{max} is according to Subclause 16.6 for the corresponding DCI format N1.

Exhibit 20 (“3GPP TS 36.213 version 14.17.0 Release 14”), at 441, available at https://www.etsi.org/deliver/etsi_ts/136200_136299/136213/14.17.00_60/ts_136213v141700p.pdf

51. By further way of example, each Accused Product comprises generating circuitry configured to generate a first DCI format indicating a resource for a transmission of another SC-MCCH information.

6.4.3.3 DCI Format N2

DCI format N2 is used for paging, direct indication, scheduling of one NPDSCH codeword carrying SC-MCCH in one cell, and notifying SC-MCCH change.

The following information is transmitted by means of the DCI format N2:

Exhibit 19, at 199.

5.8a.1.2 SC-MCCH scheduling

The SC-MCCH information (i.e. information transmitted in messages sent over SC-MCCH) is transmitted periodically, using a configurable repetition period. SC-MCCH transmissions (and the associated radio resources and MCS) are indicated on PDCCH.

5.8a.1.3 SC-MCCH information validity and notification of changes

Change of SC-MCCH information only occurs at specific radio frames, i.e. the concept of a modification period is used. Within a modification period, the same SC-MCCH information may be transmitted a number of times, as defined by its scheduling (which is based on a repetition period). The modification period boundaries are defined by SFN values for which $\text{SFN} \bmod m = 0$, where m is the number of radio frames comprising the modification period. The modification period is configured by means of *SystemInformationBlockType20* (*SystemInformationBlockType20-NB* in NB-IoT). If H-SFN is provided in *SystemInformationBlockType1-BR*, modification period boundaries for BL UEs or UEs in CE are defined by SFN values for which $(\text{H-SFN} * 1024 + \text{SFN}) \bmod m = 0$. The modification period boundaries for NB-IoT UEs are defined by SFN values for which $(\text{H-SFN} * 1024 + \text{SFN}) \bmod m = 0$.

When the network changes (some of) the SC-MCCH information, it notifies the UEs, other than BL UEs, UEs in CE or NB-IoT UEs, about the change in the first subframe which can be used for SC-MCCH transmission in a repetition period. LSB bit in 8-bit bitmap when set to '1' indicates the change in SC-MCCH. Upon receiving a change notification, a UE interested to receive MBMS services transmitted using SC-PTM acquires the new SC-MCCH information starting from the same subframe. The UE applies the previously acquired SC-MCCH information until the UE acquires the new SC-MCCH information.

When the network changes (some of) the SC-MCCH information for start of new MBMS service(s) transmitted using SC-PTM, it notifies BL UEs, UEs in CE or NB-IoT UEs about the change in every PDCCH which schedules the first SC-MCCH in a repetition period in the current modification period. The notification is transmitted with 1 bit. The bit, when set to '1', indicates the start of new MBMS service(s) [see TS 36.212 \[22, 5.3.3.1.14 & 6.4.3.3\]](#). Upon receiving a change notification, a BL UE, UE in CE or NB-IoT UE interested to receive MBMS services transmitted using SC-PTM acquires the new SC-MCCH information scheduled by the PDCCH. The BL UE, UE in CE or NB-IoT UE applies the previously acquired SC-MCCH information until the BL UE, UE in CE or NB-IoT UE acquires the new SC-MCCH information.

Exhibit 18, at 209.

52. By further way of example, each Accused Product comprises transmitting circuitry configured to transmit, in more than one first subframe, the first DCI format carried on a first NPDDCH.

16.4.1 UE procedure for receiving the narrowband physical downlink shared channel

A UE shall upon detection on a given serving cell of a NPDCCH with DCI format N1/N2 ending in subframe n intended for the UE, decode, starting in $n+5$ DL subframe, the corresponding NPDSCH transmission in N consecutive NB-IoT DL subframe(s) n_i with $i = 0, 1, \dots, N-1$ according to the NPDCCH information, where

- subframe n is the last subframe in which the NPDCCH is transmitted and is determined from the starting subframe of NPDCCH transmission and the DCI subframe repetition number field in the corresponding DCI;
- subframe(s) n_i with $i=0, 1, \dots, N-1$ are N consecutive NB-IoT DL subframe(s) excluding subframes used for SI messages where, $n_0 < n_1 < \dots, n_{N-1}$;
- $N = N_{\text{Rep}} N_{\text{SF}}$, where the value of N_{Rep} is determined by the repetition number field in the corresponding DCI (see Subclause 16.4.1.3), and the value of N_{SF} is determined by the resource assignment field in the corresponding DCI (see Subclause 16.4.1.3), and
- k_0 is the number of NB-IoT DL subframe(s) starting in DL subframe $n+5$ until DL subframe n_0 , where k_0 is determined by the scheduling delay field (I_{Delay}) for DCI format N1, and $k_0 = 0$ for DCI format N2. For DCI CRC scrambled by G-RNTI, k_0 is determined by the scheduling delay field (I_{Delay}) according to Table 16.4.1-1a, otherwise k_0 is determined by the scheduling delay field (I_{Delay}) according to Table 16.4.1-1. The value of R_{max} is according to Subclause 16.6 for the corresponding DCI format N1.

Exhibit 20, at 441.

53. By further way of example, in the Accused Products, a period of the more than one first subframe is different from a period of the more than one second subframe.

5.8a.1.3 SC-MCCH information validity and notification of changes

When the network changes SC-MTCH specific information e.g. start of new MBMS service(s) transmitted using SC-PTM or change of ongoing MBMS service(s) transmitted using SC-PTM, it notifies the BL UEs, UEs in CE or NB-IoT UEs in the PDCCH which schedules the SC-MTCH in the current modification period. The notification is transmitted with a 2 bit bitmap. The LSB in the 2-bit bitmap, when set to '1', indicates the change of the on-going MBMS service and the MSB in the 2-bit bitmap, when set to '1', indicates the start of new MBMS service(s), see TS 36.212 [22, 5.3.3.1.12 & 5.3.3.1.13 & 6.4.3.2]. In the case the network changes an on-going SC-MTCH transmission in the next modification period, it notifies the BL UEs, UEs in CE or NB-IoT UEs in the PDCCH which schedules this SC-MTCH in the current modification period. In the case the network starts new MBMS service(s) transmitted using SC-PTM, the network notifies the UEs which have on-going SC-MTCH in the PDCCH scheduling each of the SC-MTCH. Upon receiving such notification, a BL UE, UE in CE or NB-IoT UE acquires the new SC-MCCH information at the start of the next modification period. The BL UE, UE in CE or NB-IoT UE applies the previously acquired SC-MCCH information until the BL UE, UE in CE or NB-IoT UE acquires the new SC-MCCH information.

Exhibit 18, at 209-210.

5.8.1.3 MCCH information validity and notification of changes

Change of MCCH information only occurs at specific radio frames, i.e. the concept of a modification period is used. Within a modification period, the same MCCH information may be transmitted a number of times, as defined by its scheduling (which is based on a repetition period). The modification period boundaries are defined by SFN values for which $\text{SFN} \bmod m = 0$, where m is the number of radio frames comprising the modification period. The modification period is configured by means of *SystemInformationBlockType13*.

When the network changes (some of) the MCCH information, it notifies the UEs about the change during a first modification period. In the next modification period, the network transmits the updated MCCH information. These general principles are illustrated in figure 5.8.1.3-1, in which different colours indicate different MCCH information. Upon receiving a change notification, a UE interested to receive MBMS services acquires the new MCCH information immediately from the start of the next modification period. The UE applies the previously acquired MCCH information until the UE acquires the new MCCH information.

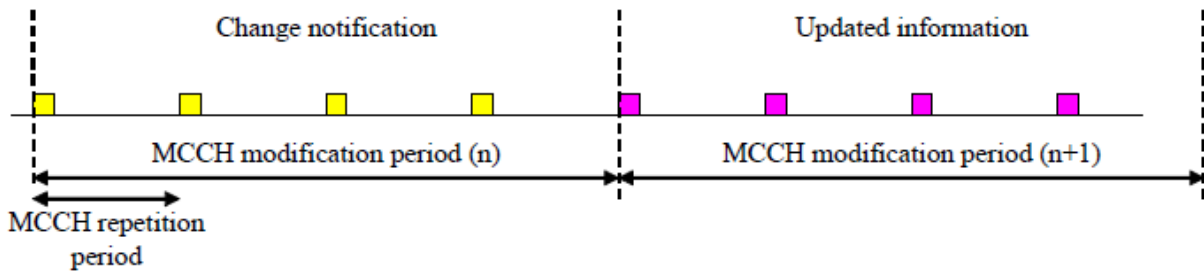


Figure 5.8.1.3-1: Change of MCCH Information

Id. at 202-203.

54. By further way of example, each Accused Product comprises transmitting circuitry configured to transmit the another SC-MCCH information with use of the resource indicated by the first DCI format and in accordance with the second DCI format.

6.4.3.3 DCI Format N2

DCI format N2 is used for paging, direct indication, scheduling of one NPDSCH codeword carrying SC-MCCH in one cell, and notifying SC-MCCH change.

The following information is transmitted by means of the DCI format N2:

- If the format N2 CRC is scrambled by P-RNTI:
 - Flag for paging/direct indication differentiation – 1 bit, with value 0 for direct indication and value 1 for paging
- Else if the format N2 CRC is scrambled by a SC-RNTI:
 - Information for SC-MCCH change notification – 1 bit as defined in clause 5.8a of [6]
- If the format N2 CRC is scrambled by P-RNTI and Flag=0:
 - Direct Indication information – 8 bits provide direct indication of system information update and other fields, as defined in [6]
 - Reserved information bits are added until the size is equal to that of format N2 with Flag=1
- If the format N2 CRC is scrambled by P-RNTI and Flag=1, or if the format N2 CRC is scrambled by SC-RNTI:
 - Resource assignment – 3 bits as defined in clause 16.4.1.3 of [3]
 - Modulation and coding scheme – 4 bits as defined in clause 16.4.1.5 of [3]
 - Repetition number – 4 bits as defined in clause 16.4.1.3 of [3]
 - DCI subframe repetition number – 3 bits as defined in clause 16.6 of [3]

Exhibit 19, at 199-200.

6.4.3.2 DCI Format N1

DCI format N1 is used for the scheduling of one NPDSCH codeword in one cell, random access procedure initiated by a NPDCCH order, and notifying SC-MCCH change. The DCI corresponding to a NPDCCH order is carried by NPDCCH.

The following information is transmitted by means of the DCI format N1:

- If the format N1 CRC is scrambled by C-RNTI or RA-RNTI:
 - Flag for format N0/format N1 differentiation – 1 bit, where value 0 indicates format N0 and value 1 indicates format N1
 - NPDCCH order indicator – 1 bit
- Else if the format N1 CRC is scrambled by a G-RNTI:
 - Information for SC-MCCH change notification – 2 bits as defined in clause 5.8a of [6]

Id., at 199.

55. T-Mobile has indirectly infringed and continues to indirectly infringe one or more claims of the '764 Patent, as provided by 35 U.S.C. § 271(b), by inducing infringement by others, such as T-Mobile's partners, customers, clients, and end-users, in this District and elsewhere in the United States. For example, T-Mobile's partners, customers, clients, and end-users directly

infringe, either literally or under the doctrine of equivalents, through their use of the inventions claimed in the '764 Patent. T-Mobile 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 partners, customers, clients, and end-users suggesting that they use the Accused Products in an infringing manner, including technical support, marketing, product manuals, advertisements, and online documentation related to the Accused Products. Because of T-Mobile's inducement, T-Mobile's partners, customers, clients, and end-users use the Accused Products in a way T-Mobile intends and they directly infringe the '764 Patent. T-Mobile performs these affirmative acts with knowledge of the '764 Patent and with the intent, or willful blindness, that the induced acts directly infringe the '764 Patent.

56. T-Mobile has indirectly infringed and continues to indirectly infringe one or more claims of the '764 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement by others, such as partners, customers, clients, and end-users, in this District and elsewhere in the United States. T-Mobile's affirmative acts of selling and offering to sell the Accused Products in this District and elsewhere in the United States and causing the Accused Products to be manufactured, used, sold, and offered for sale contribute to others' use and manufacture of the Accused Products such that the '764 Patent is directly infringed by others. The accused components within the Accused Products are material to the invention of the '764 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by T-Mobile to be especially made or adapted for use in the infringement of the '764 Patent. T-Mobile performs these affirmative acts with knowledge of the '764 Patent and with intent, or willful blindness, that they cause the direct infringement of the '764 Patent.

57. AWT has suffered damages as a result of Defendants' direct and indirect infringement of the '764 Patent in an amount to be proved at trial.

COUNT IV
(Infringement of the '566 Patent)

58. Paragraphs 1 through 18 are incorporated by reference as if fully set forth herein.

59. AWT has not licensed or otherwise authorized Defendants to make, use, offer for sale, sell, or import any products that embody the inventions of the '566 Patent.

60. Defendants have and continue to directly infringe the '566 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '566 Patent. Such products include at least the Accused Products.

61. For example, Defendants have and continue to directly infringe at least claim 8 of the '566 Patent by making, using, offering to sell, selling, and/or importing into the United States products and services that operate with at least phones, tablets, and hotspot devices that implement 3GPP standards (*e.g.*, 3GPP TS 38.213 V15.14.0 and TS 38.331 V15.13.0), such as the Accused Products, which include a base station (gNB) comprising: a processor; and memory in electronic communication with the processor, wherein instructions stored in the memory are executable to: transmit, to a user equipment (UE), a signaling, an uplink control channel (PUCCH) spans over multiple slots being determined based on the signaling; and receive uplink control information (UCI) with the frequency hopping for the configured multiple slots PUCCH, wherein the number of symbols of the PUCCH is the same in each slot of the multiple slots, and the location of the symbols for the PUCCH is the same in the each slot of the multiple slots.

62. For example, upon information and belief, each Accused Product comprises a base station (gNB) comprising a processor and memory in electronic communication with the processor, which is compliant with the 3GPP TS 38.213 V15.14.0 and 3GPP TS 38.331 V15.13.0 standards.

2023-05-30 **3GPP MEMBERSHIP**

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T-Mobile USA (T-Mobile USA, Inc.)	UNITED STATES	ETSI
T-Mobile USA Inc. (T-Mobile USA Inc.)	UNITED STATES	ATIS

Total : 2 Individual Members

Exhibit 11, available at <https://webapp.etsi.org/3gppmembership/Results.asp?SortMember=Name&DirMember=ASC&SortPartner=Name&DirPartner=ASC&SortMarket=Name&DirMarket=ASC&SortObserver=Name&DirObserver=ASC&SortGuest=Name&DirGuest=ASC&Name=t-mobile+usa&search=Search>

- **Sept 2018:** First multi-vendor 3GPP based [5G data call](#) using commercial radios and Intel's mmWave RF chip
- **Sept 2018:** First U.S. mobile-to-mobile [5G New Radio \(NR\) video call](#)
- **Jul 2018:** America's first [nationwide NB-IoT](#) network live
- **Jun 2018:** Nation's first bi-directional over-the-air [5G data session](#) on a 3GPP-compliant 5G New Radio system

Exhibit 12, available at <https://www.t-mobile.com/news/un-carrier-network-list-of-firsts>

T-Mobile USA

"This is an important moment and a crucial development toward making 5G NR happen," said Neville Ray, Chief Technology Officer for T-Mobile US. "At T-Mobile, we're committed to drive a 5G rollout across the US in 2020, and the efforts of 3GPP will help us to realize this great win for our customers."

Exhibit 13, available at <https://www.3gpp.org/news-events/3gpp-news/industry-pr-5g>

63. By way of example, each Accused Product transmits, to a user equipment (UE), a signaling, an uplink control channel (PUCCH) spans over multiple slots being determined based on the signaling.

9.2.6 PUCCH repetition procedure

For PUCCH formats 1, 3, or 4, a UE can be configured a number of slots, $N_{\text{PUCCH}}^{\text{repeat}}$, for repetitions of a PUCCH transmission by respective *nrofSlots*.

For $N_{\text{PUCCH}}^{\text{repeat}} > 1$,

- the UE repeats the PUCCH transmission with the UCI over $N_{\text{PUCCH}}^{\text{repeat}}$ slots
- a PUCCH transmission in each of the $N_{\text{PUCCH}}^{\text{repeat}}$ slots has a same number of consecutive symbols, as provided by *nrofSymbols* in *PUCCH-format1*, *nrofSymbols* in *PUCCH-format3*, or *nrofSymbols* in *PUCCH-format4*
- a PUCCH transmission in each of the $N_{\text{PUCCH}}^{\text{repeat}}$ slots has a same first symbol, as provided by *startingSymbolIndex* in *PUCCH-format1*, *startingSymbolIndex* in *PUCCH-format3*, or *startingSymbolIndex* in *PUCCH-format4*
- the UE is configured by *interslotFrequencyHopping* whether or not to perform frequency hopping for PUCCH transmissions in different slots
 - if the UE is configured to perform frequency hopping for PUCCH transmissions across different slots
 - the UE performs frequency hopping per slot
 - the UE transmits the PUCCH starting from a first PRB, provided by *startingPRB*, in slots with even number and starting from the second PRB, provided by *secondHopPRB*, in slots with odd number. The slot indicated to the UE for the first PUCCH transmission has number 0 and each subsequent slot until the UE transmits the PUCCH in $N_{\text{PUCCH}}^{\text{repeat}}$ slots is counted regardless of whether or not the UE transmits the PUCCH in the slot
 - the UE does not expect to be configured to perform frequency hopping for a PUCCH transmission within a slot
 - If the UE is not configured to perform frequency hopping for PUCCH transmissions across different slots and if the UE is configured to perform frequency hopping for PUCCH transmissions within a slot, the frequency hopping pattern between the first PRB and the second PRB is same within each slot

Exhibit 14, at 69.

PUCCH-FormatConfig ::=	SEQUENCE {	
interslotFrequencyHopping	ENUMERATED {enabled}	OPTIONAL, -- Need R
additionalDMRS	ENUMERATED {true}	OPTIONAL, -- Need R
maxCodeRate	PUCCH-MaxCodeRate	OPTIONAL, -- Need R
nrofSlots	ENUMERATED {n2, n4, n8}	OPTIONAL, -- Need S
p12BPSK	ENUMERATED {enabled}	OPTIONAL, -- Need R
simultaneousSHARQ-ACK-CSI	ENUMERATED {true}	OPTIONAL, -- Need R
}		

Exhibit 15, at 298.

64. By further way of example, each Accused Product receives uplink control information (UCI) with the frequency hopping for the configured multiple slots PUCCH.

9.2.6 PUCCH repetition procedure

For PUCCH formats 1, 3, or 4, a UE can be configured a number of slots, $N_{\text{PUCCH}}^{\text{repeat}}$, for repetitions of a PUCCH transmission by respective *nrofSlots*.

For $N_{\text{PUCCH}}^{\text{repeat}} > 1$,

- the UE repeats the PUCCH transmission with the UCI over $N_{\text{PUCCH}}^{\text{repeat}}$ slots
- a PUCCH transmission in each of the $N_{\text{PUCCH}}^{\text{repeat}}$ slots has a same number of consecutive symbols, as provided by *nrofSymbols* in *PUCCH-format1*, *nrofSymbols* in *PUCCH-format3*, or *nrofSymbols* in *PUCCH-format4*
- a PUCCH transmission in each of the $N_{\text{PUCCH}}^{\text{repeat}}$ slots has a same first symbol, as provided by *startingSymbolIndex* in *PUCCH-format1*, *startingSymbolIndex* in *PUCCH-format3*, or *startingSymbolIndex* in *PUCCH-format4*
- the UE is configured by *interslotFrequencyHopping* whether or not to perform frequency hopping for PUCCH transmissions in different slots
 - if the UE is configured to perform frequency hopping for PUCCH transmissions across different slots
 - the UE performs frequency hopping per slot
 - the UE transmits the PUCCH starting from a first PRB, provided by *startingPRB*, in slots with even number and starting from the second PRB, provided by *secondHopPRB*, in slots with odd number. The slot indicated to the UE for the first PUCCH transmission has number 0 and each subsequent slot until the UE transmits the PUCCH in $N_{\text{PUCCH}}^{\text{repeat}}$ slots is counted regardless of whether or not the UE transmits the PUCCH in the slot
 - the UE does not expect to be configured to perform frequency hopping for a PUCCH transmission within a slot
 - If the UE is not configured to perform frequency hopping for PUCCH transmissions across different slots and if the UE is configured to perform frequency hopping for PUCCH transmissions within a slot, the frequency hopping pattern between the first PRB and the second PRB is same within each slot

Exhibit 14, at 69.

65. By further way of example, in the Accused Products, the number of symbols of the PUCCH is the same in each slot of the multiple slots and the location of the symbols for the PUCCH is the same in the each slot of the multiple slots.

9.2.6 PUCCH repetition procedure

For PUCCH formats 1, 3, or 4, a UE can be configured a number of slots, $N_{\text{PUCCH}}^{\text{repeat}}$ for repetitions of a PUCCH transmission by respective *nrofSlots*.

For $N_{\text{PUCCH}}^{\text{repeat}} > 1$,

- the UE repeats the PUCCH transmission with the UCI over $N_{\text{PUCCH}}^{\text{repeat}}$ slots
- a PUCCH transmission in each of the $N_{\text{PUCCH}}^{\text{repeat}}$ slots has a same number of consecutive symbols, as provided by *nrofSymbols* in *PUCCH-format1*, *nrofSymbols* in *PUCCH-format3*, or *nrofSymbols* in *PUCCH-format4*
- a PUCCH transmission in each of the $N_{\text{PUCCH}}^{\text{repeat}}$ slots has a same first symbol, as provided by *startingSymbolIndex* in *PUCCH-format1*, *startingSymbolIndex* in *PUCCH-format3*, or *startingSymbolIndex* in *PUCCH-format4*
- the UE is configured by *interslotFrequencyHopping* whether or not to perform frequency hopping for PUCCH transmissions in different slots
 - if the UE is configured to perform frequency hopping for PUCCH transmissions across different slots
 - the UE performs frequency hopping per slot
 - the UE transmits the PUCCH starting from a first PRB, provided by *startingPRB*, in slots with even number and starting from the second PRB, provided by *secondHopPRB*, in slots with odd number. The slot indicated to the UE for the first PUCCH transmission has number 0 and each subsequent slot until the UE transmits the PUCCH in $N_{\text{PUCCH}}^{\text{repeat}}$ slots is counted regardless of whether or not the UE transmits the PUCCH in the slot
 - the UE does not expect to be configured to perform frequency hopping for a PUCCH transmission within a slot
 - If the UE is not configured to perform frequency hopping for PUCCH transmissions across different slots and if the UE is configured to perform frequency hopping for PUCCH transmissions within a slot, the frequency hopping pattern between the first PRB and the second PRB is same within each slot

Exhibit 14, at 69.

66. T-Mobile has indirectly infringed and continues to indirectly infringe one or more claims of the '566 Patent, as provided by 35 U.S.C. § 271(b), by inducing infringement by others, such as T-Mobile's partners, customers, clients, and end-users, in this District and elsewhere in the United States. For example, T-Mobile's partners, customers, clients, and end-users directly infringe, either literally or under the doctrine of equivalents, through their use of the inventions

claimed in the '566 Patent. T-Mobile 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 partners, customers, clients, and end-users suggesting that they use the Accused Products in an infringing manner, including technical support, marketing, product manuals, advertisements, and online documentation related to the Accused Products. Because of T-Mobile's inducement, T-Mobile's partners, customers, clients, and end-users use the Accused Products in a way T-Mobile intends and they directly infringe the '566 Patent. T-Mobile performs these affirmative acts with knowledge of the '566 Patent and with the intent, or willful blindness, that the induced acts directly infringe the '566 Patent.

67. T-Mobile has indirectly infringed and continues to indirectly infringe one or more claims of the '566 Patent, as provided by 35 U.S.C. § 271(c), by contributing to direct infringement by others, such as partners, customers, clients, and end-users, in this District and elsewhere in the United States. T-Mobile's affirmative acts of selling and offering to sell the Accused Products in this District and elsewhere in the United States and causing the Accused Products to be manufactured, used, sold, and offered for sale contribute to others' use and manufacture of the Accused Products such that the '566 Patent is directly infringed by others. The accused components within the Accused Products are material to the invention of the '566 Patent, are not staple articles or commodities of commerce, have no substantial non-infringing uses, and are known by T-Mobile to be especially made or adapted for use in the infringement of the '566 Patent. T-Mobile performs these affirmative acts with knowledge of the '566 Patent and with intent, or willful blindness, that they cause the direct infringement of the '566 Patent.

68. AWT has suffered damages as a result of Defendants' direct and indirect infringement of the '566 Patent in an amount to be proved at trial.

DEMAND FOR JURY TRIAL

Plaintiff hereby demands a jury for all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, AWT prays for relief against Defendants as follows:

- a. Entry of judgment declaring that Defendants have directly and/or indirectly infringed one or more claims of each of the Patents-in-Suit;
- b. An order awarding damages sufficient to compensate AWT for Defendants' infringement of the Patents-in-Suit, but in no event less than a reasonable royalty, together with interest and costs;
- c. Entry of judgment declaring that this case is exceptional and awarding AWT its costs and reasonable attorney fees under 35 U.S.C. § 285; and
- d. Such other and further relief as the Court deems just and proper.

Dated: May 31, 2023

Respectfully submitted,

/s/ Alfred R. Fabricant

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