

Internet Draft: Mapping Between MMS and Internet Mail  
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## Mapping Between the Multimedia Messaging Service (MMS) and Internet Mail

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### Abstract

The cellular telephone industry has defined a service known as the Multimedia Messaging Service (MMS). This service uses formats and protocols which are similar to, but differ in key ways from those used in Internet mail.

This document specifies how to exchange messages between these two services, including mapping information elements as used in MMS X-MMS-\* headers to and from that used in ESMT and Internet message headers.

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## [1](#) Introduction

### [1.1](#) Scope

This specification describes how to exchange messages with Internet mail systems. This includes translation between MMS (as defined by 3GPP/3GPP2/OMA) and Internet Mail messages using Extended Simple Mail Transfer Protocol [[SMTP](#)] and Internet mail format [[Msg-Fmt](#)].

The MMS architecture [[Stage 2](#)] and specifications [[Stage 3](#)] refer to interfaces as reference points named MMx. For example, MM1 is the client-server interface, MM4 is the server-server interface, and MM3 is an interface to "external" or non-MMS systems. The specification in this document be used on MMS reference point MM3 to exchange messages between MMS systems and any system which uses Internet Message formats and protocols.

Note that MM3 can also be used for interworking with "external" (non-MMS) systems other than SMTP-based, such as Short Messaging Service (SMS) and access to external mail stores (such as a voice mail system). This specification does not address these other uses or sub-interfaces of MM3; it is only concerned with Internet mail interworking and specifically exchange of messages.

All MM3 Stage 2 [[Stage\\_2](#)] functions are supported except for reply charging. Sender address hiding may be used but is not recommended without security assurances which are beyond the scope of this specification (see [Section 3](#)).

## **[1.2](#) Conventions Used in this Document**

The key words "REQUIRED", "MUST", "MUST NOT", "SHOULD", "SHOULD NOT", and "MAY" in this document are to be interpreted as described in "Key words for use in RFCs to Indicate Requirement Levels" [[KEYWORDS](#)].

## **[1.3](#) Assumptions**

It is assumed that the reader is already familiar with the contents of the 3GPP2 MMS Specification Overview [[Overview](#)], MMS Stage 1 (requirements) [[Stage\\_1](#)] and Stage 2 (architecture and abstract messages) [[Stage\\_2](#)], and 3GPP/3GPP2 Stage 3 (protocols) [[Stage\\_3](#)] documents. It is also assumed that the reader is familiar with Internet mail, especially [RFC 2821](#) [[SMTP](#)] and [RFC 2822](#) [[Msg-Fmt](#)].

## **[2](#) Mapping Between MMS and Internet Mail**

This section defines the interworking between MMS Relay/Servers and External Servers using native ESMTTP. That is, information elements are exchanged using standard Internet Message [[Msg-Fmt](#)] header fields and standard [[SMTP](#)] elements.

SMTP and Internet mail extensions are used for features such as delivery reports, message expiration, discovery of server support for optional features, etc.

### **[2.1](#) Mapping Specification**

#### **[2.1.1](#) Sending MMs**

When sending an MM to an external messaging system such an Internet mail system, the originator MMS Relay/Server SHOULD convert the MM if required.

The originator MMS Relay/Server SHOULD use the information elements associated with the MM to define the control information (Internet Message header fields and ESMTP values) needed for the transfer protocol. The originator MMS Relay/Server MAY also use the information elements associated with the MM to convey these within the converted message.

[Section 2.1.3](#) lists the mappings between X-MMS-\* headers and Internet Message header fields and ESMTP values.

Delivery and read report MMs SHOULD be converted to standard Internet Message report format (multipart/report) to the extent possible.

#### **[2.1.2](#) Receiving messages**

When receiving a message from an external messaging system the recipient MMS Relay/Server MAY convert incoming messages to the MM format used within the receiving system.

The recipient MMS Relay/Server MAY convert control information received from the External Server into appropriate information elements of an MM.

[Section 2.1.3](#) lists the mappings between X-MMS-\* headers and Internet Message header fields and ESMTP values.

Standard Internet Message report format (multipart/report) messages MAY be converted to delivery or read report MMS, as appropriate.

### 2.1.3 MMS Information Element Mappings

The mappings between MMS elements and ESMT/Internet Message elements are detailed below. The MMS Headers listed are from [OMA-MMS].

Information Elem	<a href="#">RFC 2821</a> Element	<a href="#">RFC 2822</a> Header	MMS Header
3GPP MMS Version	.....	x-mms-mms-version:	x-mms-version:
Message Type (of PDU)	N/A	N/A	x-mms-message-type:
Transaction ID	N/A	N/A	x-mms-transaction-id:
Message ID	ENVID [ <a href="#">DSN</a> ]	Message-ID:	Message-id:
Recipient address(es)	RCPT TO address(es)	To:, Cc:, or omitted (bcc)	To:, Cc:, Bcc:
Sender's address	MAIL FROM address if user-originated; MUST set MAIL FROM to null (" <a href="#">"&gt;&lt;&gt;</a> ") for all automatically-generated MMs	From: (MAY set to locally-generated value to hide sender identity in anonymous messages when receiving system does not support anonymous messages)	From:
Content type	.....	Content-Type:	Content-type:
Message class	Class=auto:	MAY set 'Prece	x-mms-message-

	MUST set MAIL   FROM to null   ("<>").	dence: bulk'   on class=auto	class:
Date and time	.....	Date:	Date:
Time of expiry	DELIVER-BY   [ <a href="#">Deliver-By</a> ]	.....	x-mms-expiry:
Earliest delivery time	AFTER [Future-   Deliv]	.....	x-mms-delivery   -time:

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Information Elem	<a href="#">RFC 2821</a> Element	<a href="#">RFC 2822</a> Header	MMS Header
Delivery report request	NOTIFY [ <a href="#">DSN</a> ]   SHOULD also   specify recip-   ient address as   ORCPT; SHOULD   also specify   ENVID	.....	x-mms-delivery   -report:
Importance	.....	X-Priority:   (MAY use   'Importance'   instead).	x-mms-   priority:
Sender visibility	X-ANONYMOUS (see   text below)	.....	x-mms-sender-   visibility:
Read reply request	.....	Disposition-   Notification   -To: [ <a href="#">MDN</a> ]	x-mms-read-   reply:
Reply-charging permission	(not currently   supported)	(not currently   supported)	x-mms-reply-   charging:
Reply-charging permission deadline	(not currently   supported)	(not currently   supported)	x-mms-reply-   charging-   deadline:
Reply-charging permission limitation	(not currently   supported)	(not currently   supported)	x-mms-reply-   charging-   size:

Reply-charging usage request	(not currently supported)	(not currently supported)	x-mms-reply- charging- id:
Reply-charging usage reference	(not currently supported)	(not currently supported)	x-mms-reply- charging:
Subject	.....	Subject:	Subject:
Forward counter	.....	Resent-Count:	(Not sup- ported)
Previously-sent- by	.....	Resent-From:	x-mms-previous ly-sent-by:

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Information Elem	<a href="#">RFC 2821</a> Element	<a href="#">RFC 2822</a> Header	MMS Header
Previously-sent- date and-time	.....	Resent-Date:	x-mms- previously- sent-date:
Hop/host trace	.....	Received:	(Not sup- ported)
Content	.....	<message body>	<message body>

#### **2.1.3.1 Conversion of messages from MMS to Internet format**

##### 3GPP MMS Version

The 'x-mms-mms-version:' header, if present, MAY be retained.

##### Message Type (of PDU)

The 'x-mms-message-type:' header, if present, SHOULD be removed.

##### Transaction ID

The 'x-mms-transaction-id:' header, if present, SHOULD be removed.

##### Message ID

The 'Message-ID:' header MUST be retained. If not present it MUST be created, with a unique value. The message ID SHOULD be transmitted in the SMTP envelope as the ENVID parameter, as specified in [[DSN](#)].

#### Recipient(s) address

The address of each recipient MUST be transmitted in the SMTP envelope as a RCPT TO value. All disclosed recipients SHOULD also appear in a 'To:' or 'Cc:' header. At least one 'To:' or 'Cc:' header MUST be present. If all recipients are undisclosed, a 'To:' header MAY be created that contains a comment, for example 'To: (undisclosed recipients)'. The 'To:' header SHOULD NOT appear more than once. The 'Cc:' header SHOULD NOT appear more than once.

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Each recipient address MUST obey the length restrictions per [[SMTP](#)] and [[Msg-Fmt](#)].

Current Internet message format requires that only 7-bit US-ASCII characters be present. Other characters (for example, non-7-bit characters in a phrase part of an address header) must be encoded according to [[Hdr-Enc](#)]. Note that it would be possible to define an SMTP extension to permit transmission of unencoded 8-bit characters, but in the absence of such an extension [[Hdr-Enc](#)] must be used.

#### Sender address

The address of the message sender SHOULD appear in the 'From:' header, unless address hiding has been requested. If address hiding has been requested, the 'From:' header MAY contain a comment to this effect, for example, 'From: (anonymous sender)'.

The address of the message sender for all user-generated messages ('X-Mms-Message-Class: personal') SHOULD be transmitted in the SMTP envelope as the MAIL FROM value unless address hiding has been requested and the receiving server is not known to support address hiding.

The 'From:' header and the MAIL FROM value MAY set to a locally-generated value to hide the sender identity in anonymous

messages when the receiving system does not support anonymous messages. Locally generated addressed MAY be internally mapped to the actual address to allow replies to anonymous messages, but such mapping is beyond the scope of this specification.

Because of the risk of mail loops, it is critical that the MAIL FROM be set to null ("<>") for all automatically-generated MMs ('X-Mms-Message-Class: auto'). The MAIL FROM value MUST be set to null for all automatically -generated messages.

Current Internet message format requires that only 7-bit US-ASCII characters be present. Other characters (for example, non-7-bit characters in a phrase part of an address header) must be encoded according to [[Hdr-Enc](#)]. Note that it would be possible to define an SMTP extension to permit transmission of unencoded 8-bit characters, but in the absence of such an extension [[Hdr-Enc](#)] must be used.

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The sender address MUST obey the length restrictions of [[SMTP](#)] and [[Msg-Fmt](#)].

#### Content type

The 'Content-Type:' header SHOULD be preserved. Content types not in widespread use in the Internet MAY be converted into those that are, when such conversion can be done without loss of content. For example, SMIL messages MAY be converted into widely-supported multipart/related with multipart/html.

#### Message class

The 'x-mms-message-class:' header SHOULD be removed. A 'Precedence: bulk' header MAY be inserted for class=auto. See 'Sender Address' above.

#### Time of Expiry

The 'x-mms - expiry:' header, if present, SHOULD be removed.

The remaining time until the message is considered expired SHOULD be

transmitted in the SMTP envelope by using the DELIVER-BY extension, as specified in [[Deliver-By](#)].

Note that the ESMTP DELIVER-BY extension carries remaining time until expiration; each server decrements the value by the amount of time it has possessed the message. The 'x-mms-expiry:' header may contain either the absolute time at which the message is considered expired or the relative time until the message SHOULD be expired.

Earliest delivery time

The 'x-mms-delivery-time:' header , if present, SHOULD be removed.

Messages SHOULD be retained at the original server until the earliest delivery time has been reached. On message submission, the client MAY indicate the remaining time until relay or delivery is permitted by using the AFTER extension as proposed in [draft-vaudreuil-futuredelivery-xx.txt](#).

Note that the ESMTP AFTER extension carries the amount of time that the original server is required to retain the message before it may be relayed or delivered. The 'x-mms-delivery-time:' header may contain either the absolute or relative time.

Delivery report request

Requests for delivery status notification (DSN) SHOULD be transmitted in the SMTP envelope by using the DSN extension as specified in [[DSN](#)] to request "success" or "none" notification (depending on the value of the 'x-mms-delivery-report' header). When the NOTIFY extension is used, the unaltered recipient address SHOULD be transmitted as the ORCPT value, and the original message ID SHOULD be transmitted as the ENVID value.

The 'x-mms-delivery-report:' header, if present, SHOULD be removed.

Importance

Message importance (also known as priority) SHOULD be transmitted using an 'X-Priority:' header.

Although not standardized, many email applications support the

'X-Priority:' header, and use an 'X-Priority' value of 3 for messages with "normal" priority. More important messages have lower values and less important message have higher values. In most cases, urgent messages have an X-Priority value of 1.

Suggested mappings for 'x-priority:' follow:

'X-Mms-Priority: High'	'X-Priority: 2 (high)'
'X-Mms-Priority: Normal	[omit]
'X-Mms-Priority: Low	'X-Priority: 4 (low)'

Normal priority messages SHOULD omit the 'X-Priority:' header.

Message importance MAY instead be transmitted using an 'Importance:' header with one of the values 'high', 'normal', or 'low'.

The 'x-mms-priority:' header, if present, SHOULD be removed.

#### Sender visibility

Requests for sender address hiding MAY be transmitted in the SMTP envelope by using the X-ANONYMOUS extension. The request is made by adding "X-ANONYMOUS" to the MAIL FROM command. Servers which support address hiding MAY advertise this by including X-ANONYMOUS in their EHLO response.

Note that even if servers claim to support address hiding, there is no technical guarantee that it will be properly honored; servers MUST not trust other servers to support this without a basis which is beyond the scope of this specification (such as business relationships).

The 'x-mms-sender-visibility:' header, if present, SHOULD be removed.

#### Read reply request

A request for a read reply SHOULD be transmitted using a 'Disposition-Notification-To:' header as specified in [[MDN](#)].

The 'x-mms-read-reply:' header, if present, SHOULD be removed.

## Reply-charging

Reply charging permission and acceptance are complex issues requiring both user agent and server support. Misapplied reply charging may cause incorrect billing. Until the security issues have been properly addressed, reply charging SHOULD NOT be honored when using this interface.

The 'x-mms-reply-charging:', 'x-mms-reply-charging-deadline:', 'x-mms-reply-charging-size:', and 'x-mms-reply-charging-id:' headers MAY be removed. Messages containing a reply-charging usage request ('x-mms-reply-charging-id:' and 'x-mms-reply-charging: accepted' or 'x-mms-reply-charging: accepted (text only)' headers) SHOULD be rejected.

## Subject

The 'Subject:' header MUST be preserved. Current Internet message format requires that only 7-bit US-ASCII characters be present. Other characters must be encoded according to [[Hdr-Enc](#)]. Note that it would be possible to define an SMTP extension to permit transmission of unencoded 8-bit characters, but in the absence of such an extension [[Hdr-Enc](#)] must be used.

## Resending/Forwarding

In Internet mail, there are two primary ways of sending a previously received message to a new recipient: forwarding and resending. Forwarding is when a user creates a new message containing the original message, either simply embedded within the text, or delineated. Embedded messages generally have each original line preceded by a quote symbol ('>'), surround the original text with a preceding and trailing line which starts with hyphens as per [[Encap](#)], such as '--- begin forwarded text' and '--- end forwarded text', or encapsulate the original message as a 'message/rfc822' content type, perhaps within a 'multipart/mixed' message. (This last method offers more robust delineation.) Resending is when the

original message is unaltered except for the possible addition of 'resent-' headers to explain the resending to the new recipient.

A message may be resent more than once; each time new 'resent-' headers SHOULD be added at the top of the message. Thus, if more than one series of 'resent-' headers are present, the original series is the last; the most recent is the first.

#### Forward counter

The 'Resent-Count:' header MAY be used to track the number of times the message has been resent. Note that loop control is often done by counting 'Received' headers, which are more general than 'resent-' headers.

#### Previously-sent Information

A 'Resent-From:' header MAY be added to indicate the address of the user who directed the message to be resent.

A 'Resent-Date:' header SHOULD be added to indicate the time and date that the message was resent.

Any 'x-mms-previously-sent-by:' and 'x-mms-previously-sent-date' headers, if present, SHOULD be removed. The information contained in them SHOULD be translated into 'from:', 'resent-to:', 'resent-from:', 'resent-date:', and 'resent-count:' headers. The original sender of the message SHOULD appear in the 'from:' header; the original recipient(s) SHOULD appear in the 'to:' header; the time and date the message was originally sent SHOULD appear in the 'date:' header. The most recent sender SHOULD appear in the top-most 'resent-from:' header; the most recent recipient(s) SHOULD appear in the top-most 'resent-to:' header; the time and date the message was most recently sent MUST appear in the top-most 'resent-date:' header.

#### 'Received:' Headers

Each system that processes a message SHOULD add a 'Received:' header as per [\[SMTP\]](#). A message MAY be rejected if the number of 'Received:' headers exceeds a locally-defined maximum, which MUST conform to [\[SMTP\] section 6.2](#).

## Content

The message content appears in the message body. Note that Internet message format requires that line-endings be encoded as CR LF, thus charset encodings that do not have this property cannot be used in text/\* body parts. (They MAY be used in other body parts, but only when they are suitable encoded or when binary transmission has been negotiated.) In particular, MMS allows UTF-16, while Internet message format does not. UTF-16 encoding MUST be transcoded to UTF-8 or another charset and encoding which is suitable for use in Internet message format/protocols.

### **2.1.3.2 Conversion of messages from Internet to MMS format**

#### 3GPP MMS Version

An 'x-mms-mms-version:' header SHOULD be added.

#### Message Type (of PDU)

An 'x-mms-message-type:' header SHOULD be used in accordance with the specific MMS interface (e.g., MM1, MM4).

#### Transaction ID

An 'x-mms-transaction-id:' header SHOULD be used in accordance with the specific MMS interface (e.g., MM1, MM4).

#### Message ID

The 'Message-ID:' header MUST be retained. If not present it MUST be created, with a unique value. If the 'Message-ID:' header does not exist, but the SMTP envelop contains an ENVID value (as specified in [[DSN](#)]), it MAY be used as the message ID.

#### Recipient(s) address

'To:' and 'Cc:' headers MUST be retained.

Each recipient contained in the SMTP envelope (RCPT TO values) MUST be considered a recipient of the message. Recipients who appear in address headers but not the SMTP envelope MUST be ignored. Recipients are processed in accordance with the MMS interface (e.g., MM1, MM4).

#### Sender address

The 'From:' header MUST be retained.

If address hiding has been requested, the 'From:' header MAY contain a comment to this effect, for example, 'From: (anonymous sender)'.

#### Content type

The 'Content-Type:' header SHOULD be preserved.

#### Message class

An X-Mms-Message-Class: personal' header SHOULD be created for all received messages with a non-null return path (MAIL FROM value in the SMTP envelope). An X-Mms-Message-Class: auto' header MAY be created for messages with a null return path.

#### Time of Expiry

An 'x-mms - expiry:' header SHOULD be created if the message contains a relative time to expiration in the DELIVER-BY extension, as specified in [[Deliver-By](#)].

#### Earliest delivery time

An 'x-mms-delivery-time:' header SHOULD NOT be created. If a message arrives via ESMTP relay containing an earliest time of delivery in the AFTER extension, it SHOULD be rejected. If a message is submitted via Message Submission [[Submission](#)] containing an earliest time of delivery in the AFTER extension, it MUST either be retained until the delivery time arrives, or rejected. It MUST NOT be delivered or further relayed prior to the delivery time.

An 'x-mms-delivery-report:' header SHOULD be created for messages which request 'success' or 'none' delivery status notification by use of the DSN extension as specified in [[DSN](#)]. Requests for 'delay' notifications or non-default actions, such as that only the message headers should be returned, cannot be mapped onto MMS headers and thus SHOULD be ignored.

#### Priority

An 'x-priority:' or 'importance:' header, if present, SHOULD be replaced with an 'x-mms-priority:' header. Suggested mappings:

'X-Priority: 1 (highest)'	'X-Mms-Priority: High'
'X-Priority: 2 (high)'	'X-Mms-Priority: High'
'X-Priority: 3 (normal)'	[omitted]
'X-Priority: 4 (low)'	'X-Mms-Priority: Low'
'X-Priority: 5 (lowest)'	'X-Mms-Priority: Low'

Normal priority messages SHOULD omit the 'X-Mms-Priority:' header.

#### Sender visibility

Requests for sender address hiding may be received in the SMTP envelope by the X-ANONYMOUS extension. Servers which support address hiding MAY advertise this by including X-ANONYMOUS in their EHLO response. A message received which includes X-ANONYMOUS in the MAIL FROM command has requested address hiding.

Note that even if servers claim to support address hiding, there is no technical guarantee that it will be properly honored; servers SHOULD NOT trust other servers to support this without a basis which is beyond the scope of this specification (such as business relationships).

Requests for sender address hiding MAY be reflected in the created MM by adding an 'x-mms-sender-visibility:' header.

#### Read reply request

A request for a read reply contained in a 'Disposition-Notification-To:' header as specified in [[MDN](#)] SHOULD be replaced with an 'x-mms-read-reply:' header.

## Subject

The 'Subject:' header MUST be preserved.

## Resending/Forwarding

One or more sets of 'resent-' headers, if present, SHOULD be mapped to 'to:', 'from:', 'date:', and 'x-mms-previously-sent-' headers.

## 'Received:' Headers

Each system that processes a message SHOULD add a 'Received:' header as per [[SMTP](#)]. A message MAY be rejected if the number of 'Received:' headers exceeds a locally-defined maximum, which MUST be no less than 100.

## Content

The message content appears in the message body.

### **2.1.4 Report Conversion**

Standard Internet Message systems use the multipart/report MIME type for delivery and disposition (read) reports. Delivery reports are specified in [[DSN](#)]. Message disposition reports, which include read reports, are specified in [[MDN](#)].

When creating delivery or disposition reports from MMS reports, the MMS report MAY be parsed to determine the reported event and time, status, and the headers of the referenced (original) message. These elements, once determined, are used to populate the subparts of the delivery or disposition report. The first subpart is of type text/plain, and contains a human-readable explanation of the event. This text MAY include a statement that the report was synthesized based on an MMS report. The second subpart is of type report/delivery-status (for delivery reports) or report/disposition-notification (for disposition reports). This second part contains a structured itemization of the event. The third subpart is of type message/rfc822 and includes the headers and optionally the body of the referenced (original) message.

### **2.1.5 Message Delivery**

Within Internet mail, when ESMTP is used and delivery reports are requested, delivery is considered to be acceptance of a message by the final server, that is, the server closest to the recipient. When an MMS Relay/Server receives a message using ESMTP and a delivery report is requested, the MMS Relay/Server MAY consider the message delivered when it has been sent to the MMS User Agent.

## **3 Security Considerations**

Data contained within messages SHOULD NOT be automatically trusted. Even within a carrier's network, and certainly within the Internet, various deliberate and accidental attacks or corruptions are possible. For example, routers may contain vulnerabilities which may be exploited, IP traffic be intercepted and/or modified, etc. Systems such as MMS and Internet Mail are thus potentially vulnerable to a wide range of attacks, including misidentification of message sources, unauthorized disclosure of message contents, unauthorized disclosure of message sender or recipient, alteration of message recipient or content, etc.

Since MMS does not include a clear separation between in-transit envelope and message content, there are increased risks of unauthorized disclosure of routing information, and additional challenges in protecting data. Some MMS features contain inherently more risk than others. For example, reply charging and sender address hiding. The reply charging mechanism requires a high degree of trust between entities with little technical basis. Deliberate or accidental abuse of this trust can result in unexpected or unauthorized charges. For example, a sender may be charged for unauthorized replies, or a sender may be charged for a reply which the author thought would be paid for the recipient. A sender's identity may be disclosed in violation of a request for this to be blocked. The identity of recipients may be disclosed to other recipients (or even non-recipients) for a message in which the sender intended for the recipients not to be disclosed.

Mechanisms can be developed to protect against various threats, however, these are not included in this version of this specification. It is recommended that features such as reply charging and sender identity hiding not be used across carrier domains, and be used within carrier domains only with full understanding of the risks involved.

#### 4 Normative References

OMA:

OMA specifications are available at the OMA web site  
<<http://www.openmobilealliance.org>>.

[OMA-MMS] OMA-WAP-MMS-ENC-v1\_1-20020823

3GPP2 and 3GPP:

3GPP2 specifications are available at the 3GPP2 (Third  
Generation Partnership Project 2) web site  
<<http://www.3gpp2.org>>.

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Partnership Project) web site <<http://www.3gpp.org>>

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