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# System Requirements for Unstructured Supplementary Services Data

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**REVISION HISTORY**

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<b>REVISION HISTORY</b>		
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## **FOREWORD**

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This standard was prepared by Third Generation Partnership Project 2 (3GPP2) TSG-S.

This foreword is not part of this document.

## 1   **1   SCOPE**

2   This document describes support for Unstructured Supplementary Services  
3   Data (USSD) in cdma2000<sup>®1</sup> circuit-switched systems.

### 4   **1.1       Document Conventions**

5   “Shall” and “shall not” identify requirements to be followed strictly to conform  
6   to this document and from which no deviation is permitted. “Should” and  
7   “should not” indicate that one of several possibilities is recommended as  
8   particularly suitable, without mentioning or excluding others, that a certain  
9   course of action is preferred but not necessarily required, or that (in the  
10   negative form) a certain possibility or course of action is discouraged but not  
11   prohibited. “May” and “need not” indicate a course of action permissible within  
12   the limits of the document. “Can” and “cannot” are used for statements of  
13   possibility and capability, whether material, physical or causal.

14

## 15   **2       REFERENCES**

### 16   **Informative References**

17   The following documents do not contain provisions of the specification. They  
18   are listed to aid in better understanding this specification.

19

20           [1] 3GPP TS 22.090, *USSD Stage 1*

21           [2] 3GPP TS 29.002, *Mobile Application Part (MAP) specification*

22           [3] 3GPP TS 23.038, *Alphabets and Language Specific Information*

23

## 24   **3       INTRODUCTION**

25       USSD is a mechanism to provide basic data services to devices with  
26       simple user interface capabilities and low data rates that has previously  
27       been implemented in GSM systems [1]. This specification describes an  
28       adaptation to cdma2000 systems that are compatible with GSM USSD  
29       servers.

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<sup>1</sup> cdma2000<sup>®</sup> is the trademark for the technical nomenclature for certain specifications and standards of the Organizational Partners (OPs) of 3GPP2. Geographically (and as of the date of publication), cdma2000<sup>®</sup> is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States.

## 1 4 DEFINITIONS AND ABBREVIATIONS

2

Term	Definition
GSM	Global System for Mobility
DBM	Data Burst Message
kbps	kilo-bits per second
MAP	Mobile Application Part
MMI	Man-Machine Interface
MS	Mobile Station
SMS	Short Message Service
UA	User Agent
USSD	Unstructured Supplementary Services Data

3

## 4 5 GENERAL FEATURE DESCRIPTION

### 5 5.1 Description

6 Unstructured Supplementary Data Services offer a simple but broad  
 7 category of mobile data services, without use of Internet Protocol on the  
 8 MS, making it available on basic mobile devices with limited multimedia  
 9 and protocol support.

10 There are two modes of USSD:

#### 11 (a) Man-Machine Interface (MMI) mode

12 In MMI-mode USSD-enabled MS transports user-entered character  
 13 strings to the network; or the MS displays to the user character  
 14 strings generated by a network entity. This provides a simple,  
 15 interactive, text-based user interface.

#### 16 (b) Application mode

17 In application mode USSD allows the transport of data between a  
 18 network entity and a User Agent (UA) entity within the Mobile Station  
 19 (MS). This UA entity is something other than a simple display of  
 20 received text. For example, for network generated Application Mode  
 21 USSD communication, the data may not represent a legible string of  
 22 characters but may be an application-specific message; hence it is not  
 23 to be written on the MS's display.

1 USSD is generally characterized by short transmissions of small  
2 amounts of data, not requiring a high data rate (less than 1 kbps is  
3 typically sufficient). Hence a radio transmission mechanism such as the  
4 Data Burst Message (DBM) in cdma2000 is sufficient to support this type  
5 of communication.

6 Note that the data rate of 1 kbps is meant to convey an order of  
7 magnitude, not a precise or absolute limit; higher data rates are  
8 permissible. Considering the small payloads expected in USSD, a data  
9 rate of this order of magnitude is sufficient to provide acceptable  
10 performance.

## 11 **5.2 Use Cases and Example Services**

12 There are numerous examples of usage of USSD to provide a variety of  
13 telecommunication services and applications. Some illustrative examples  
14 are briefly described here. Potential for new types of services and  
15 applications is significant.

- 16 • Account Balance: Getting information for the balance of a prepaid  
17 phone. The balance can be requested by the user or can be sent to  
18 the user, e.g., if it falls below a certain amount. A similar  
19 application would be to obtain bank balance, or confirmation of a  
20 banking or credit card transaction (e.g., on an account shared with  
21 a minor);
- 22 • Election Results: Voting results can be viewed and voting statistics  
23 obtained on mobile phones during vote counting in an election. It  
24 can be provided real time, and elaborated for different regions of a  
25 country.
- 26 • Location-Specific Data: Tourists can obtain information that varies  
27 depending on their location. This can be particularly useful in  
28 cases of many visitors, e.g. during large sporting events. A service  
29 such as this was implemented during 2008 Summer Olympics in  
30 Beijing, China. Tourists can use a USSD application to get  
31 coupons for events in a visited location (Russian tourists can use  
32 such an application when visiting Turkey).

- 1           • Parking Management System: Some European cities have  
2           deployed a parking management system using USSD. When using  
3           city street parking, the driver sends a message to a number  
4           displayed on street signs (numbers vary from parking zone to  
5           parking zone). The content of the message is the car license plate  
6           number. The reply confirms the parking ticket purchase and gives  
7           the expiry time, as well as charge information. Parking  
8           enforcement personnel have access to the database of all parked  
9           cars, and can check if parking is valid for any car parked on the  
10          street (e.g. by querying by license plate number from the database).  
11          The driver gets 5-minute warning on the mobile phone that  
12          parking ticket is about to expire, so he/she can extend it, or move  
13          the vehicle.

14          This last example is illustrative of potential intricacy of some USSD  
15          applications, as well as their value. In this case, the application involves  
16          not only sending a message (and the associated telephone company  
17          accounting), but also city accounting/transaction processing (a  
18          mCommerce transaction), maintaining of current database of parked  
19          cars and parking expiration times, triggering of the expiry messages, as  
20          well as a system of allowing the parking attendants to access the  
21          database remotely and perform queries, to name a few service  
22          components. Though the user experience is simple text messaging  
23          available on any phone, the associated USSD application has many  
24          valuable facets of a complex and useful service, but one that is much  
25          less complex to implement than installing parking meters and collecting  
26          coins.

27

## 1   **6    DETAILED REQUIREMENTS**

### 2   **6.1   Requirements Scope**

3       The intent of the requirements outlined is to describe features for a  
4       cdma2000 based communication system that supports USSD. This does  
5       not represent an imposition for network entities involved or MS to  
6       support such capabilities in a given product; nor is there an imposition  
7       of any deployment requirements on a network operator.

8

### 9   **6.2   System Requirements**

10       **USSD-01        Direction and Modes of Communication:** The system shall  
11       support two-way USSD capability for two different modes of  
12       communication between the MS and a USSD service entity:  
13       MMI mode (displayable character string) and application  
14       mode (not-to-be-displayed strings).

15       **USSD-02        Compatibility:** cdma2000 based USSD system shall  
16       interwork with existing USSD applications. They shall use  
17       USSD protocol messages, USSD message parameters and  
18       USSD error codes that are identical to or easily translated to  
19       or from the USSD protocol elements defined in GSM version  
20       of the service (see [1], [2], and [3]).

21       **USSD-03        Voice Service Simultaneity:** It shall be possible to conduct  
22       USSD communication while an MS is on a voice call. It shall  
23       be possible to conduct USSD communication when an MS is  
24       not on a voice call.

25       **USSD-04        Protocol Characteristics:** The USSD communication  
26       should employ a protocol with low signaling overhead.

27       **USSD-05        Roaming Ability:** USSD shall be supported while roaming if  
28       the roaming partner network supports USSD.

29       **USSD-06        Character Set Support:** USSD shall support comprehensive  
30       international character sets (see [3]). Any given  
31       implementation may be confined to a limited number of  
32       character sets (e.g., those relevant in geographic locality).  
33       There should be graceful handling by both the MS and the  
34       USSD application servers of any character set  
35       incompatibility.

36

1 **6.3 Radio Interface Requirements**

2 **USSD-07** **Radio Interface Impact:** USSD should reuse existing  
3 standardized radio interface capabilities of cdma2000  
4 networks (e.g., DBM).

5

6 **6.4 Mobile Station Requirements**

7 **USSD-08** **MS Design Impact:** It should be possible to implement  
8 USSD in a MS using minimal software-only modifications.

9 **USSD-09** **USSD Origination:** It shall be possible for a user to generate  
10 MMI mode USSD data (e.g., a character string) on a USSD-  
11 capable MS.

12 **USSD-10** **USSD Protocol:** The MS shall support the transmission,  
13 reception and handling of USSD messages.

14

15 **6.5 Network Requirements**

16 **USSD-11** **Network Impact:** Impact of USSD deployment in an  
17 existing network should be minimized by judicious choice of  
18 protocols and system solutions.

19

20 **6.6 Performance Goals and Requirements**

21 **USSD-12** **Message Latency:** Given adequate network capacity  
22 provisioning, USSD latency should be conducive to human  
23 interactive communication (e. g., comparable to Instant  
24 Messaging latency).

25