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

UNILOC 2017 LLC, Plaintiff, vs. AT&T SERVICES, INC., and AT&T MOBILITY LLC, Defendants.	§ § § § § § § § § § § § §	Case No. 2:19-cv-00102 Jury Trial Demanded

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Uniloc 2017 LLC ("Uniloc"), by and through the undersigned counsel, hereby brings this action and makes the following allegations of patent infringement relating to U.S. Patent Nos. 7,075,917, 6,868,079, and 7,167,487 against Defendants AT&T Services, Inc., and AT&T Mobility LLC (collectively "AT&T") and alleges as follows upon actual knowledge with respect to itself and its own acts, and upon information and belief as to all other matters:

NATURE OF THE ACTION

1. This is an action for patent infringement. Uniloc alleges that AT&T infringes U.S. Patent Nos. Patent Nos. 7,075,917 (the "'917 patent"), 6,868,079, (the "'079 patent") and 7,167,487 (the ""487 patent"), copies of which are attached as Exhibits A-C, respectively (collectively "the Asserted Patents").

2. Uniloc alleges that AT&T directly and indirectly infringes the Asserted Patents by importing, making, offering for sale, selling and operating (1) a WCDMA network including a radio network controller and related user equipment that operate in compliance with HSPA/HSPA+ standardized in UMTS 3 GPP Release 6 and above, such as the AT&T Velocity USB stick and other devices supporting HSPA/HSPA+ and (2) a LTE network including base stations, LTE connectivity, mobile hotspots, Internet-enabled vehicles and other LTE-connected mobile devices that communicate using the LTE standard. AT&T also induces and contributes to the infringement of others. Uniloc seeks damages and other relief for AT&T's infringement of the Asserted Patents.

THE PARTIES

3. Uniloc 2017 LLC is a Delaware corporation having places of business at 1209 Orange Street, Wilmington, Delaware 19801, 620 Newport Center Drive, Newport Beach, California 92660 and 102 N. College Avenue, Suite 303, Tyler, TX 75702.

4. Uniloc holds all substantial rights, title and interest in and to the Asserted Patents.

5. Upon information and belief, Defendant AT&T Services, Inc. is a Delaware corporation with a place of business at 175 E. Houston, San Antonio, Texas 78205 and a registered agent for service of process at CT Corp System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201

6. Upon information and belief, Defendant AT&T Mobility LLC is a Delaware limited liability company with a of business at 1025 Lenox Park Blvd NE, Atlanta, Georgia 30319 and a registered agent for service of process at CT Corp System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

7. Upon information and belief AT&T has at least the following regular and established places of business in this District: 4757 S. Broadway Ave., Tyler Texas 75703; 2028 Southeast Loop 323, Tyler, Texas 75701; 8922 S. Broadway Ave., Tyler, Texas 75703.

JURISDICTION AND VENUE

8. This action for patent infringement arises under the Patent Laws of the United States, 35 U.S.C. § 1 et. seq. This Court has original jurisdiction under 28 U.S.C. §§ 1331 and 1338.

9. This Court has both general and specific personal jurisdiction over AT&T because they have committed acts within the Eastern District of Texas giving rise to this action and have established minimum contacts with this forum such that the exercise of jurisdiction over AT&T would not offend traditional notions of fair play and substantial justice. AT&T, directly and through subsidiaries and intermediaries (including distributors, retailers, franchisees and others), has committed and continues to commit acts of infringement in this District by, among other things, making, using, testing, selling, licensing, importing, and/or offering for

sale/license products and services that infringe the Asserted Patents.

10. Venue is proper in this district and division under 28 U.S.C. §§1391(b)-(d) and 1400(b) because AT&T has committed acts of infringement in the Eastern District of Texas and has multiple regular and established places of business in the Eastern District of Texas.

COUNT I: INFRINGEMENT OF U.S. PATENT NO. 7,075,917

11. The allegations of paragraphs 1-10 of this Complaint are incorporated by reference as though fully set forth herein.

12. The ’917 patent titled, “Wireless Network With A Data Exchange According To The ARQ Method,” issued on July 11, 2006. A copy of the ’917 patent is attached as Exhibit A.

13. Pursuant to 35 U.S.C. § 282, the ’917 patent is presumed valid.

14. Upon information and belief, AT&T makes, uses, offers for sale, and sells in the United States and imports into the United States a WCDMA network including a radio network controller and related user equipment that operate in compliance with HSPA/HSPA+ standardized in UMTS 3 GPP Release 6 and above, such as the AT&T Velocity USB stick and other devices supporting HSPA/HSPA+ (collectively the “Accused Infringing Devices”).

15. Upon information and belief, the Accused Infringing Devices infringe at least claim 1 of the ’917 patent in the exemplary manner described below.

16. AT&T provides a WCDMA network including a Radio Network Controller and related user equipment (“UEs” or “terminals”) that communicate using a hybrid ARQ method. The Radio Network Controller and UEs have a physical layer for the transmission and reception of data. AT&T operates a network that supports WCDMA/HSPA. Figure 1 shows that a UE is part of the network and that the UE has a physical layer/L1 and Section 5.1 shows that the radio interface of the UE has a physical layer.

6 UTRAN Architecture

The UTRAN consists of a set of Radio Network Subsystems connected to the Core Network through the Iu.

A RNS consists of a Radio Network Controller one or more Node Bs and optionally one SAS. A Node B is connected to the RNC through the Iub interface.

A Node B can support FDD mode, TDD mode or dual-mode operation.

…

The UTRAN architecture is shown in figure 4.

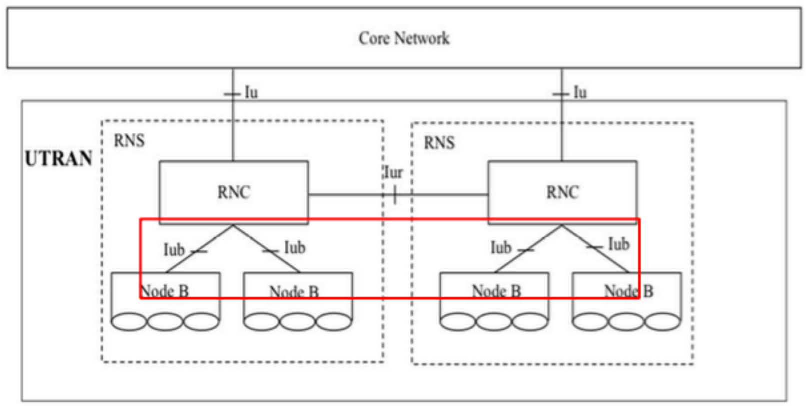


Figure 4: UTRAN Architecture

Source: (3GPP TS 25.401 V6.9.0 (2006-12), pages 13-14)

4 Assumed UMTS Architecture

Figure 1 shows the assumed UMTS architecture as outlined in [1]. The figure shows the UMTS architecture in terms of its entities User Equipment (UE), UTRAN and Core Network. The respective reference points Uu (Radio Interface) and Iu (CN-UTRAN interface) are shown. The figure illustrates furthermore the high-level functional grouping into the Access Stratum and the Non-Access Stratum.

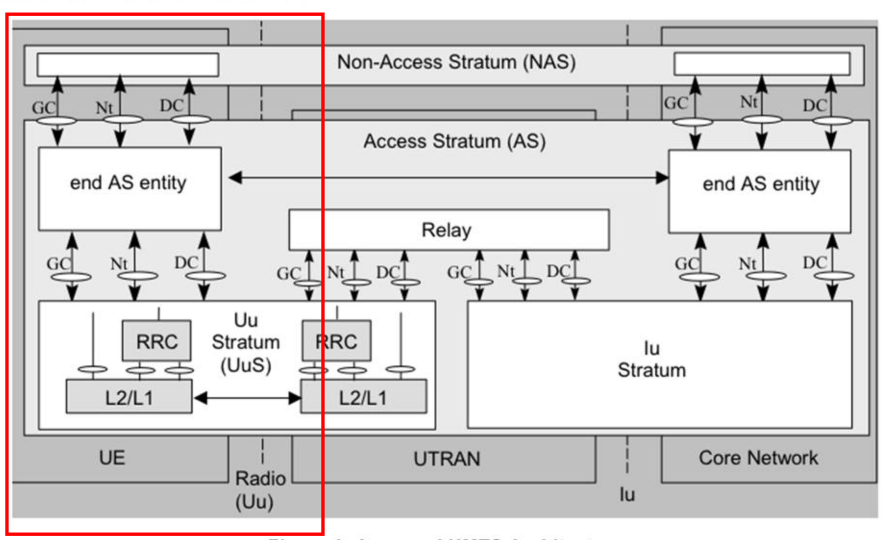


Figure 1: Assumed UMTS Architecture

Source: (3GPP TS 25.301 V6.6.0 (2008-03), pages 8-9)

5.1 Overall protocol structure

The radio interface is layered into three protocol layers:

- the physical layer (L1);
- the data link layer (L2);
- network layer (L3).

Layer 2 is split into following sublayers: Medium Access Control (MAC), Radio Link Control (RLC), Packet Data Convergence Protocol (PDCP) and Broadcast/Multicast Control (BMC).

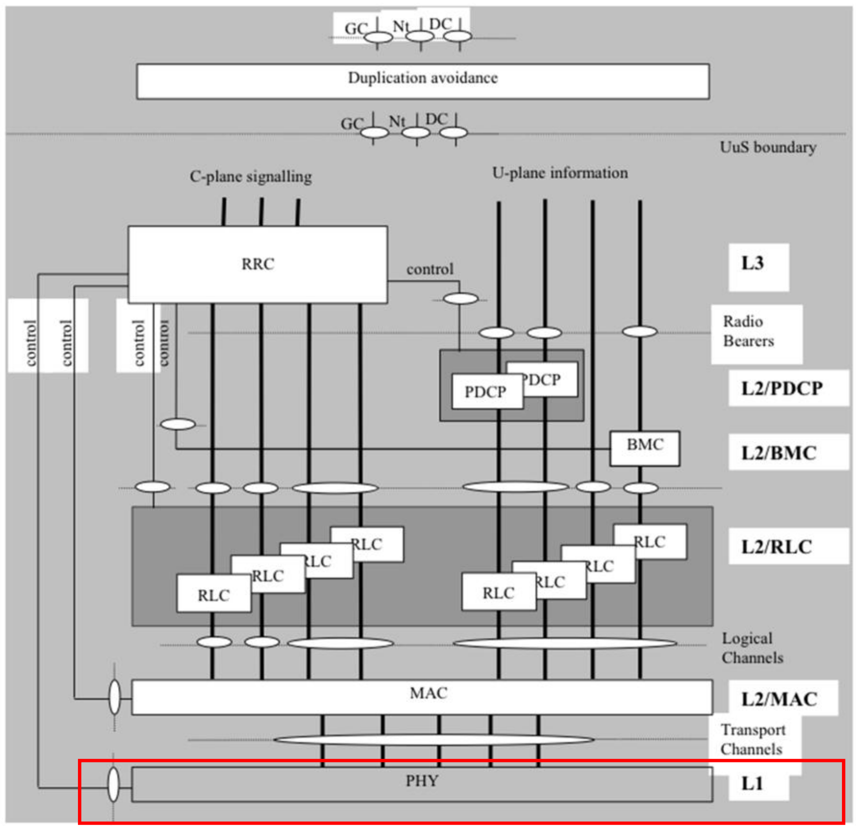


Figure 2: Radio Interface protocol architecture (Service Access Points marked by circles)

Source: (3GPP TS 25.301 V6.6.0 (2008-03), pages 9-11)

17. An exemplary terminal that AT&T provides and that operates on AT&T's network is shown below.

AT&T Velocity® USB Stick

Connect online easily with this compact and portable USB modem. With the AT&T Velocity USB Stick1 and the nation's best data network2, extreme speed is just a USB port away!

Wireless Technology

4G LTE	Bands 2,4,5,12,29, and 30
4G	HSPA+ with enhanced backhaul
3G – UMTS	850/900/1900/2100MHz
SIM Type	Nano

Source: https://www.att.com/devices/att/velocity-usb-stick-refurb.html#specs

18. The Accused Infringing Devices store in a physical layer buffer ("stored in a memory") medium access control-es (MAC-es) protocol data units (PDUs) ("transport blocks") after being hybrid automatic repeat request (HARQ) coded ("coded transport blocks"). Each MAC-es PDU ("transport block") includes at least one acknowledged mode data (AMD) radio link control (RLC) PDU ("a packet data unit which is delivered by an assigned radio link control layer"). Each AMD RLC PDU has a unique 12-bit sequence number ("identified by a packet data unit sequence number"). Section 4.8 shows that the enhanced uplink data is HARQ coded in the physical layer for transmission and Section 4.2.1.3.1 shows that the AMD RLC PDUs ("a packet data unit which is delivered by an assigned radio link control layer") are provided to lower layers, such as the MAC layer.

4.8 Coding for E-DCH

Figure 21 shows the processing structure for the E-DCH transport channel mapped onto a separate CCTrCH. Data arrives to the coding unit in form of a maximum of one transport block once every transmission time interval (TTI). The following coding steps can be identified:

- Add CRC to the transport block
- Code block segmentation
- Channel coding
- Physical layer hybrid ARQ and rate matching
- Physical channel segmentation
- Interleaving
- Physical channel mapping

The UTRAN architecture is shown in figure 4.

The coding steps for E-DCH transport channel are shown in the figure below.

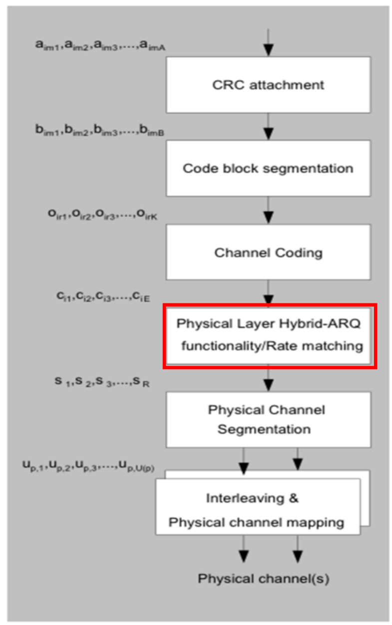


Figure 21: Transport channel processing for E-DCH

Source: (3GPP TS 25.212 V6.10.0 (2006-12), pages 65-66)

4.2.1.3.1 Transmitting side

The transmitting side of the AM-RLC entity receives RLC SDUs from upper layers through the AM-SAP.

RLC SDUs are segmented and/or concatenated into AMD PDUs of a fixed length. The segmentation is performed if the received RLC SDU is larger than the length of available space in the AMD PDU. The uplink AMD PDU size is a semi-static value that is configured by upper layers and can only be changed through re-establishment of the AM RLC entity by upper layers.

…

The transmitting side of the AM RLC entity submits AMD PDUs to the lower layer through either one or two DCCH or DTCH logical channels.

Source: (3GPP TS 25.322 V6.12.0 (2008-05), pages 16-17)

19. Figure 9b of section 5.3.5 shows that at least one RLC PDU ("packet data unit") is encapsulated into a MAC-es PDU ("transport block"), which is provided to the physical layer,

such as for HARQ coding.

5.3.5 Data flows through Layer 2

Data flows through layer 2 are characterised by the applied data transfer modes on RLC (acknowledged, unacknowledged and transparent transmission) in combination with the data transfer type on MAC, i.e. whether or not a MAC header is required. The case where no MAC header is required is referred to as "transparent" MAC transmission. Acknowledged and unacknowledged RLC transmissions both require a RLC header. In unacknowledged transmission, only one type of unacknowledged data PDU is exchanged between peer RLC entities. In acknowledged transmission, both (acknowledged) data PDUs and control PDUs are exchanged between peer RLC entities.

The resulting different data flow cases are illustrated in Figures 6 - 9. On the level of detail presented here, differences between acknowledged and unacknowledged RLC transmission are not visible. Acknowledged and unacknowledged RLC transmission is shown as one case, referred to as non-transparent RLC.

…

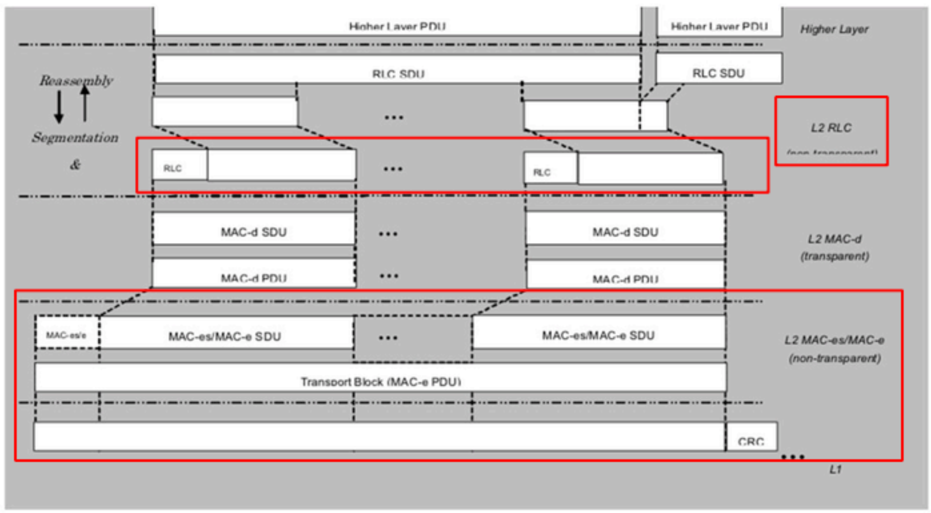


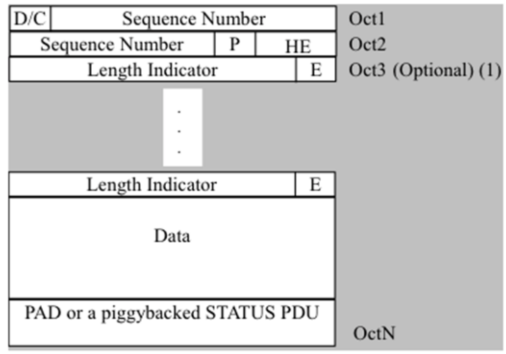
Figure 9b: Data flow for non-transparent RLC and MAC mapped to E-DCH

Source: (3GPP TS 25.301 V6.6.0 (2008-03), pages 21, 25)

20. Sections 9.2.1.4 and 9.2.2.3 show that the AMD PDUs have a sequence number.

9.2.1.4 AMD PDU

The AMD PDU is used to transfer user data, piggybacked status information and the Polling bit when RLC is operating in acknowledged mode. The length of the data part shall be a multiple of 8 bits. The AMD PDU header consists of the first two octets, which contain the "Sequence Number". The RLC header consists of the first two octets and all the octets that contain "Length Indicators".



NOTE (1): The "Length Indicator" may be 15 bits.

Figure 9.3: AMD PDU

Source: (3GPP TS 25.322 V6.12.0 (2008-05), pages 26-27)

9.2.2.3 Sequence Number (SN)

This field indicates the "Sequence Number" of the RLC PDU, encoded in binary.

PDU type	Length	Notes
AMD PDU	12 bits	Used for retransmission and reassembly
UMD PDU	7 bits	Used for reassembly

Source: (3GPP TS 25.322 V6.12.0 (2008-05), pages 28-29)

21. Section 11.3.4.8 shows that the sequence number in the AMD PDUs are used for duplicate detection and are uniquely identified by the sequence number within the receiving window.

11.3.4.8 Receiving an AMD PDU within the reception window more than once (Handling of Duplicates)

Upon reception of an AMD PDU with a "Sequence Number" within the interval VR(R)≤SN<VR(MR), for which "Sequence Number" an AMD PDU has already been received, the Receiver shall:

- discard the AMD PDU;
- consider the AMD PDU with this "Sequence Number" as having been correctly received in the next status report to be transmitted;

Source: (3GPP TS 25.322 V6.12.0 (2008-05), page 71)

22. Each MAC-es PDU ("coded transport blocks") has a transmission sequence

number, TSN, ("abbreviated sequence number") and the MAC-es PDU with its TSN ("abbreviated sequence number") is stored at least within a HARQ entity of the UE for potential HARQ retransmission. The TSN is 6 bits ("length") which is shorter ("abbreviated") than the AM RLC PDU sequence number of 12 bits. The MAC-es PDUs, including the TSNs, are transmitted to the serving radio network controller (SRNC) via the NodeB/base station ("transmitted to the radio network controller").

23. The TSN length depends on the maximum number of MAC-es PDUs to be stored unambiguously within a reordering buffer at the SRNC. The SRNC performs duplicate detection on the received MAC-es PDUs by using the TSN. If two different MAC-es PDUs (not a duplicate) had the same TSN, the SRNC would erroneously discard a correctly received MAC-es PDU. Thus, the TSN must be uniquely associated with each MAC-es PDU (non-duplicate) in the reordering buffer ("which can be shown unambiguously in a packet data unit sequence number"). To achieve this unique association, the TSN length must accommodate the maximum number of MAC-es PDUs that can be stored in the reordering buffer. The TSN length is 6 bits, which has values from 0 to 63 ("whose length depends on the maximum number of coded transport blocks to be stored"). Section 9.2.4.1 shows that the length of the TSN is 6 bits (which is shorter than the 12-bit AMD PDU sequence number).

9.2.4.1 MAC-es header parameters

- Transmission Sequence Number (TSN):
The TSN field provides the transmission sequence number for the MAC-es PDU. This information is used for reordering purposes to support in-sequence delivery to higher layers. The length of the TSN field is 6 bits.

Source: (3GPP TS 25.321 V6.18.0 (2009-03), page 50)

24. Section 11.8.1.2.1 shows that each MAC-es PDU is sequentially assigned an incremented sequence number, so that each MAC-es PDU will have a unique sequence number

in the SRNC reordering buffer.

11.8.1.2.1 TSN setting process operation

There is one TSN setting process at the UE for each logical channel. When a MAC-es PDU is transmitted, the UE operation in support of the re-ordering functionality consists in generating an explicit sequence number (TSN) for the MAC-es PDU intended for the associated re-ordering queue. In one TTI, there is only one TSN per logical channel: one for the MAC-es PDU that is transmitted.

Each TSN setting process maintains the state variable CURRENT_TSN, which indicates the sequence number to be included in the header of the following MAC-es PDU to be generated. When the TSN setting process is established, CURRENT_TSN shall be initialized to 0.

When a new payload needs to be generated for the associated re-ordering queue, the Multiplexing and TSN setting entity shall:

- set the TSN of the transmission to CURRENT_TSN;

After each MAC-es PDU is multiplexed:

- increment CURRENT_TSN by 1;
- if CURRENT_TSN > 63:
  - set CURRENT_TSN = 0.

Source: (3GPP TS 25.321 V6.18.0 (2009-03), pages 74-75)

25. Figure 9.1.5.1 of section 9.1.5 shows that the MAC-es PDU has a TSN.

9.1.5 MAC PDU (E-DCH)

In the case of E-DCH there are two MAC sublayers, MAC-e and MAC-es. MAC-es sits on top of MAC-e and receives PDUs directly from MAC-d. MAC-es SDUs (i.e. MAC-d PDUs) of the same size, coming from a particular logical channel are multiplexed together into a single MAC-es payload. There is one and only one MAC-es PDU per logical channel per TTI (since only one MAC-d PDU size is allowed per logical channel per TTI). To this payload is prepended the MAC-es header (see subclause 9.2.4.1). The number of PDUs, as well as the one DDI value identifying the logical channel, the MAC-d flow and the MAC-es SDU size are included as part of the MAC-e header. In case sufficient space is left in the E-DCH transport block or if Scheduling Information needs to be transmitted, an SI will be included at the end of the MAC-e PDU (see subclause 9.2.4.2). Multiple MAC-es PDUs from multiple logical channels, but only one MAC-e PDU can be transmitted in a TTI.

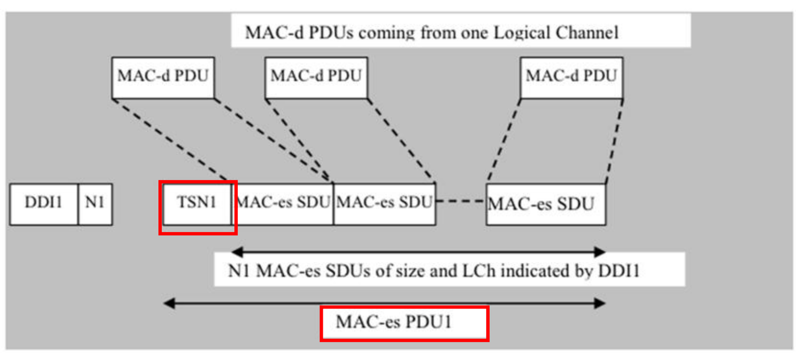


Figure 9.1.5.1 MAC-es PDU

Source: (3GPP TS 25.321 V6.18.0 (2009-03), page 35)

26. Section 5.3.5 shows that the MAC-es PDU is provided to the physical layer for

transmission (including HARQ coding).

5.3.5 Data flows through Layer 2

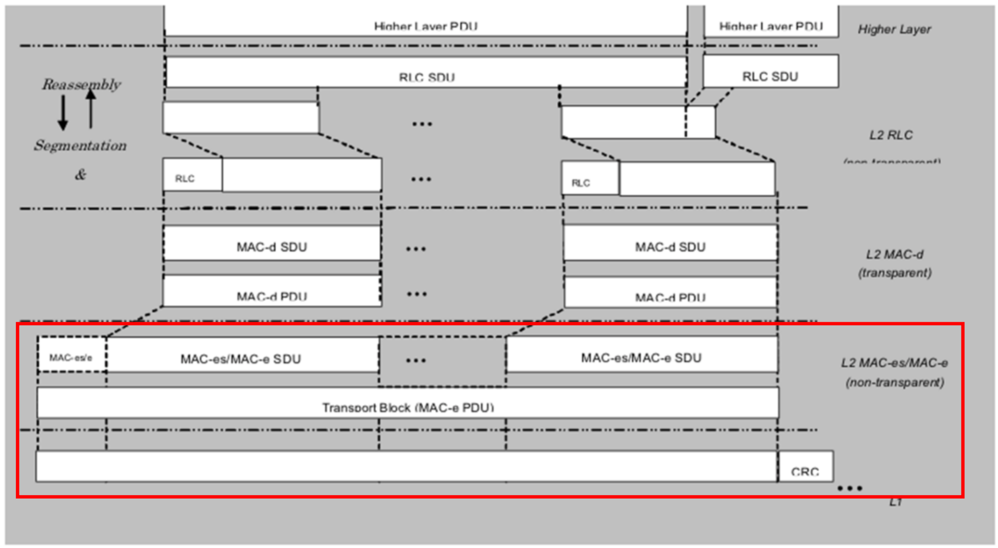


Figure 9b: Data flow for non-transparent RLC and MAC mapped to E-DCH

Source: (3GPP TS 25.301 V6.6.0 (2008-03), pages 21, 25)

27. Sections 11.8.3.1 from TS 25.321 and 10.3.2.2 from 3G Evolution HSPA and LTE for Mobile Broadband show that the infrastructure stores MAC-es PDUs in a reordering buffer and uses their unique TSNs to reorder and detect duplicate MAC-es PDUs within the reordering buffer.

11.8.3.1 Re-ordering entity

The re-ordering entity is part of the MAC-es sublayer in the SRNC. There is one re-ordering entity per UE. Each re-ordering entity will support one re-ordering process per logical channel. The DDI value is used to determine the logical channel for which each MAC-es PDU is meant. Based on this information, the MAC-es PDUs are routed to the proper re-ordering process. The re-ordering process may use the explicit TSN indication as well as the timing information provided by the Node B in order to eliminate duplicates and deliver the packets in order to RLC. The details of the re-ordering mechanism are left up to the implementation.

Source: (3GPP TS 25.321 V6.18.0 (2009-03), page 83)

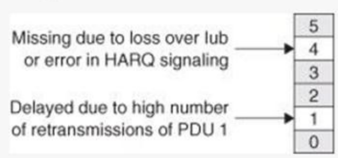
10.3.2.2. In-Sequence Delivery

Similar to the case for HS-DSCH, the multiple hybrid ARQ processes of E-DCH cannot, in themselves, ensure in-sequence delivery, as there is no interaction between the processes. Also, in soft handover situations, data is received independently in several NodeBs and can therefore be received in the RNC in a different order than transmitted. In addition, differences in Iub/Iur transport delay can cause out-of sequence delivery to RLC. Hence, in-sequence delivery must be implemented on top of the MAC-e entity and a reordering entity in the RNC has been defined for this purpose in a separate MAC entity, the MAC-es. In E-DCH, the reordering is always performed per logical channel such that all data for a logical channel is delivered in-sequence to the corresponding RLC entity. This can be compared to HS-DSCH where the reordering is performed in configurable reordering queues.

The actual mechanism to perform reordering in the RNC is implementation specific and not standardized, but typically similar principles as specified for the HS-DSCH are used. Therefore, each MAC-es PDU transmitted from the UE includes a *Transmission Sequence Number* (TSN), which is incremented for each transmission on a logical channel. By ordering the MAC-es PDUs based on TSN, in-sequence delivery to the RLC entities is possible.

To illustrate the reordering mechanism consider the situation shown in Figure 10.25. The MAC-es PDUs 0, 2, 3, and 5 have been received in the RNC while MAC-es PDUs 1 and 4 have not yet been received. The RNC can in this situation not know why PDUs 1 and 4 are missing and needs to store PDUs 2, 3, and 5 in the reordering buffer. As soon as PDU 1 arrives, PDU 1, 2, and 3 can be delivered to RLC.

Figure 10.25. Reordering mechanism.



Source: (3G Evolution HSPA and LTE for Mobile Broadband, §10.3.2.2)

28. The physical layer of the UE ("terminal") receives a HARQ coded MAC-hs PDU ("coded transport block") over high speed physical downlink shared channel(s), HS-PDSCH(s). As described in the patent description, the radio network controller sends downlink data using its base station ("radio network controller"). The UE ("terminal") checks the transport block for errors in reception. In response to the error check, the UE terminal sends an ACK ("acknowledge command") or a NACK ("negative acknowledge command") over the high speed

physical dedicated control channel, HS-PDCCH, ("back channel"). Section 5.2.1.2 shows that the HS-PDCCH ("back channel") sends HARQ-ACK data ("acknowledge command" or "negative acknowledge command").

5.2.1.2 HS-DPCCH

Figure 2A illustrates the frame structure of the HS-DPCCH. The HS-DPCCH carries uplink feedback signalling related to downlink HS-DSCH transmission. The HS-DSCH-related feedback signalling consists of Hybrid-ARQ Acknowledgement (HARQ-ACK) and Channel-Quality Indication (CQI) [3]. Each sub frame of length 2 ms (3*2560 chips) consists of 3 slots, each of length 2560 chips. The HARQ-ACK is carried in the first slot of the HS-DPCCH sub-frame. The CQI is carried in the second and third slot of a HS-DPCCH sub-frame. There is at most one HS-DPCCH on each radio link. The HS-DPCCH can only exist together with an uplink DPCCH. The timing of the HS-DPCCH relative to the uplink DPCCH is shown in section 7.7.

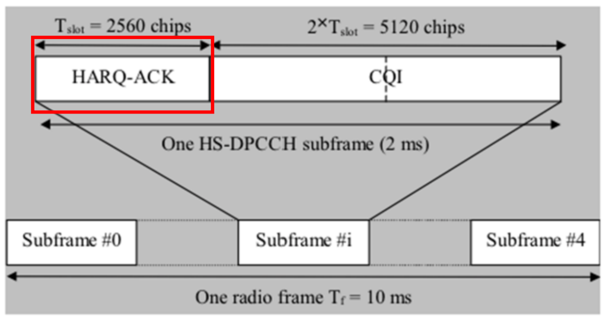


Figure 2A: Frame structure for uplink HS-DPCCH

Source: (3GPP TS 25.211 V6.10.0 (2009-09), pages 12-13)

29. Sections 6A.1.1 and 4.2.3.3 show that the UE transmits the ACKs/NACKs in response to received MAC-hs PDUs received from the MAC-hs HARQ entity.

6A.1.1 UE procedure for receiving HS-DSCH

In this sub-clause, sub-frame *n* on the HS-SCCHs refers to the sub-frame which is associated with sub-frame *n* on the HS-PDSCH as defined in [1], and sub-frame *n* on the HS-DPCCH refers to the sub-frame which is related to sub-frame *n* on the HS-PDSCH as defined in [1].

…

If a UE detects that one of the monitored HS-SCCHs in sub-frame *n* carries consistent control information intended for this UE, the UE shall start receiving the HS-PDSCHs indicated by this control information, and, if HARQ_preamble_mode = 1 and the information received on HS-SCCH is not discarded, the UE shall:

…

The UE shall transmit the ACK/NACK information received from MAC-hs in the slot allocated to the HARQ-ACK in the corresponding HS-DPCCH sub-frame as defined in [1]. When *N_acknack_transmit* is greater than one, the UE shall:

Source: (3GPP TS 25.214 V6.11.0 (2006-12), pages 34-35)

4.2.3.3 MAC-hs entity – UE Side

The MAC-hs handles the HSDPA specific functions. In the model below the MAC-hs comprises the following entities:

- HARQ:
The HARQ entity is responsible for handling the MAC functions relating to the HARQ protocol. The HARQ functional entity handles all the tasks that are required for hybrid ARQ. It is responsible for generating ACKs or NACKs. The detailed configuration of the hybrid ARQ protocol is provided by RRC over the MAC-Control SAP.

…

The associated signalling shown in the figure illustrates the exchange of information between layer 1 and layer 2 provided by primitives shown in [3].

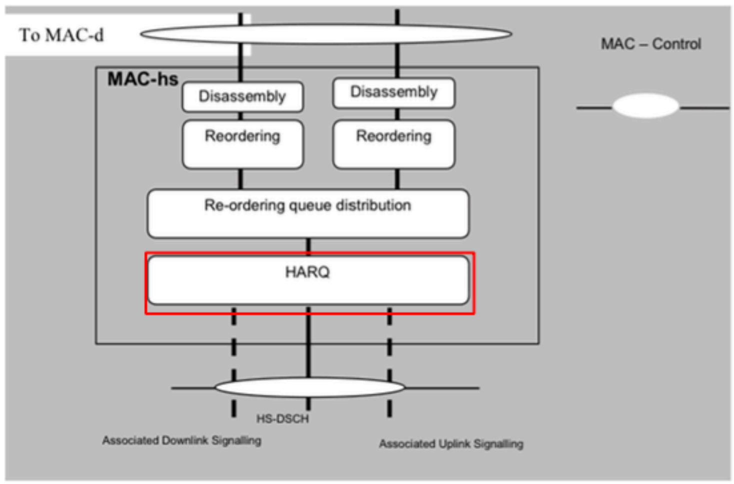


Figure 4.2.3.3.1: UE side MAC architecture / MAC-hs details

Source: (3GPP TS 25.321 V6.18.0 (2009-03), pages 16-17)

30. Section 11.6.2.2 shows that the UE sends an ACK when no error is detected ("correct reception") or a NACK when an error is detected ("there is error-affected reception").

11.6.2.2 HARQ process

The HARQ process processes the New Data Indicator indicated by lower layers for each received MAC-hs PDU.

…

The UE shall:

…

- if the data in the soft buffer has been successfully decoded and no error was detected:
  - deliver the decoded MAC-hs PDU to the reordering entity;
  - generate a positive acknowledgement (ACK) of the data in this HARQ process.
- else:
  - generate a negative acknowledgement (NAK) of the data in this HARQ process;
- schedule the generated positive or negative acknowledgement for transmission and the time of transmission relative to the reception of data in a HARQ process is configured by upper layer.

Source: (3GPP TS 25.321 V6.18.0 (2009-03), pages 68-69)

31. AT&T has infringed, and continues to infringe, at least claim 1 of the ’917 patent in the United States, by making, using, offering for sale, selling and/or importing the Accused Infringing Devices in violation of 35 U.S.C. § 271(a).

32. AT&T also has infringed, and continues to infringe, at least claim 1 of the ’917 patent by actively inducing others to use, offer for sale, and sell the Accused Infringing Devices. AT&T’s users, customers, agents or other third parties who use those devices in accordance with AT&T’s instructions infringe claim 1 of the ’917 patent, in violation of 35 U.S.C. § 271(a). AT&T intentionally instructs customers to infringe through training videos, demonstrations, brochures and user guides, such as those located at: www.att.com; forums.att.com; www.att.com/esupport; https://www.att.com/devices/att/velocity-usb-stick.html; https://www.att.com/devicehowto/index.html#!/?make=ATT&model=VelocityMF923. AT&T is thereby liable for infringement of the ’917 patent under 35 U.S.C. § 271(b).

33. AT&T also has infringed, and continues to infringe, at least claim 1 of the ’917 patent by offering to commercially distribute, commercially distributing, or importing the Accused Infringing Devices which are used in practicing the processes, and constitute a material part of the invention. AT&T knows portions of the Accused Infringing Devices to be especially made or especially adapted for use in infringement of the ’917 patent, not a staple article, and not a commodity of commerce suitable for substantial noninfringing use. AT&T is thereby liable for infringement of the ’917 Patent under 35 U.S.C. § 271(c).

34. AT&T is on notice of infringement of the ’917 patent by no later than the filing and service of this Complaint. By the time of trial, AT&T will have known and intended (since receiving such notice) that its continued actions would actively induce and contribute to the infringement of at least claim 1 of the ’917 patent.

35. Upon information and belief, AT&T may have infringed and continues to infringe the ’917 patent through other software and devices utilizing the same or reasonably similar functionality, including other versions of the Accused Infringing Devices.

36. AT&T’s acts of direct and indirect infringement have caused and continue to cause damage to Uniloc and Uniloc is entitled to recover damages sustained as a result of AT&T’s wrongful acts in an amount subject to proof at trial.

COUNT II: INFRINGEMENT OF U.S. PATENT NO. 6,868,079

40. The allegations of paragraphs 1-10 of this Complaint are incorporated by reference as though fully set forth herein.

41. The ’079 patent titled, “Radio Communication System With Request Re-Transmission Until Acknowledged,” issued on March 15, 2005. A copy of the ’079 patent is attached as Exhibit B.

42. Pursuant to 35 U.S.C. § 282, the ’079 patent is presumed valid.

43. Upon information and belief, AT&T makes, uses, offers for sale, and sells in the United States and imports into the United States a LTE network including base stations, LTE connectivity, mobile hotspots, Internet-enabled vehicles and other LTE-connected mobile devices that communicate using the LTE standard (collectively the “Accused Infringing Devices”).

Benefits of the AT&T 4G LTE network

Learn how the AT&T network connects you to the things you care about most.

★ **PRODUCT SUPPORT**

Learn about our 4G LTE Network

AT&T connects your home, businesses, cars, devices, entertainment, and your friends and family. At home or on the go, we deliver the services you want, when you want them via the AT&T network. With AT&T, you can take your world further.

Source: https://www.att.com/esupport/article.html#!/wireless/KM1008740

AT&T Velocity® USB Stick

Connect online easily with this compact and portable USB modem. With the AT&T Velocity USB Stick1 and the nation's best data network2, extreme speed is just a USB port away!

Wireless Technology

4G LTE	Bands 2,4,5,12,29, and 30
4G	HSPA+ with enhanced backhaul
3G – UMTS	850/900/1900/2100MHz
SIM Type	Nano

Source: https://www.att.com/devices/att/velocity-usb-stick-refurb.html#specs

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AT&T Wireless Internet

★★★★☆ 3.8 | 161 reviews

Bring the high-speed of AT&T 4G LTE into your home to wirelessly connect tablets, phones, and computers with AT&T Wireless Internet. This easy-to-use device also lets you use your current home phone and number for unlimited nationwide calling.

Prices start from:

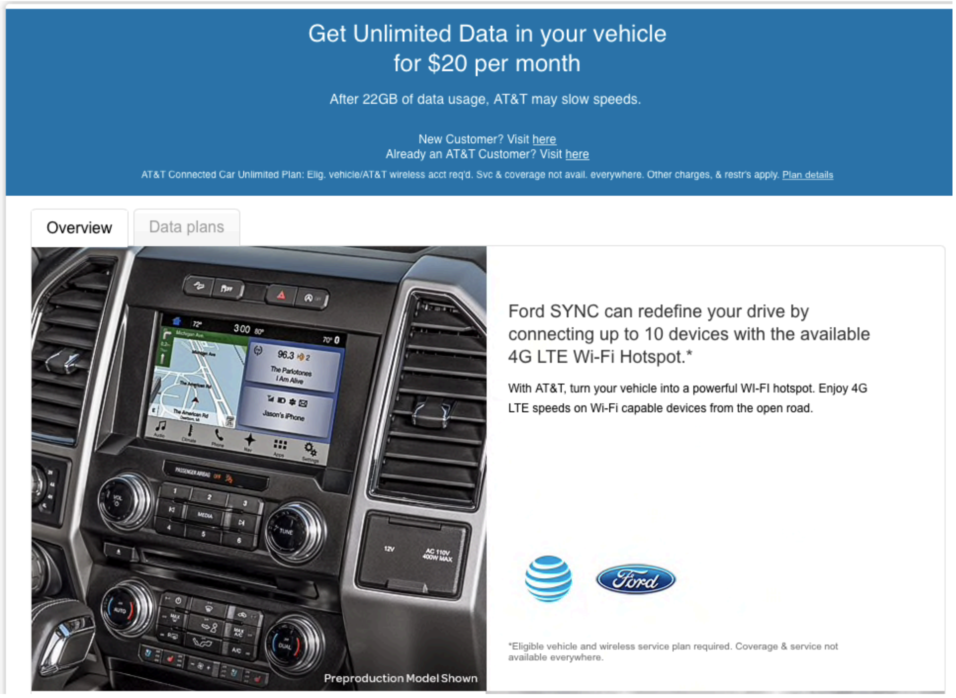
$10.00/mo. OR $199.99

Requires 0% APR 20-month installment agreement, well-qualified credit and service. Other options available.

Retail price. Requires qualified service.

Continue

Source: https://www.att.com/cellphones/att/att-wireless-internet.html#sku=sku8550279



Source: https://www.att.com/shop/wireless/connected-car/ford/ford-models.html

44. Upon information and belief, the Accused Infringing Devices infringe claim 17 of the '079 patent by practicing a method in the exemplary manner described below.

45. LTE is a cellular communication standard that utilizes radio frequencies for communication, and products built to the LTE standard operate as a radio communication system.

40. AT&T's LTE network includes a physical uplink control channel (PUCCH) used to transmit user signaling data from one or more terminals, such as AT&T LTE connectivity devices, AT&T Wi-Fi-enabled vehicles and other devices ("secondary stations").

41. LTE specifies two frame structure types for the PUCCH: frame structure Type 1 for FDD mode, and frame structure Type 2 for TDD mode. For the frame structure Type 1, a 10 ms radio frame is divided into 20 equally sized slots of 0.5 ms. For a given LTE cell on AT&T's network, respective time slots in the PUCCH are allocated to one or more terminals within that cell on a sub-frame basis.

42. Downlink and uplink transmissions are organized into radio frames with 10 ms duration. Two radio frame structures are supported.

5 Physical Layer for E-UTRA

Downlink and uplink transmissions are organized into radio frames with 10 ms duration. Two radio frame structures are supported:

- Type 1, applicable to FDD,
- Type 2, applicable to TDD.

Frame structure Type 1 is illustrated in Figure 5.1-1. Each 10 ms radio frame is divided into ten equally sized sub-frames. Each sub-frame consists of two equally sized slots. For FDD, 10 subframes are available for downlink transmission and 10 subframes are available for uplink transmissions in each 10 ms interval. Uplink and downlink transmissions are separated in the frequency domain.

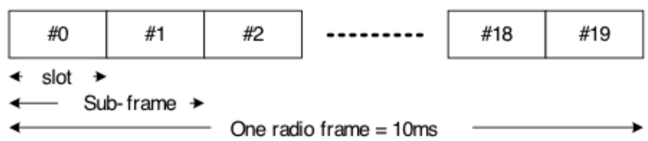


Figure 5.1-1: Frame structure type 1

Physical uplink control channel (PUCCH)

- Carries Hybrid ARQ ACK/NAKs in response to downlink transmission;
- Carries Scheduling Request (SR);
- Carries CQI reports.

Source: [3GPP TS 36.300, Section 5]

> Therefore, LTE provides a contention-free scheduling-request mechanism on the PUCCH, where each terminal in the cell is given reserved [sic] resource on which it can transmit a request for uplink resources. The contention-free resource is represented by a PUCCH resource index as described earlier, occurring at every n:th subframe.

Source: Dahlman et al., 3G EVOLUTION HSPA AND LTE FOR MOBILE BROADBAND, SECOND EDITION, p. 404

LTE specifies several formats for the PUCCH according to the different types of information that the PUCCH can carry. PUCCH format 1 is used to transmit information regarding scheduling requests in which one or more terminals may request uplink resources ("services") from the AT&T base station or eNodeB (i.e., the "primary station"). PUCCH format 1 is used to transmit, among other things, scheduling requests. These scheduling requests are transmitted in respective allocated time slots at every nth sub-frame as mentioned above and more particularly described below.

> The PUCCH shall be mapped to a control channel resource in the uplink. A control channel resource is defined by a code and two resource blocks, consecutive in time, with hopping at the slot boundary.

Source: [3GPP TS 36.300, §5.2.3]

Uplink control information (UCI) in subframe n shall be transmitted
- on PUCCH using format 1/1a/1b ...
. . .
The following combinations of uplink control information on PUCCH are supported:
. . .
- Scheduling request (SR) using PUCCH format 1
...

The scheduling request (SR) shall be transmitted on the PUCCH resource $n_{\mathrm{PUCCH}}^{(1)} = n_{\mathrm{PUCCH,SRI}}^{(1)}$ as defined in [3], where $n_{\mathrm{PUCCH,SRI}}^{(1)}$ is UE specific and configured by higher layers. The SR configuration for SR transmission periodicity and subframe offset is defined by SR configuration index I_{SR} in Table 10.1-5.
SR transmission instances are the subframes satisfying $(10 \times n_f + \lfloor n_s/2 \rfloor - N_{OFFSET,SR}) \bmod SR_{Periodicity} = 0$, where n_f is the system frame number, and n_s = {0,1,..., 19} is the slot index within the frame, and $N_{OFFSET,SR}$ is the SR subframe offset defined in Table 10.1-5 and $SR_{Periodicity}$ is the SR periodicity defined in Table 10.1-5.

Source: 3GPP TS 36.213, §10.1

The block of complex-valued symbols $z(i)$ shall be multiplied with the amplitude scaling factor β_{PUCCH} in order to conform to the transmit power P_{PUCCH} specified in Section 5.1.2.1 in [4], and mapped in sequence starting with $z(0)$ to resource elements. PUCCH uses one resource block in each of the two slots in a subframe. Within the physical resource block used for transmission, the mapping of $z(i)$ to resource elements (k,l) not used for transmission of reference signals shall be in increasing order of first k, then l and finally the slot number, starting with the first slot in the subframe.

The physical resource blocks to be used for transmission of PUCCH in slot n_s is given by

$$n_{\mathrm{PRB}} = \begin{cases} \left\lfloor \frac{m}{2} \right\rfloor & \text{if } (m + n_s \bmod 2) \bmod 2 = 0 \\ N_{\mathrm{RB}}^{\mathrm{UL}} - 1 - \left\lfloor \frac{m}{2} \right\rfloor & \text{if } (m + n_s \bmod 2) \bmod 2 = 1 \end{cases}$$

where the variable m depends on the PUCCH format. For formats 1, 1a and 1b
..
Mapping of modulation symbols for the physical uplink control channel is illustrated in Figure 5.4.3-1.
In case of simultaneous transmission of sounding reference signal and PUCCH format 1, 1a or 1b, one SC-FDMA symbol on PUCCH shall punctured.

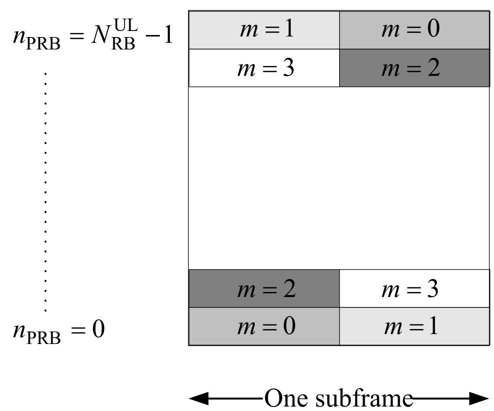


Figure 5.4.3-1: Mapping to physical resource blocks for PUCCH.

Source: 3GPP TS 36.211, Section 5.4.3

43. If after transmitting a scheduling request on the PUCCH a terminal does not receive a grant for UL-SCH resources ("an acknowledgement") from the AT&T base station, eNodeB, the secondary station re-transmits the scheduling request in consecutive allocated time slots until it receives such a grant.

44. At least one mobile device or UE ("secondary station") will transmit the scheduling request in two consecutive time slots in the assigned subframe ("allocated time slots"). The secondary station repeats the transmission of the scheduling request ("re-transmitting the same respective request") until it receives a scheduling grant. The secondary station retransmits without waiting for an acknowledgement. Section 10.1 shows that the SR is transmitted in assigned subframes.

10.1 UE procedure for determining physical uplink control channel assignment

Uplink control information (UCI) in subframe n shall be transmitted

- on PUCCH using format 1/1a/1b or 2/2a/2b if the UE is not transmitting on PUSCH in subframe n

...

The following combinations of uplink control information on PUCCH are supported:

...

- Scheduling request (SR) using PUCCH format 1

...

The scheduling request (SR) shall be transmitted on the PUCCH resource $n^{(1)}_{PUCCH} = n^{(1)}_{PUCCH,SRI}$ as defined in [3], where $n^{(1)}_{PUCCH,SRI}$ is UE specific and configured by higher layers. The SR configuration for SR transmission periodicity and subframe offset is defined by SR configuration index I_{SR} in Table 10.1-5.

SR transmission instances are the subframes satisfying $(10 \times n_f + \lfloor n_s / 2 \rfloor - N_{OFFSET,SR}) \bmod SR_{Periodicity} = 0$, where n_f is the system frame number, and $n_s = \{0,1,\ldots,19\}$ is the slot index within the frame, and $N_{OFFSET,SR}$ is the SR subframe offset defined in Table 10.1-5 and $SR_{Periodicity}$ is the SR periodicity defined in Table 10.1-5.

(3GPP TS 36.213 V8.8.0 (2009-09), pages 68-72, [REF 3])

45. Section 5.4.3 shows that the SR is transmitted in two sequential time slots ("the same request for services in consecutive allocated time slots"). The PUCCH transmission occurs in the second slot of the subframe regardless of ("without waiting for") the UE ("secondary station") receiving a grant ("re-transmitting the same request for services in consecutive allocated time slots without waiting for an acknowledgement until said acknowledgment is received").

5.4.3 Mapping to physical resources

The block of complex-valued symbols $z(i)$ shall be multiplied with the amplitude scaling factor β_{PUCCH} in order to conform to the transmit power P_{PUCCH} specified in Section 5.1.2.1 in [4], and mapped in sequence starting with $z(0)$ to resource elements. PUCCH uses one resource block in each of the two slots in a subframe. Within the physical resource block used for transmission, the mapping of $z(i)$ to resource elements (k,l) not used for transmission of reference signals shall be in increasing order of first k, then l and finally the slot number, starting with the first slot in the subframe.

. . .

Mapping of modulation symbols for the physical uplink control channel is illustrated in Figure 5.4.3-1.

In case of simultaneous transmission of sounding reference signal and PUCCH format 1, 1a or 1b, one SC-FDMA symbol on PUCCH shall punctured.

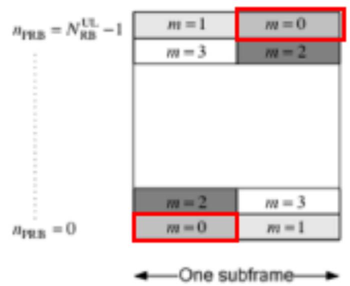


Figure 5.4.3-1: Mapping to physical resource blocks for PUCCH.

(3GPP TS 36.211 V8.9.0 (2009-12), pages 20-21, [REF 4])

46. If a sufficient amount of PUCCH energy is detected by the AT&T base station (eNodeB), the eNodeB will identify it as a scheduling request from the corresponding terminal. Hence, the eNodeB determines whether a scheduling request has been transmitted by determining whether the signal strength of the scheduling request exceeds a threshold value.

If a sufficient amount of PUCCH energy is detected by the AT&T base station (eNodeB), the eNodeB will identify it as a scheduling request from the corresponding terminal. Hence, the eNodeB determines whether a scheduling request has been transmitted by determining whether the signal strength of the scheduling request exceeds a threshold value.

For PUCCH format 1, information is carried by the presence/absence of transmission of PUCCH from the UE. In the remainder of this section, $d(0) = 1$ shall be assumed for PUCCH format 1.
[3GPP TS 36.211, §5.4.1]

Scheduling requests are used to request resources for uplink data transmission. Obviously, a scheduling request should be transmitted when the terminal is requesting resources, otherwise the terminal should be silent to save battery resources and not create unnecessary interference. Hence, unlike hybrid-ARQ acknowledgements, no explicit information bit is transmitted by the scheduling request; the information is instead conveyed by the presence (or absence) of energy on the corresponding PUCCH.

Source: Dahlman et al., 3G EVOLUTION HSPA AND LTE FOR MOBILE BROADBAND, SECOND EDITION, p. 400.

47. AT&T has infringed, and continues to infringe, at least claim 17 of the '079 patent in the United States, by making, using, offering for sale, selling and/or importing the Accused Infringing Devices in violation of 35 U.S.C. § 271(a).

48. AT&T also has infringed, and continues to infringe, at least claim 17 of the '079 patent by actively inducing others to use, offer for sale, and sell the Accused Infringing Devices. AT&T's users, customers, agents or other third parties who use those devices in accordance with AT&T's instructions infringe claim 17 of the '079 patent, in violation of 35 U.S.C. § 271(a). AT&T intentionally instructs customers to infringe through training videos, demonstrations, brochures and user guides, such as those located at: www.att.com; forums.att.com; www.att.com/esupport; https://www.att.com/devices/att/velocity-usb-stick.html; https://www.att.com/devicehowto/index.html#!/?make=ATT&model=VelocityMF923; https://www.att.com/buy/connected-devices-and-more; https://www.att.com/shop/wireless/connected-car/ford/ford-models.html; https://www.att.com/plans/connected-car/vlt.html. AT&T is thereby liable for infringement of the '079 patent under 35 U.S.C. § 271(b).

49. AT&T also has infringed, and continues to infringe, at least claim 17 of the '079 patent by offering to commercially distribute, commercially distributing, or importing the Accused Infringing Devices which devices are used in practicing the processes, or using the systems, of the '079 patent, and constitute a material part of the invention. AT&T knows portions of the Accused Infringing Devices to be especially made or especially adapted for use in infringement of the '079 patent, not a staple article, and not a commodity of commerce suitable for substantial noninfringing use. AT&T is thereby liable for infringement of the '079 Patent

under 35 U.S.C. § 271(c).

50. AT&T is on notice of its infringement of the ’079 patent by no later than the filing and service of this Complaint. By the time of trial, AT&T will have known and intended (since receiving such notice) that its continued actions would actively induce and contribute to the infringement of at least claim 17 of the ’079 patent.

51. Upon information and belief, AT&T may have infringed and continues to infringe the ’079 patent through other software and devices utilizing the same or reasonably similar functionality, including other versions of the Accused Infringing Devices.

52. AT&T’s acts of direct and indirect infringement have caused and continue to cause damage to Uniloc and Uniloc is entitled to recover damages sustained as a result of AT&T’s wrongful acts in an amount subject to proof at trial.

COUNT III: INFRINGEMENT OF U.S. PATENT NO. 7,167,487

53. The allegations of paragraphs 1-10 of this Complaint are incorporated by reference as though fully set forth herein.

54. The ’487 patent titled, “Network With Logic Channels And Transport Channels,” issued on January 23, 2007. A copy of the ’487 patent is attached as Exhibit C.

55. Pursuant to 35 U.S.C. § 282, the ’487 patent is presumed valid.

56. The Accused Infringing Devices include a network, base stations and related devices (UE) operating on the network using logical channels and support channels. In particular, AT&T operates a network and makes, uses, offers for sale, and/or sells in the United States and imports into the United States a network, base stations, electronic devices that operate on that network in compliance with HSUPA/HSUPA+ standardized in UMTS 3GPP Release 6 and above, such as, the AT&T Velocity USB stick and other devices supporting HSPA/HSPA+

(collectively the "Accused Infringing Devices").

57. Upon information and belief, the Accused Infringing Devices infringe at least claim 1 of the '487 patent in the exemplary manner described below. The UMTS 3GPP Release 6 and above standard provides a mapping of logical channels to transport channels.

5.3.1.1.2 Mapping between logical channels and transport channels

5.3.1.1.2.2 Mapping in Downlink

The mappings as seen from the UE and UTRAN sides are shown in Figure 4 and Figure 5 respectively.

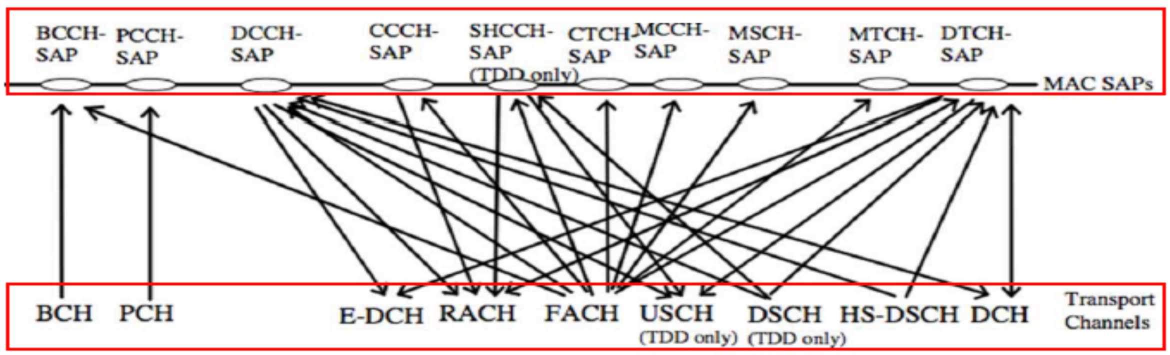


Figure 4: Logical channels mapped onto transport channels, seen from the UE side

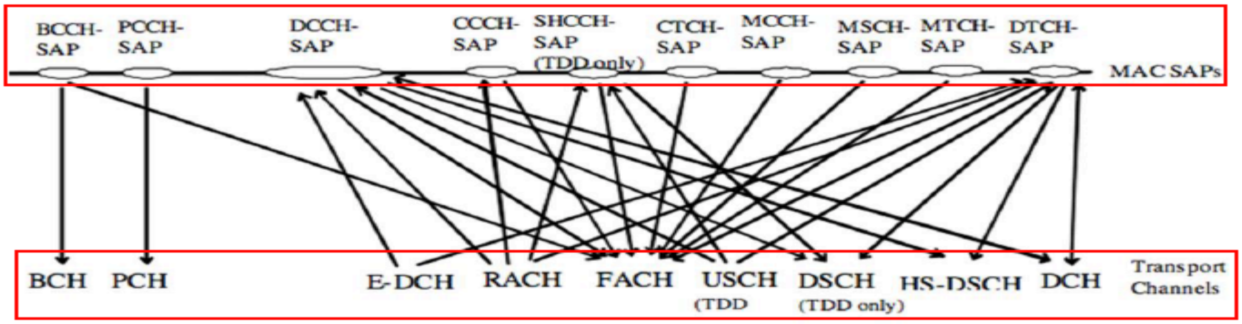


Figure 5: Logical channels mapped onto transport channels, seen from the UTRAN side

Source: 3GPP TS 25.301 V6.6.0 (2008-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Interface Protocol Architecture, http://www.3gpp.org/ftp/Specs/html-info/25301.htm, Page 16-17.

58. The Accused Infringing Devices are designed for transmitting transport blocks formed from packet units of the logic channels. For example, the Accused Infringing Devices include a medium access control (MAC) layer that receives upper layer protocol data units (PDUs) (i.e., "packet units"), on logical channels and multiplexes the upper layer PDUs into transport blocks. As such the transport blocks are formed from the packet units (PDUs). As shown below, the logical channels come from the upper layer into the MAC and are output on the transport channels for transmission.

5.3.1.2 MAC functions

The functions of MAC include:

...

- **Multiplexing/demultiplexing of upper layer PDUs into/from transport blocks delivered to/from the physical layer on common transport channels**. MAC should support service multiplexing for common transport channels, since the physical layer does not support multiplexing of these channels.
- **Multiplexing/demultiplexing of upper layer PDUs into/from transport block sets delivered to/from the physical layer on dedicated transport channels**. The MAC allows service multiplexing for dedicated transport channels. This function can be utilised when several upper layer services (e.g. RLC instances) can be mapped efficiently on the same transport channel. In this case the identification of multiplexing is contained in the MAC protocol control information.

Source: 3GPP TS 25.301 V6.6.0 (2008-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Interface Protocol Architecture, http://www.3gpp.org/ftp/Specs/html-info/25301.htm, Page 18.

4.2.3 Traffic Related Architecture - UE Side

Figure 4.2.3.1 illustrates the connectivity of MAC entities.

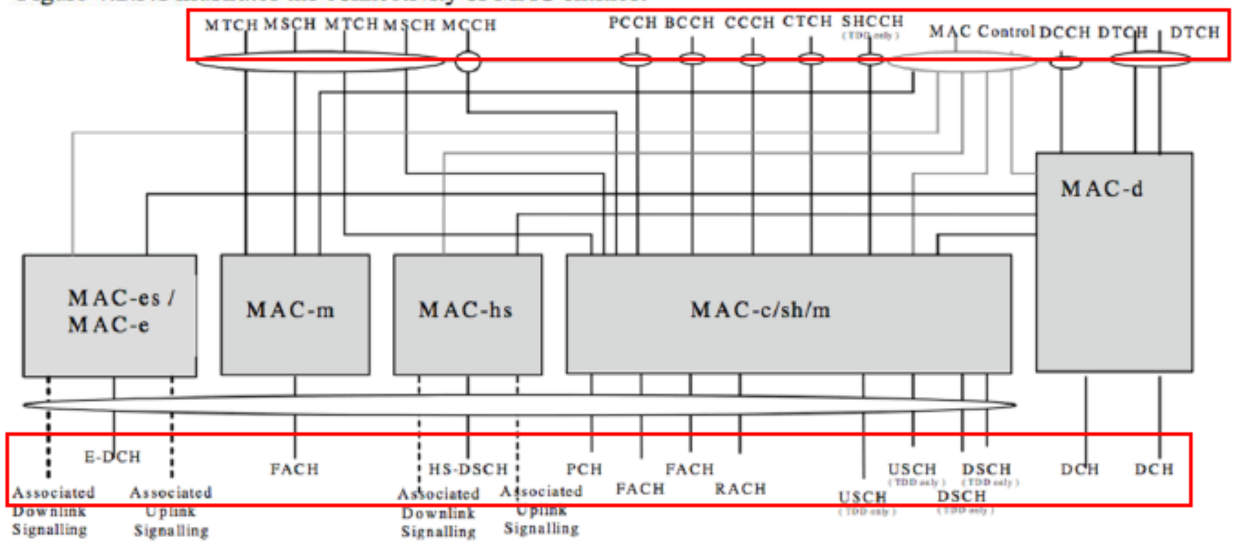


Figure 4.2.3.1: UE side MAC architecture

Source: 3GPP TS 25.321 V6.18.0 (2009-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Medium Access Control (MAC) protocol specification, http://www.3gpp.org/ftp/Specs/html-info/25321.htm, Page 12.

59. A number of valid transport format combinations are allocated to the transport channels. For example, the network signals devices operating on the network (UE), which transport format combinations (TFCs) they can use for the transport channels (i.e., "valid transport format combinations"). For the dedicated channel (DCH) transport channel, UE are configured to use a transport format combination set (TFCS). For the enhanced DCH (E-DCH) transport channel, a UE is configured to use a table of enhanced TFCs (E-TFCs). The network configures a UE to limit the number of TFCs/E-TFCs used (i.e., the "number of valid transport format combinations"), so that a fixed number of bits are sent by the UE to indicate the selected TFC/E-TFC. For example, 128 E-TFCs are included in each E-TFC table, so that the EU only uses 7 bits to signal the selected E-TFC. As shown below, a UE is configured to use a table of E-TFCs/E-TFCIs ("valid") for the E-DCH transport channel and are configured to use a set of TFCs, TFCs, ("valid") for the DCH transport channel. The E-DCH uses a 7-bit indicator (128

values) to indicate the selected E-TFC (E-TFCI) for the E-DCH.

11.8.1.4 E-TFC Selection

...

The transmission format and data allocation shall follow the requirements below:

- Only E-TFCs from the configured E-TFCS shall be considered for the transmission;

Source: 3GPP TS 25.321 V6.18.0 (2009-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Medium Access Control (MAC) protocol specification, http://www.3gpp.org/ftp/Specs/html-info/25321.htm, Page 78-79.

10.3.6.99 E-DPDCH Info

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
E-TFCI table index	MP		Integer (0..1)	Indicates which standardised E-TFCI TB size table shall be used	REL-6
E-DCH minimum set E-TFCI	MD		Integer (0..127)	See [15]; Absence means no E-DCH minimum set	REL-6
Reference E-TFCIs	MP	1 to 8		See [29]	REL-6
>Reference E-TFCI	MP		Integer (0..127)		REL-6
>Reference E-TFCI PO	MP		Integer (0..29)	Refer to quantization of the power offset in [28]	REL-6

Source: 3GPP TS 25.331 V6.26.0 (2011-12) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Resource Control (RRC); Protocol Specification, http://www.3gpp.org/ftp/Specs/html-info/25331.htm, Page 647.

10.3.5.13 TFCS Explicit Configuration

Information Element/Group name	Need	Multi	IE type and reference	Semantics description
CHOICE *TFCS representation*	MP			
>Complete reconfiguration				
>>TFCS complete reconfiguration information	MP		TFCS Reconfiguration/Addition information 10.3.5.15	
>Addition				
>>TFCS addition information	MP		TFCS Reconfiguration/Addition information 10.3.5.15	
>Removal				
>>TFCS removal information	MP		TFCS Removal Information 10.3.5.16	
>Replace				
>>TFCS removal information	MP		TFCS Removal Information 10.3.5.16	
>>TFCS addition information	MP		TFCS Reconfiguration/Addition information 10.3.5.15	

Source: 3GPP TS 25.331 V6.26.0 (2011-12) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Resource Control (RRC); Protocol Specification, http://www.3gpp.org/ftp/Specs/html-info/25331.htm, Page 577.

- *E-TFCI*, the E-DCH transport format combination indicator of 7 bits indicating the transport format being transmitted simultaneously on E-DPDCHs. In essence, the E-TFCI tells the receiver the transport block size coded on the E-DPDCH. From this information the receiver can derive how many E-DPDCHs are transmitted in parallel and what spreading factor is used.

Source: Harri Holma, Antti Toskala (2006), *HSDPA/HSUPA for UMTS High Speed Radio Access for Mobile Communications*, John Wiley & Sons, LTD.

60. The combinations indicate the transport blocks designed for transmission for each transport channel. For example, each TFC (i.e., "combination") of the E-TFCs defines one or more transport blocks designed for transmission over each transport channel. An E-TFC defines a unique transport block size, having associated physical layer parameters, which are applied to one or more transport blocks (i.e., "indicate the transport blocks designed for transmission for

each transport channel”). To illustrate, each E-TFC is uniquely associated with a number of channelization codes and a spreading factor used at the physical layer for that transport block. For the claimed “combinations indicate the transport blocks designed for transmission for each transport channel,” the E-TFC defines the formatting or the “design” of the transport block at the physical layer (*i.e.,* “for transmission”). Annex B is one of the E-DCH transport block size tables. The selected E-TFC has a corresponding E-TFCI and transport block size. The selection of the E-TFC sets the format (i.e., “design”) for transport blocks sent on the E-DCH transport channel. The E-TFC/E-TFCI defines the physical layer processing of the E-DCH transport blocks.

Annex B (normative): E-DCH Transport Block Size Tables for FDD

The mapping between the chosen E-TFCI and the corresponding E-DCH transport block size is given in the following tables:

B.1 2ms TTI E-DCH Transport Block Size Table 0

E-TFCI	TB Size (bits)	E-TFCI	TB Size (bits)	E-TFCI	TB Size (bits)	E-TFCI	TB Size (bits)	E-TFCI	TB Size (bits)
0	18	30	342	60	1015	90	3008	120	8913
1	120	31	355	61	1053	91	3119	121	9241
2	124	32	368	62	1091	92	3234	122	9582

. . .

Source: 3GPP TS 25.321 V6.18.0 (2009-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Medium Access Control (MAC) protocol specification, http://www.3gpp.org/ftp/Specs/html-info/25321.htm, Page 86.

10.2.3. E-TFC Selection

The E-TFC selection is responsible for selecting the transport format of the E-DCH, thereby determining the data rate to be used for uplink transmission, and to control MAC-e multiplexing. Clearly, the selection needs to take the scheduling

Source: Erik Dahlman, et al (2008), *3G Evolution HSPA and LTE for Mobile Broadband*. Elsevier Ltd.

- *E-TFCI*, the E-DCH transport format combination indicator of 7 bits indicating the transport format being transmitted simultaneously on E-DPDCHs. In essence, the E-TFCI tells the receiver the transport block size coded on the E-DPDCH. From this information the receiver can derive how many E-DPDCHs are transmitted in parallel and what spreading factor is used.

Source: Harri Holma, Antti Toskala (2006), *HSDPA/HSUPA for UMTS High Speed Radio Access for Mobile Communications*, John Wiley & Sons, LTD.

61. A selection algorithm is provided for selecting the transport format combinations and the selection of the transport format combinations is carried out while taking into account a minimum bit rate criterial applicable to the respective logic channel. For example, uses an E-TFC selection algorithm (i.e., "algorithm provided for selecting…") to select E-TFCs (i.e., "transport format combinations"). The logical channels have respective QoS criteria, including a Guaranteed bit rate (GBR) (i.e., "minimum bit rate"). The Accused Infringing Device is provided a non-scheduled grant for the logical channel to meet the GBR (i.e., "a minimum bit rate obtaining for the respective logical channel"). The non-scheduled grant for the GBR service is used by the Accused Infringing Device to select the E-TFC (i.e., "the selection of the transport format combinations is carried out while taking into account a minimum bit rate"). As shown below, a UE uses the non-scheduled grants in the E-TFC selection (i.e., "selection of the transport format combinations") to achieve the guaranteed bit rate for logical channels ("minimum bit rate obtaining for respective logical channel"). The non-scheduled grants are used for the E-TFC selection (i.e., "selection of the transport format combinations"). The guaranteed bitrate is the number of bits delivered within a period of time divided by the duration of the time period ("minimum bit rate"). Additionally, the guaranteed bitrate ("minimum bit rate") is part of the QoS profile for the radio bearer/logical channel.

11.1 General Principle

The QoS of ongoing flows mapped on E-DCH for a UE is maintained by the serving Node B and by the UE. The Node B controls the resources allocated to a UE versus other UEs by means of scheduling as specified in clause 9. The UE controls the QoS of all its logical channels mapped on E-DCH by means of E-TFC selection as specified in subclause 11.2, and by HARQ operation, specified in clause 8.

In addition to these mechanisms, guaranteed bit rate services for MAC-d flows are also supported through non-scheduled transmission. A flow using non-scheduled transmission is defined by the SRNC and provided in the UE and in the Node B. Details on non-scheduled transmission can be found in section 10.

Source: 3GPP TS 25.309 V6.6.0 (2006-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; FDD Enhanced Uplink; Overall description; Stage 2, http://www.3gpp.org/ftp/Specs/html-info/25309.htm, Page 27.

10 Non-scheduled transmissions

When non-scheduled transmission is configured by the SRNC, the UE is allowed to send E-DCH data at any time, up to a configured number of bits, without receiving any scheduling command from the Node B. Thus, signalling overhead and scheduling delay are minimized.

Typical examples of data that may use non-scheduled transmission are the SRBs and GBR services.

Source: 3GPP TS 25.309 V6.6.0 (2006-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; FDD Enhanced Uplink; Overall description; Stage 2, http://www.3gpp.org/ftp/Specs/html-info/25309.htm, Page 26.

The transmission format and data allocation shall follow the requirements below:

- Only E-TFCs from the configured E-TFCS shall be considered for the transmission;
- For all logical channels, if the logical channel belongs to a non-scheduled MAC-d flow, its data shall be considered as available up to the corresponding non-scheduled grant, if the logical channel does not belong to a non-scheduled MAC-d flow, its data shall be considered as available up to the Serving Grant;

. . .

- if the transmission contains any scheduled data, the size of the selected MAC-e PDU shall not exceed the total of:
  - all non-scheduled grants which are applicable for transmission in this TTI;

Source: 3GPP TS 25.321 V6.18.0 (2009-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Medium Access Control (MAC) protocol specification, http://www.3gpp.org/ftp/Specs/html-info/25321.htm, Page 79-80.

11.2 TFC and E-TFC selection

Logical channels mapped on the DCHs are always prioritised over those mapped on E-DCH.

The principle of the TFC selection across E-DCH and DCH is the following:

...

- E-TFC restriction is performed with the following characteristics;

...

- Among the supported E-TFCs, the UE selects the smallest E-TFC that maximises the transmission of data according to the non-scheduled grant(s) and the serving grant;

Source: 3GPP TS 25.309 V6.6.0 (2006-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; FDD Enhanced Uplink; Overall description; Stage 2, http://www.3gpp.org/ftp/Specs/html-info/25309.htm, Page 28-29.

Guaranteed bitrate (kbps)

Definition: guaranteed number of bits delivered by UMTS at a SAP within a period of time (provided that there is data to deliver), divided by the duration of the period. The traffic is conformant with the guaranteed bitrate as long as it follows a token bucket algorithm where token rate equals Guaranteed bitrate and bucket size equals Maximum SDU size.

The conformance definition should not be interpreted as a required implementation algorithm. The token bucket algorithm is described in annex B.

UMTS bearer service attributes, e.g. delay and reliability attributes, are guaranteed for traffic up to the Guaranteed bitrate. For the traffic exceeding the Guaranteed bitrate the UMTS bearer service attributes are not guaranteed.

[Purpose: Describes the bitrate the UMTS bearer service shall guarantee to the user or application. Guaranteed bitrate may be used to facilitate admission control based on available resources, and for resource allocation within UMTS.]

Source: 3GPP TS 23.107 V6.4.0 (2006-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Quality of Service (QoS) concept and architecture, http://www.3gpp.org/ftp/Specs/html-info/23107.htm, Page 18.

6.4.3.3 UMTS bearer attributes: summary

In table 2, the defined UMTS bearer attributes and their relevancy for each bearer traffic class are summarised. Observe that traffic class is an attribute itself.

Table 2: UMTS bearer attributes defined for each bearer traffic class

Traffic class	Conversational class	Streaming class	Interactive class	Background class
Maximum bitrate	X	X	X	X
Delivery order	X	X	X	X
Maximum SDU size	X	X	X	X
SDU format information	X	X		
SDU error ratio	X	X	X	X
Residual bit error ratio	X	X	X	X
Delivery of erroneous SDUs	X	X	X	X
Transfer delay	X	X		
Guaranteed bit rate	X	X		
Traffic handling priority			X	
Allocation/Retention priority	X	X	X	X
Source statistics descriptor	X	X		
Signalling indication			X	

Source: 3GPP TS 23.107 V6.4.0 (2006-03) Technical Specification 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Quality of Service (QoS) concept and architecture, http://www.3gpp.org/ftp/Specs/html-info/23107.htm, Page 22.

62. AT&T has infringed, and continues to infringe, at least claim 1 of the '487 patent in the United States, by making, using, offering for sale, selling and/or importing the Accused Infringing Devices in violation of 35 U.S.C. § 271(a).

63. AT&T also has infringed, and continues to infringe, at least claim 1 of the '487 patent by actively inducing others to use the Accused Infringing Devices. AT&T's users, customers, agents or other third parties who use wireless devices (e.g., smartphones, tablets, hotspots, etc.) with the Accused Infringing Devices in accordance with AT&T's instructions infringe claim 1 of the '487 patent, in violation of 35 U.S.C. § 271(a). AT&T intentionally instructs its customers to infringe through support information, demonstrations, brochures and user guides, such as those located at: www.att.com; forums.att.com; www.att.com/esupport; https://www.att.com/devices/att/velocity-usb-stick.html; https://www.att.com/devicehowto/index.html#!/?make=ATT&model=VelocityMF923. AT&T is

thereby liable for infringement of the ’487 patent under 35 U.S.C. § 271(b).

64. AT&T also has infringed, and continues to infringe, at least claim 1 of the ’487 patent by offering to commercially distribute, commercially distributing, or operating the Accused Infringing Devices which are used in practicing the processes, or using the systems, of the ’487 patent, and constitute a material part of the invention. AT&T knows portions of the Accused Infringing Devices to be especially made or especially adapted for use in infringement of the ’487 patent, not a staple article, and not a commodity of commerce suitable for substantial noninfringing use. AT&T is thereby liable for infringement of the ’487 Patent under 35 U.S.C. § 271(c).

65. AT&T is on notice of its infringement of the ’487 patent by no later than the filing and service of this Complaint and by virtue of a previously filed case against AT&T concerning the ’487 patent. By the time of trial, AT&T will have known and intended (since receiving such notice) that its continued actions would actively induce and contribute to the infringement of at least claim 1 of the ’487 patent.

66. Upon information and belief, AT&T may have infringed and continues to infringe the ’487 patent through other network technology utilizing the same or reasonably similar functionality, including other versions of the Accused Infringing Devices.

67. AT&T’s acts of direct and indirect infringement have caused and continue to cause damage to Uniloc and Uniloc is entitled to recover damages sustained as a result of AT&T’s wrongful acts in an amount subject to proof at trial.

PRAYER FOR RELIEF

WHEREFORE, Uniloc 2017 LLC prays for the following relief:

A. A judgment that AT&T has infringed one or more claims of the ’917 patent literally and/or under the doctrine of equivalents directly and/or indirectly by inducing infringement and/or by contributory infringement;

B. A judgment that AT&T has infringed one or more claims of the ’079 patent literally and/or under the doctrine of equivalents directly and/or indirectly by inducing infringement and/or by contributory infringement;

C. A judgment that AT&T has infringed one or more claims of the ’487 patent literally and/or under the doctrine of equivalents directly and/or indirectly by inducing infringement and/or by contributory infringement;

D. That for each Asserted Patent this Court judges infringed by AT&T this Court award Uniloc its damages pursuant to 35 U.S.C. § 284 and any royalties determined to be appropriate;

E. That this be determined to be an exceptional case under 35 U.S.C. § 285 and that Uniloc be awarded enhanced damages up to treble damages for willful infringement as provided by 35 U.S.C. § 284;

F. That this Court award Uniloc prejudgment and post-judgment interest on its damages;

G. That Uniloc be granted its reasonable attorneys’ fees in this action;

H. That this Court award Uniloc its costs; and

I. That this Court award Uniloc such other and further relief as the Court deems proper.

DEMAND FOR JURY TRIAL

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

Date: March 26, 2019

/s/ M. Elizabeth Day
M. Elizabeth Day

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