

ETSI TS 124 250 V14.1.0 (2018-01)



**LTE;
Protocol for Reliable Data Service between UE and SCEF;
Stage 3
(3GPP TS 24.250 version 14.1.0 Release 14)**



ReferenceRTS/TSGC-0124250ve10

Keywords

LTE

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2018.

All rights reserved.

DECT™, PLUGTESTS™, UMTS™ and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

3GPP™ and LTE™ are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M logo is protected for the benefit of its Members.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	5
1 Scope	6
2 References	6
3 Definitions and abbreviations.....	6
3.1 Definitions	6
3.2 Abbreviations	6
4 Overview	6
4.1 General	6
4.2 Reference Model	7
4.3 Description of RDS protocol	7
4.3.1 Protocol functions	7
4.3.2 Acknowledged operation	8
4.3.3 Unacknowledged operation	8
5 Frame structure and format of fields	8
5.1 General	8
5.2 Address and Control field.....	8
5.2.1 Address and Control field format	8
5.2.2 Protocol Discriminator bit (PD).....	10
5.2.3 Address bit (ADS)	10
5.2.4 Source port number (Source Port)	10
5.2.5 Destination port number (Destination Port)	10
5.2.6 Information transfer frame - I	11
5.2.7 Supervisory frame - S	11
5.2.8 Unconfirmed Information frame - UI	11
5.2.9 Unnumbered frame - U	11
5.2.10 Command / Response bit (C/R).....	11
5.3 Control field parameters and associated state variables	11
5.3.1 Acknowledgement request bit (A)	11
5.3.2 Acknowledged operation variables and parameters.....	12
5.3.2.1 Send state variable V(S).....	12
5.3.2.2 Acknowledge state variable V(A)	12
5.3.2.3 Send sequence number N(S)	12
5.3.2.4 Receive state variable V(R).....	12
5.3.2.5 Receive sequence number N(R)	12
5.3.2.6 Selective Acknowledgement (SACK) bitmap R(n)	12
5.4 Commands and responses	12
5.4.1 General.....	12
5.4.2 Unnumbered (U) frames	13
5.4.2.1 SET_ACK_MODE command.....	13
5.4.2.2 DISCONNECT command.....	13
5.4.2.3 ACCEPT response	13
5.4.2.4 ERROR command / response.....	13
5.4.2.5 SET_PARAMETERS command / response.....	14
5.4.3 Information (I) and Supervisory (S) frames.....	14
5.4.3.1 General	14
5.4.3.2 Selective Acknowledgement (SACK) command / response	14
6 Protocol procedures.....	15
6.1 Overview	15
6.2 Procedures	15

6.2.1	Types of RDS procedures	15
6.2.2	Establishment of acknowledged transfer procedure	15
6.2.2.1	General	15
6.2.2.2	Establishment of acknowledged transfer procedure initiation	15
6.2.2.3	Establishment of acknowledged transfer procedure accepted by receiver	16
6.2.2.4	Establishment of acknowledged transfer procedure completed by originator	16
6.2.2.5	Establishment of acknowledged transfer procedure not accepted by receiver	16
6.2.3	Acknowledged information transfer procedure	17
6.2.3.1	General	17
6.2.3.2	Transmitting I frames and requesting acknowledgements	17
6.2.3.3	Receiving I frames and sending acknowledgements	18
6.2.3.4	Receiving acknowledgements	18
6.2.4	Termination of acknowledged transfer procedure	19
6.2.4.1	General	19
6.2.4.2	Termination of acknowledged transfer procedure initiation	19
6.2.4.3	Termination of acknowledged transfer procedure accepted by receiver	19
6.2.4.4	Termination of acknowledged transfer procedure completed by originator	19
6.2.4.5	Termination of acknowledged transfer procedure not accepted by receiver	20
6.2.5	Unacknowledged information transfer procedure	20
6.2.5.1	General	20
6.2.5.2	Unacknowledged information transfer procedure initiation	20
6.2.5.3	Unacknowledged information transfer procedure accepted by receiver	20
6.2.5.4	Unacknowledged information transfer procedure completed by originator	20
6.2.5.5	Unacknowledged information transfer procedure not accepted by receiver	20
6.3	Abnormal cases	21
6.3.1	Expiry of timer T200	21
6.3.2	Expiry of timer T201	21
6.4	List of RDS Parameters	21
6.4.1	General	21
6.4.2	RDS version number (Version)	21
6.4.3	Retransmission timers (T200 and T201)	21
6.4.4	Maximum number of retransmissions (N200)	21
6.4.5	Maximum number of outstanding I frames (k)	21
6.4.6	Maximum length of Information Field (N201)	21
Annex A (informative):	Change history	22
History		23

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

ETSI STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/517fe6be-a1eb-4bd5-842f-2b0347238669/etsi-ts-124-250-v14.1.0-2018-01>

1 Scope

The present document specifies a Reliable Data Service (RDS) protocol between the UE and Service Capability Exposure Function (SCEF).

The present document defines the frame structure, format of fields and procedures for operation of the RDS protocol. RDS is mainly intended to be used for acknowledged data transfer, but it also supports unacknowledged data transfer.

The present document is applicable to the UE and to the SCEF in the Evolved Packet System (EPS).

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.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP 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 3GPP TR 21.905 [1].

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.682 [2] apply:

SCEF

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP 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 3GPP TR 21.905 [1].

RDS	Reliable Data Service
-----	-----------------------

4 Overview

4.1 General

The Reliable Data Service (RDS) protocol supports the following requirements:

- RDS supports peer-to-peer data transfers and shall provide reliable data delivery between the UE and the SCEF. The data is transferred via a PDN connection between the UE and SCEF.
- A UE can connect to multiple SCEFs. A UE can connect to multiple SCS/AS via the SCEF.
- RDS shall support multiple applications on the UE to simultaneously conduct data transfers with their peer entities on the SCEF using a single PDN connection between the UE and SCEF.
- RDS shall support both acknowledged and unacknowledged data transfers.
- RDS shall support variable-length frames and shall allow detection and elimination of duplicate frames at the receiving endpoint.

4.2 Reference Model

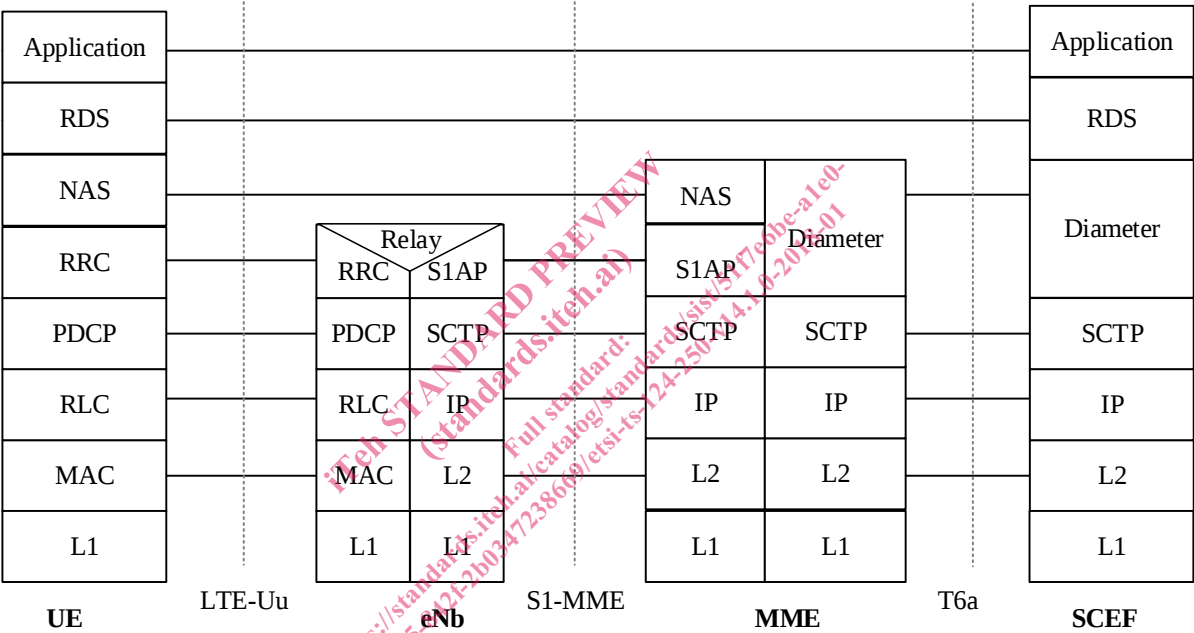


Figure 4.2-1: Protocol layering for reliable data transfer between UE and SCEF via E-UTRAN

The reference model showing the protocol layering for reliable data transfer between UE and SCEF is illustrated in figure 4.2-1. The RDS operates above the NAS and Diameter layers in the reference architecture.

4.3 Description of RDS protocol

4.3.1 Protocol functions

RDS establishes a peer-to-peer logical link between the UE and SCEF. The logical link is identified by a pair of port numbers and EPS bearer ID. Each port number is used to identify an application on the UE side or SCEF side and is carried in the address field of each frame. The source port number identifies the application on the originator and the destination port number identifies the application on the receiver. When a single application on the originator conducts data transfer with a single application on the receiver, the source port number and destination port number need not be used. Each RDS frame shall consist of a header and an information field of variable length. The header shall contain information about port numbers and the frame number that is used to identify the frame and provide reliable transmission. The information field contains the payload to be transferred between the UE and SCEF.

The UE establishes a PDN connection with the SCEF either during Attach or through UE requested PDN connectivity. The UE shall use the EPS bearer ID to select the bearer to transfer RDS PDUs to the SCEF. The EPS bearer ID identifies the destination (at the UE or SCEF) and is not carried in the frame as it is already included in the NAS ESM

message header. Once the UE and network successfully negotiate to use RDS for a particular PDN connection, the PDN connection shall transfer data only using RDS protocol.

RDS shall support both single and multiple applications within the UE. RDS shall provide functionality for flow control and sequence control to maintain the sequential order of frames across the logical link.

4.3.2 Acknowledged operation

In acknowledged operation the information is transmitted in order in numbered Information (I) frames. The I frames are acknowledged at the RDS layer. Error recovery and reordering mechanisms based on retransmission of acknowledged I frames are specified. Several I frames can be acknowledged at the same time. Flow control is implemented via a sliding window mechanism.

The procedure for establishment of acknowledged transfer is described in clause 6.

4.3.3 Unacknowledged operation

In unacknowledged operation the information is transmitted in numbered Unconfirmed Information (UI) frames. The UI frames are not acknowledged at the RDS layer. Error recovery and reordering mechanisms are not defined. Duplicate UI frames are discarded. Flow control procedures are not defined.

5 Frame structure and format of fields

5.1 General

The peer-to-peer transfers using RDS shall conform to the frame format as shown in figure 5.1-1. The frame header shall consist of the Address and Control field and is a minimum of 1 octet and a maximum of 3 octets long. The Information field is of variable length.

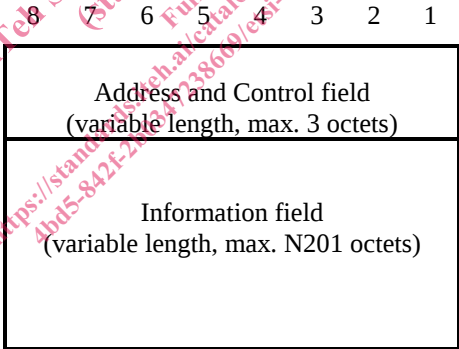


Figure 5.1-1: RDS frame format

5.2 Address and Control field

5.2.1 Address and Control field format

The Address and Control field identifies the type of frame and consists of minimum of 1 octet and maximum of 3 octets. The following types of control field frames are specified:

- confirmed information transfer (I frame);
- supervisory functions (S frame);
- unconfirmed information transfer (UI frame); and
- control functions (U frame).

The address and control field format for RDS is shown in figure 5.2.1-1. The description of address and control field bits is shown in Table 5.2.1-1.

Address and Control Field Bits									Octet
Format	8	7	6	5	4	3	2	1	
I Format	PD	0	A	X	ADS	N(S)			1
	N(R)			R1	R2	R3	S1	S2	2
	Source Port				Destination Port				3
S Format	PD	1	1	0	ADS	A	X	X	1
	N(R)			R1	R2	R3	S1	S2	2
	Source Port				Destination Port				3
UI Format	PD	1	0	X	ADS	N(U)			1
	Source Port				Destination Port				2
U Format	PD	1	1	1	ADS	CR	X	X	1
	X	X	X	X	M4	M3	M2	M1	2
	Source Port				Destination Port				3

Figure 5.2.1-1: Address and Control field format