# WAP WTAI (GSM)

Version 08-Nov-1999

## Wireless Application Protocol
## Wireless Telephony Application Interface Specification

## GSM Specific Addendum

***Disclaimer:***

*This document is subject to change without notice.*

# Contents

# 1 Scope

Wireless Application Protocol (WAP) is a result of continuous work to define an industry wide specification for developing applications that operate over wireless communication networks. The scope for the WAP Forum is to define a set of specifications to be used by service applications. The wireless market is growing very quickly, and reaching new customers and services. To enable operators and manufacturers to meet the challenges in advanced services, differentiation and fast/flexible service creation WAP defines a set of protocols in transport, session and application layers. For additional information on the WAP architecture, refer to "*Wireless Application Protocol Architecture Specification"* [WAP].

This document is an addendum to the *Wireless Telephony Application Interface* (WTAI). While WTAI defines an API that is valid for all supported types of mobile networks, this document outlines functions that are specific to networks using GSM technology. In this specification, the following networks are supported: GSM, DCS1800 and PCS1900.

# 2 Document Status

This document is available online in the following formats:

- PDF format at http://www.wapforum.org/.

## 2.1 Copyright Notice



## 2.2 Errata

Known problems associated with this document are published at http://www.wapforum.org/

## 2.3 Comments

Comments regarding this document can be submitted to the WAP Forum in the manner published at http://www.wapforum.org/

# 3 References

The following section describes references relevant to this document.

## 3.1 Normative references

[RFC1630] "Uniform Resource Identifiers (URI)", T. Berners-Lee, et al., June 1994. URL: ftp://ds.internic.net/rfc/rfc1630.txt

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997. URL: ftp://ds.internic.net/rfc/rfc2119.txt

[WAP] "Wireless Application Protocol Architecture Specification", WAP Forum, 1998. URL: http://www.wapforum.org/

[WMLScript] "WMLScript Language Specification", WAP Forum, 1999. URL: http://www.wapforum.org/

[WTA] "Wireless Telephony Application Specification", WAP Forum, 1999. URL: http://www.wapforum.org/

[WTAI] "Wireless Telephony Application Interface Specification", WAP Forum, 1999. URL: http://www.wapforum.org/

# 4 Definitions and abbreviations

The following section describes definitions and abbreviations common to this document.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

## 4.1 Definitions

The following are terms and conventions used throughout this specification.

**WMLScript** - a scripting language used to program the mobile device. WMLScript is an extended subset of the JavaScript™ scripting language.

## 4.2 Abbreviations

For the purposes of this specification, the following abbreviations apply.

| | |
|---|---|
| **API** | Application Programming Interface |
| **DCS** | Digital Communications System |
| **GSM** | Global System for Mobile Communication |
| **PCS** | Personal Communications System |
| **RFC** | Request For Comments |
| **URI** | Uniform Resource Identifier [RFC1630] |
| **WAP** | Wireless Application Protocol [WAP] |
| **WTA** | Wireless Telephony Applications [WTA] |
| **WTAI** | Wireless Telephony Applications Interface [WTAI] |

# 5 GSM Specific Library

In addition to the WTAI functions defined in [WTAI], GSM networks also supports the functions specified in this chapter. Since GSM is the predecessor, the function library is named using that abbreviation.

## 5.1 Network Events

Table 1 specifies the GSM specific network events which may be handled by the active context.

**Table 1, GSM specific network events**

| *Event* | *Parameters* | *Description* |
|---|---|---|
| gsm/ru | USSD-String,<br>USSD-DataCodingScheme,<br>type,<br>id. | USSD message received from the network.<br><br><USSD-String> = String:<br>Contents of the incoming USSD string. This may include any of the USSD characters permitted by GSM 02.90. For type 3 messages, this parameter is null.<br><br><USSD-DataCodingScheme> = String:<br>Permitted values specified in GSM 02.90. For type 3 messages, this parameter is null.<br><br><type> = String:<br>0 = result to a ProcessUnstructuredSS-Request operation<br>1 = UnstructuredSS-Request operation<br>2 = UnstructuredSS-Notify operation<br>3 = error to a ProcessUnstructuredSS-Request operation<br><br><id> = String:<br>Transaction id of the incoming USSD message (specified in GSM 04.07 §11) |
| gsm/ch | id | Call Held indication. A call has been put on hold by a client application e.g. using the WTAI function "Call Hold".<br><id>:<br>The identity of the call put on hold. |
| gsm/ca | id | Call Active indication. A call has been activated by a client application e.g. using the WTAI function "Accept Call".<br><id>:<br>The identity of the activated call. |

## 5.2 Network Functions

The functions defined in this chapter follows the same function definition format as the one used in [WTAI]. Technical terms used in this chapter, e.g. events and error codes, are also explained in [WTAI].

**Name:** WTAGSM

**Library ID:** 518

**Description:** This library contains functions that are unique to GSM networks.

## 5.3 Call Reject

| **Description** | |
|---|---|
| Rejects an unanswered call. | |
| **URI:** | wtai://gsm/cr;<id> [! <result>] |
| **WMLScript:** | reject(id); |
| **Function ID:** | 0 |
| **Parameters:** | <id> = String:<br>The identity of the call to be rejected. |
| **Output:** | <result> = String:<br>The return value is the identity of the rejected call or a negative number in case of failure, the WTAI error code. |
| **Examples:** | URI: wtai://gsm/cr; 1<br>WMLScript: WTAGSM.reject ("1”); |
| **Associated Events:** | - |
| **Notes:** - | |

## 5.4 Call Hold

| **Description** | |
|---|---|
| Puts an answered call on hold. | |
| **URI:** | wtai://gsm/ch;<id> [! <result>] |
| **WMLScript:** | hold(id); |
| **Function ID:** | 1 |
| **Parameters:** | <id> = String:<br>The identity of the call to be put on hold. |
| **Output:** | <result> = String:<br>The return value is the identity of the held call or a negative number in case of failure, the WTAI error code. |
| **Examples:** | URI: wtai://gsm/ch; 1<br>WMLScript: WTAGSM.hold ("1”); |
| **Associated Events:** | - |
| **Notes:** The call can be retrieved using the *Accept Call* function (wtai://vc/ac) or released using the *Release Call* function (wtai://vc/rc). | |

## 5.5 Explicit Call Transfer

| **Description** | |
|---|---|
| Transfers an active call to another party. The function gives a user that has two calls to parties B and C, the calls identified by "Bid" and "Cid" respectively, the possibility to connect B and C and at the same time disconnect her self. Before transfer, the connection to party B must be estalished. The transfer can then take place after the connection to party C has been established or while party C is being informed of the call. | |
| **URI:** | wtai://gsm/ct; <Bid> ; <Cid> [! <result>] |
| **WMLScript:** | transfer(Bid, Cid); |
| **Function ID:** | 2 |
| **Parameters:** | <Bid> = String:<br>The identity of the call to party B and also the call to be transferred.<br><Cid> = String:<br>The identity of the call to party C, to whom party B should be connected. |
| **Output:** | <result> = String:<br>The return value is the identity of the transferred call or a negative number in case of failure, the WTAI error code. |
| **Examples:** | URI: wtai://gsm/ct; 1; 2<br>WMLScript: WTAGSM.transfer ("1" ,"2" ); |
| **Associated Events:** | - |
| **Notes:** - | |

## 5.6 Call Deflection

| **Description** | |
|---|---|
| Deflects an incoming, unanswered call to another party. The function gives a user the possibility to route an incoming call to another destination without answering the call. | |
| **URI:** | wtai://gsm/cd; <id> ; <dest> [! <result>] |
| **WMLScript:** | deflect(id, dest); |
| **Function ID:** | 7 |
| **Parameters:** | <id> = String:<br>The identity of the call to be deflected.<br><dest> = String:<br>The destination to where the call should be deflected (any valid phone number). |
| **Output:** | <result> = String:<br>The return value is the identity of the deflected call or a negative number in case of failure, the WTAI error code. |
| **Examples:** | URI: wtai://gsm/cd; 1;"+15551234"<br>WMLScript: WTAGSM.deflect ("1" ,"+15551234"); |
| **Associated Events:** | - |
| **Notes:** - | |

## 5.7 Join Multiparty

| **Description** | |
|---|---|
| This function is partly used for establishing a multiparty call, and partly for joining new parties to an existing multiparty.<br>Establish a multiparty: Joins an active call with a call on hold. A multiparty call (with a unique "id") is established.<br>Add new party: Joins an active call with a multiparty on hold.<br>How a call is put on hold is described in [WTAI]. | |
| **URI:** | wtai://gsm/jm [! <result>] |
| **WMLScript:** | Multiparty; |
| **Function ID:** | 3 |
| **Parameters:** | - |
| **Output:** | <result> = String:<br>The return value is the identity of the multiparty call or a negative number in case of failure, the WTAI error code. |
| **Examples:** | URI: wtai://gsm/jm<br>WMLScript: WTAGSM.multiparty; |
| **Associated Events:** | - |
| **Notes:** - | |

## 5.8 Retrieve from Multiparty

| **Description** | |
|---|---|
| Separates a certain party from a multiparty call for a private conversation. The rest of the multiparty is put on hold. | |
| **URI:** | wtai://gsm/rm;<id> [! <result>] |
| **WMLScript:** | retrieve("1"); |
| **Function ID:** | 4 |
| **Parameters:** | <id> = String:<br>The identity of the call to be retrieved from the multiparty. |
| **Output:** | <result> = String:<br>The return value is the identity of the retrieved call or in case of failure, a negative number and the WTAI error code. |
| **Examples:** | URI: wtai://gsm/rm;1<br>WMLScript: WTAGSM.retrieve ("1"); |
| **Associated Events:** | - |
| **Notes:** - | |

## 5.9 Provide location information

| **Description** | |
|---|---|
| This function is used to provide the current location information of the GSM terminal. This information uniquely identifies the GSM cell in which the user is located at invocation time. The user must explicitly acknowledge the operation. | |
| **URI:** | wtai://gsm/li [! <result>] |
| **WMLScript:** | location; |
| **Function ID** | 5 |
| **Parameters:** | - |
| **Output:** | <result> = String:<br><br>The return value is a string including the 8 octets of the GSM location information in hexadecimal representation as follows:<br><br>Octets 1 – 3 Mobile Country & Network Codes (MCC & MNC)<br><br>Octets 4 – 5 Location Area Code (LAC)<br><br>Octets 6 – 7 Cell Identity Value (Cell ID)<br><br>Octet 8 Timing Advance<br><br>The mobile country code (MCC), the mobile network code (MNC), the location area code (LAC), the cell ID and the Timing Advance are coded as in GSM 04.08.<br><br>In case of failure, the return value is a negative number and the WTAI error code. |
| **Examples:** | URI: wtai://gsm/li<br><br>WMLScript: WTAGSM.location; |
| **Associated Events:** | - |
| **Notes: -** | |

# 5.10 Send USSD

| **Description** | |
|---|---|
| This function is used to make the handset send a USSD message. The assumption of the WTA user-agent is that the SendUSSD command always succeeds. However, in case of failure an error code acording to Appendix B or [WTAI] Appendix B is returned. | |
| **URI:** | wtai://gsm/su ; <USSD-String> ; <USSD-DataCodingScheme> ; <type> ; <id> [! <result>] |
| **WMLScript:** | sendUSSD (USSD-String,USSD-DataCodingScheme,type,id); |
| **Function ID** | 6 |
| **Parameters:** | <USSD-String> = String:<br>Contents of the USSD string to send. This may include any of the USSD characters permitted by GSM 02.90.<br><br><USSD-DataCodingScheme> = String:<br>Permitted values specified in GSM 02.90.<br><br><type> = String:<br>0 = ProcessUnstructuredSS-Request operation<br>1 = result to a UnstructuredSS-Request operation<br>2 = result to a UnstructuredSS-Request operation to be followed by release of the USSD transaction (i.e. after sending the FACILITY message, the mobile must send a RELEASE COMPLETE message for the transaction id associated with the USSD message)<br><br><id> = String:<br>In the case where the sent USSD message is in response to a network initiated USSD message, i.e. a type 1 or 2 message, then this parameter takes the value of the transaction id of the corresponding network initiated USSD message. In case the sent USSD message is not in response to a network initiated USSD message, i.e. a type 0 message, then this parameter shall take the value –1. |
| **Output:** | <result> = String:<br>The return value is the transaction id (specified in GSM 04.07 §11) of the sent USSD message or a negative number in case of failure |
| **Examples:** | URI: wtai://gsm/su; *#157#<br>WMLScript: WTAGSM.sendUSSD("*#157#); |
| **Associated Events:** | gsm/ru, USSD message received |
| **Notes: -** | |

# Appendix A. WTAI URI and WMLScript Function Libraries

In the table below, the URI and WMLScript Function Libraries Calls valid for GSM networks are summarised. The arguments have been left out in order to increase readability. The figures in the column named "Lib/Func ID" denote the *Library* and *Function ID*s.

**Table 2 , URI's and WMLScript Functions**

| *Lib/Func ID* | *URI* | *WMLScript call* | *Description* |
|---|---|---|---|
| 518.0 | `wtai://gsm/cr` | `WTAGSM.reject` | Reject an incoming call |
| 518.1 | `wtai://gsm/ch` | `WTAGSM.hold` | Put a call on hold |
| 518.2 | `wtai://gsm/ct` | `WTAGSM.transfer` | Transfer an active call |
| 518.3 | `wtai://gsm/jm` | `WTAGSM.multiparty` | Join/create a multiparty call |
| 518.4 | `wtai://gsm/rm` | `WTAGSM.retrieve` | Retrieve a party from a multiparty call |
| 518.5 | `wtai://gsm/li` | `WTAGSM.location` | Get location information |
| 518.6 | `wtai://gsm/su` | `WTAGSM.sendUSSD` | Send a USSD message |
| 518.7 | `wtai://gsm/cd` | `WTAGSM.deflect` | Deflect an unanswered call |

# Appendix B. WTAI GSM predefined error codes

Functions in the WTAI function library may return a result code indicating the outcome of a function call. In most cases a positive integer indicates a successful outcome. WTAI defines a set of error codes, non-positive result codes, which can be returned by the WTAI functions. Note! Not all codes are used by all functions. Codes in the range -1 to -63 are reserved for WTA standard library functions. Network specific WTA must use codes in the range –64 to –127.

**Table 3, WTAI predefined error codes**

| Error code | Description |
|---|---|
| -64 | USSD dialogue in progress |
| -65 | Illegal characters |
| -66 to –128 | Reserved for other network specific error codes |

# Appendix C. Static Conformance Requirements

This static conformance clause defines a minimum set of features that should be implemented to ensure that WTA could interact with the mobile network. A feature can be optional or mandatory. Although a function is mandatory it may not work, e.g. if the corresponding feature it is not implemented in the mobile or in the network or if the user has no subscription for this feature.

## C.1 Client features

### C.1.1 Network Events

| Item | Function | Reference | Status |
|---|---|---|---|
| WTAI_GSMEV_C001 | Received USSD message | 5.1 | M |
| WTAI_GSMEV_C002 | Call Held indication | 5.1 | M |
| WTAI_GSMEV_C003 | Call Active indication | 5.1 | M |

### C.1.2 Network Functions

| Item | Function | Reference | Status |
|---|---|---|---|
| WTAI_GSM_C001 | Call Reject | 5.3 | M |
| WTAI_GSM_C002 | Call Hold | 5.4 | M |
| WTAI_GSM_C003 | Explicit Call Transfer | 5.5 | M |
| WTAI_GSM_C004 | Join Multiparty | 5.7 | M |
| WTAI_GSM_C005 | Retrieve from Multiparty | 5.8 | M |
| WTAI_GSM_C006 | Provide location information | 5.9 | M |
| WTAI_GSM_C007 | Send USSD | 5.10 | M |
| WTAI_GSM_C008 | Call Deflection | 5.6 | M |

### C.1.3 WMLScript Bytecode Interpreter Capabilities

| Item | Function | Reference | Status |
|---|---|---|---|
| WTAI_GSMINT_C001 | Supports GSM Network WTAI library identifier | A | M |
| WTAI_GSMINT_C002 | Supports GSM Network WTAI function identifiers | A | M |

# C.2 Server features

## C.2.1 WMLScript Encoder Capabilities

| Item | Function | Reference | Status |
|---|---|---|---|
| WTAI_GSMENC_S001 | Supports GSM Network WTAI library identifier | A | M |
| WTAI_GSMENC_S002 | Supports GSM Network WTAI function identifiers | A | M |