ETSI TS 125 446 V13.1.0 (2016-05)

Universal Mobile Telecommunications System (UMTS);
MBMS synchronisation protocol (SYNC)
(3GPP TS 25.446 version 13.1.0 Release 13)

3GPP
A GLOBAL INITIATIVE

Reference
RTS/TSGR-0325446vd10

Keywords
UMTS

ETSI

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Contents

Foreword

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1 Scope

The present document specifies the MBMS Synchronisation Protocol. For the release of this specification it is used on Iu towards UTRAN and M1 towards E-UTRAN.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
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[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 25.410: "UTRAN Iu interface: General Aspects and Principles".

[3] 3GPP TS 25.323: "Packet Data Convergence Protocol (PDCP) specification".

[4] 3GPP TS 25.346: "Introduction of the Multimedia Broadcast Multicast Service (MBMS) in the Radio Access Network (RAN); Stage 2".

[5] 3GPP TS 36.440: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); General aspects and principles for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN".

[6] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

RAN Access interface: interface between the Core Network and the Radio Access Network.

RAN Access node: termination point of the RAN Access interface at the Radio Access Network.

MBMS RAB: denotes the Radio Access data bearer together with the RAN Access Interface data bearer for MBMS service user data transmission.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

MRNC	MBMS Master RNC (as specified in TS 25.346 [4])
SC-PTM	Single Cell – Point To Multipoint

SYNC MBMS synchronisation protocol

3.4 Specification notations

For the purposes of the present document, the following notations apply:

Procedure When referring to a procedure in the specification the Procedure Name is written with the first letters in each word in upper case characters followed by the word "procedure", e.g. Iu Rate Control procedure.

Frame When referring to a control or data frame in the specification, the CONTROL/DATA FRAME NAME is written with all letters in upper case characters followed by the words "control/data frame", e.g. TIME ALIGNMENT control frame.

IE When referring to an information element (IE) in the specification the *Information Element Name* is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. *Frame Number* IE.

Value of an IE When referring to the value of an information element (IE) in the specification the "Value" is written as it is specified in subclause 5.6.3 enclosed by quotation marks, e.g. "0" or "255".

4 General

4.1 General aspects for the SYNC protocol for UTRAN

4.1.1 General aspects

The MBMS Synchronisation protocol (SYNC) is located in the User plane of the Radio Network layer over the Iu interface: the Iu UP protocol layer.

The SYNC protocol for UTRAN is used to convey user data associated to MBMS Radio Access Bearers.

One SYNC protocol instance is associated to one MBMS RAB and one MBMS RAB only. If several MBMS RABs are established towards one given UE, then these MBMS RABs make use of several SYNC protocol instances.

SYNC protocol instances exist at Iu access point as defined (TS 25.410 [2]) i.e. at CN and UTRAN.

Whenever an MBMS RAB requires transfer of user data in the Iu UP, an Iu UP protocol instance exists at each Iu interface access points. These Iu UP protocol instances are established and released together with the associated MBMS RAB.

The following figure illustrates the logical placement of the SYNC protocol layer and the placement of the Data Streams sources outside of the Access Stratum.

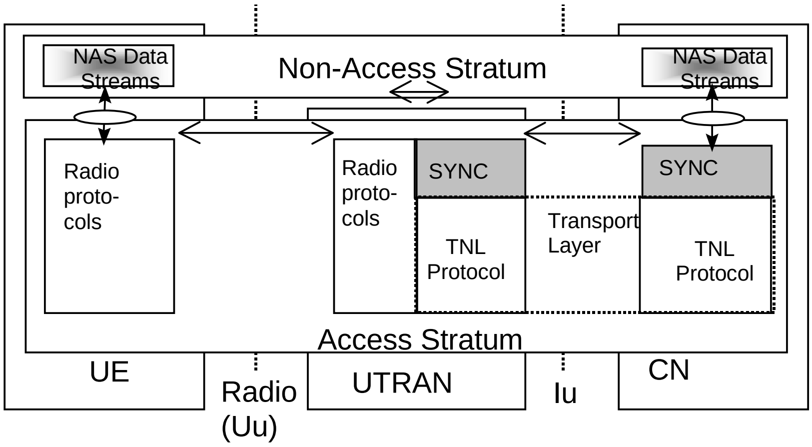

Figure 4.1.1-1: SYNC protocol layer occurrence in UTRAN overall architecture (User Plane View)

4.2 General aspects for the SYNC protocol for E-UTRAN

4.2.1 General aspects

The MBMS Synchronisation protocol (SYNC) is located in the User plane of the Radio Network layer over the M1 interface: the M1 UP protocol layer.

The SYNC protocol for E-UTRAN is used to convey user data associated to MBMS Radio Access Bearers.

One SYNC protocol instance is associated to one MBMS E-RAB and one MBMS E-RAB only.

SYNC protocol instances exist at M1 access point as defined (TS 36.440 [5]) i.e. at EPC and E-UTRAN.

Whenever an MBMS E-RAB requires transfer of user data in the M1 UP, an M1 UP protocol instance exists at each M1 interface access points. These M1 UP protocol instances are established and released together with the associated MBMS E-RAB.

The following figure illustrates the logical placement of the SYNC protocol layer and the placement of the Data Streams sources outside of the Access Stratum.

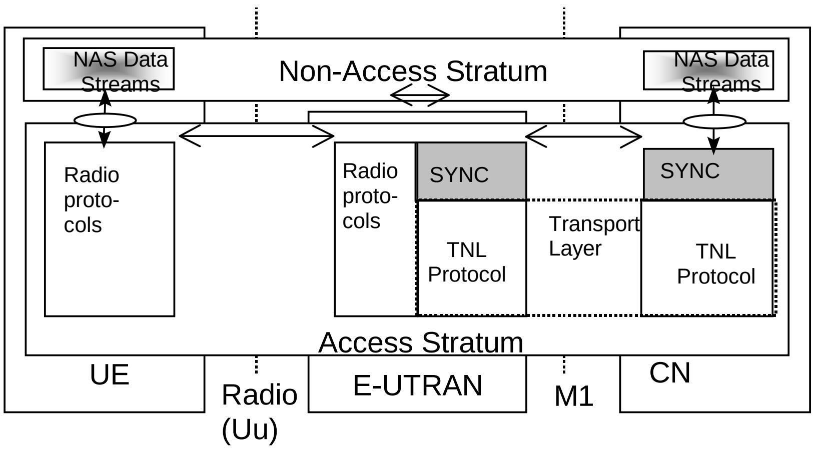

Figure 4.2.1-1: SYNC protocol layer occurrence in E-UTRAN overall architecture (User Plane View)

5 SYNC protocol version 1

5.1 General

5.1.1 Applicablity of SYNC protocol version 1

This version of the specification specifies the SYNC protocol for UTRAN and E-UTRAN. It is on top of TNL in Iu (UTRAN) and M1 (E-UTRAN) user plane, i.e. Iu userplane TNL transports SYNC protocol PDUs over the Iu interface, M1 userplane TNL transports SYNC protocol PDUs over the M1 interface.

As a specification convention, within this specification, the interface between the Core Network and the Radio Access Network is denoted as the 'RAN Access Interface', the termination point at the Radio Access Network is denoted as 'RAN Access Node', the termination point at the Core Network is denoted as 'Core Network' (CN). Further, 'MBMS RAB' denotes the Radio Access data bearer together with the RAN Access Interface data bearer for MBMS service user data transmission.

For the application of the SYNC protocol to UTRAN, the RAN Access Interface is the Iu interface, the RAN Access Node is the RNC.

For the application of the SYNC protocol to E-UTRAN, the RAN Access Interface is the M1 interface, the RAN Access Node is the eNB.

5.1.1 Operation of the SYNC protocol

The SYNC protocol layer is present for data streams that originate in the CN and carry additional information within a specific userplane-frame.

The two strata communicate through a Service Access Point for Non Access Stratum (NAS) Data Streams transfer.

5.1.2 Interfaces of the SYNC protocol layer

As part of the Access Stratum responsibility, the SYNC protocol layer provides the services and functions that are necessary to handle non access stratum data streams for MBMS. The SYNC protocol layer is providing these services to the UP upper layers through a Dedicated Service Access Point used for Information Transfer.

The SYNC protocol layer is using services of the Transport layers in order to transfer user plane PDUs over the RAN Access interface.

5.2 SYNC protocol layer services

The following functions are needed to support the SYNC protocol:

- Transfer of user data along with synchronisation information;
- Transfer of synchronisation information without user data.

5.3 Services Expected from the UP Data Transport layer

The SYNC protocol layer expects the following services from the Transport Network Layer:

- Transfer of user data.
- No flow control.