

Example of a WAP OTA
Service Settings Message

5 June, 2001
Version 1.1

**EXAMPLE OF A WAP OTA
SERVICE SETTINGS MESSAGE
Version 1.1
2001-June-5**

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1. REFERENCES

1. *Over The Air Settings Specification; Approved version: 6.0, 30th May 2000*. Copyright © 2000 Ericsson and Nokia Mobile Phones.

2. *Over The Air Settings Specification; Approved version: 6.5, 5th December 2000*. Copyright © 2000 Ericsson and Nokia Mobile Phones.

3. *AT Command Set for Nokia GSM Products*. Copyright © 2000 Nokia Mobile Phones. The document is available from the Forum Nokia Smart Messaging Developer Section. The Forum Nokia web page is located at: <http://www.forum.nokia.com>

4. *GSM Specifications* defined in the document.

2. PURPOSE OF THIS DOCUMENT

The purpose of this document is to give an example of a complete WAP OTA service settings message. The example presented in this document has been tested with the following Nokia WAP terminals:

Nokia 7110
Nokia 6210
Nokia 6250
Nokia 9110i Communicator
Nokia 3330
Nokia 9210 Communicator

Testing was done by sending WAP OTA service setting messages with the HyperTerminal application running on Windows NT 4.0 with Service Pack 6a. A Nokia data supported phone was used as a transmitting device.

This document is based on the *Over The Air Settings Specification; Approved version: 6.5, 5th December 2000*.

Please note the following information:

1. The characteristic attribute TYPE=ID is not supported on the Nokia WAP terminals listed below:

Nokia 7110
Nokia 6210
Nokia 6250
Nokia 9110i Communicator
Nokia 3330
Nokia 9210 Communicator

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2. The characteristic attribute TYPE=BOOKMARK included in the same OTA message with a WAP service setting set is supported on the Nokia WAP terminals listed below:

Nokia 7110 (firmware version 4.94 or later)
Nokia 6210
Nokia 6250
Nokia 9110i Communicator
Nokia 3330
Nokia 9210 Communicator

3. A separate WAP bookmark can be received with the Nokia WAP terminals listed below:

Nokia 7110 (firmware version 4.94 or later)
Nokia 6210
Nokia 6250
Nokia 9110i Communicator
Nokia 3330
Nokia 9210 Communicator

Only one bookmark can be received in an OTA message. If several bookmarks are received in the same OTA message, then only the last one is presented to the user.

3. SENDING A MESSAGE IN PDU MODE

A short message can be sent from the PC program using AT commands. This section gives an example of how a message containing textual information is sent from the PC program to a mobile phone. See "AT Command Set for Nokia GSM Products" for more information.

To send an SMS in PDU mode:

AT command	Description
AT+CMGF=0<enter/carriage return>	Changes the SMS sending mode to PDU mode (default is 0, PDU mode).
AT+CMGS=<length><enter/carriage return><pdu><ctrl-Z>	Sends a message from the DTE to the network (SMS-SUBMIT). <length> is the length of the actual TPDU in octets. The RP layer SC (short message centre) address octets are not counted in the length. <pdu> is the RP SC address Address-Value field followed by a TPDU in hexadecimal format.

The modem responds with "+CMGS: < TP-Message-reference value in integer format>" and OK, and the message is sent. Sending can be cancelled by using the <ESC> character. <ctrl-z> must be used to indicate the end of the message body.

For more information about possible error responses from the modem, see "AT Command Set for Nokia GSM Products".

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4. SENDING A WAP OTA SERVICE SETTINGS MESSAGE (TPDU CODING 8-BIT)

SMS-SUBMIT and SMS-DELIVER are TPDU (Transport Protocol Data Units). These can be built in different ways; the structure is explained in more detailed in the GSM 03.40 specification. SUBMIT goes from the phone to the network and DELIVER comes from the network to the phone. This section includes a practical example of sending an 8-bit WAP OTA service settings message in the SMS PDU mode. The example uses Windows HyperTerminal. Due to the length of the WAP OTA service settings message, it must be sent in two parts.

4.1. Example of a WAP OTA service settings message, PART 1 OF MESSAGE

AT+CMGF=0 Sets SMS PDU mode on
OK
AT+CMGS=154 Length of the SMS PDU (TPDU octets), the RP layer SC address is not included

```
0051000C9153487004633200F5A78C0B0504C34FC002000304020101062C1F2A6170706C6
9636174696F6E2F782D7761702D70726F762E62726F777365722D73657474696E67730081
EA01016A0045C6060187124501871311033132332E34352E3132332E36370001872111032
B343538333537320001872270018723110377617075736572000187241103776170706173
737700018728720187
```

+CMGS: 212 Message reference is shown
OK

Table 1. Message 1 TPDU in hexadecimal format

RP SC address (optional)	Value	Description	Status
	07	Address length	The length of the address is 7. This includes the type of numbering plan indication.
	91	Type of address	International address using the ISDN telephone numbering plan.
	53 48 50 02 02 00	Short message service centre address	The short message service centre number. For example, +35 84 05 20 20 00 is encoded as 53 48 50 02 02 00. In this case, the address is 6 octets.

The RP SC address is optional and instead of the string defined above it is possible to use the hexadecimal value **00**. Please note that if 00 is used instead of the RP SC address, the SMS centre number is not defined. In this case, the SMS centre number must be found from the sending device or SIM card.

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TPDU Octet 1 bit	Value (hex 51)	Description	Status
7	0	TP-Reply-Path	Reply path not set
6	1	TP-User-Data-Header-Indicator	Indication that user data contains an additional header
5	0	TP-Status-Report-Request	Not requested
4	1	TP-Validity-Period-Format	Relative format (bits 4 and 3)
3	0	TP-Validity-Period-Format	Relative format (bits 4 and 3)
2	0	TP-Reject-Duplicates	Do not reject duplicates in SC
1	0	TP-Message-Type-Indicator	Type:SMS-SUBMIT (from phone to network), (bits 1 and 0)
0	1	TP-Message-Type-Indicator	Type:SMS-SUBMIT (from phone to network), (bits 1 and 0)
TPDU Octet 2	Value	Description	Status
	00	TP-Message-Reference	Given by the phone; the application/user does not need to fill this octet.
TPDU Octet 3	Value	Description	Status
	0C	Address length in semi-octets.	The length of the address is 12 in semi-octets. This includes the type of numbering plan indication.
TPDU Octet 4	Value	Description	Status
	91	Type of address	International address using the ISDN telephone numbering plan.
TPDU Octets 5-10	Value	Description	Status
	53 48 70 04 63 32	TP-Destination-Address	The destination telephone number. For example, +35 84 07 40 36 23 is encoded as 53 48 70 04 63 32. In this case, the address is 6 octets. The address can be 2 to 12 octets long.
TPDU Octet 11	Value	Description	Status
	00	TP-Protocol-Identifier, consists of one octet. For details, see the GSM 03.40 specification, version 7.2.0, page 53.	Parameter identifying the above layer protocol, if any.
TPDU Octet 12 bits	Value (hex F5)	Description	Status
7	1	TP-Data-Coding-Scheme used in TP-User-Data, consists of one octet. See the GSM 03.38 specification.	Functionality (bits 7 and 6) related to usage of bits 4-0.
6	1		Functionality (bits 7 and 6) related to usage of bits 4-0.
5	1		Indicates that text is compressed.
4	1		Indicates that bits 1 and 0 have message class

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TPDU Octet 13	Value	Description	Status
			meaning.
3	0	Alphabet being used (bits 3 and 2)	Bit 3 is reserved, set to 0.
2	1	Alphabet being used (bits 3 and 2)	8-bit data.
1	0	Message class (bits 1 and 0)	Class 1, Default meaning: ME-specific.
0	1	Message class (bits 1 and 0)	Class 1, Default meaning: ME-specific.
TPDU Octet 14	Value	Description	Status
	A7	TP-Validity-Period (Relative format). For details, see the GSM 03.40 specification, version 7.2.0, page 55.	A7 -> 24 hours,
TPDU Octets 15-154	Value	Description	Status
	8C	TP-User-Data-Length	Parameter indicating the length of the TP-User-Data field to follow. Represented as a number of octets (integer). 8C hex -> 140 octets. The length includes the user data header and the data itself.
	0B0504C3 4FC00200 03040201 01062C1F 2A617070 6C696361 74696F6E 2F782D77 61702D70 726F762E 62726F77 7365722D 73657474 696E6773 0081EA01 016A0045 C6060187 12450187 13110331 32332E34 352E3132 332E3637 00018721 11032B34 35383335 37320001 87227001 87231103 77617075 73657200 01872411 03776170 70617373 77000187 28720187	TP-User-Data	The user data. Format of the user data depends on what type of message is sent. This WAP OTA service settings message includes user data headers and the user data itself.

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4.2. Example of a WAP OTA service settings message, PART 2 OF MESSAGE

AT+CMGF=0 Sets SMS PDU mode on
OK
AT+CMGS=107 Length of the SMS PDU (TPDU octets), the RP layer SC address is not included

0051000c9153487004633200f5a75d0b0504c34fc0020003040202296a010186071103687
474703a2f2f7761702e646b0001c60801871511034142432053657276696365000101c67f
018715110341424320576170000187171103687474703a2f2f7761702e646b00010101

+CMGS: 213 Message reference is shown
OK

Table 2. Message 2 TPDU in hexadecimal format

RP SC address (optional)	Value	Description	Status
	07	Address length	The length of the address is 7. This includes the type of numbering plan indication.
	91	Type of address	International address using the ISDN telephone numbering plan.
	53 48 50 02 02 00	Short message service centre address	The short message service centre number. For example, +35 84 05 20 20 00 is encoded as 53 48 50 02 02 00. In this case, the address is 6 octets.

The RP SC address is optional and instead of the string defined above, it is possible to use the hexadecimal value 00. Please note that if 00 is used instead of the RP SC address, the SMS centre number is not defined. In this case, the SMS centre number must be found from the sending device or SIM card.

TPDU Octet 1 bit	Value (hex 51)	Description	Status
7	0	TP-Reply-Path	Reply path not set
6	1	TP-User-Data-Header-Indicator	Indication that user data contains an additional header
5	0	TP-Status-Report-Request	Not requested
4	1	TP-Validity-Period-Format	Relative format (bits 4 and 3)
3	0	TP-Validity-Period-Format	Relative format (bits 4 and 3)
2	0	TP-Reject-Duplicates	Do not reject duplicates in SC
1	0	TP-Message-Type-Indicator	Type:SMS-SUBMIT (from phone to network), (bits 1 and 0)

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0	1	TP-Message-Type-Indicator	Type:SMS-SUBMIT (from phone to network), (bits 1 and 0)
TPDU Octet 2	Value	Description	Status
	00	TP-Message-Reference	Given by the phone; the application/user does not need to fill this octet.
TPDU Octet 3	Value	Description	Status
	0C	Address length in semi-octets.	The length of the address is 12 in semi-octets. This includes the type of numbering plan indication.
TPDU Octet 4	Value	Description	Status
	91	Type of address	International address using the ISDN telephone numbering plan.
TPDU Octets 5-10	Value	Description	Status
	53 48 70 04 63 32	TP-Destination-Address	The destination telephone number. For example, +35 84 07 40 36 23 is encoded as 53 48 70 04 63 32. In this case, the address is 6 octets. The address can be 2 to 12 octets long.
TPDU Octet 11	Value	Description	Status
	00	TP-Protocol-Identifier, consists of one octet. For details, see the GSM 03.40 specification, version 7.2.0, page 53.	Parameter identifying the above layer protocol, if any.
TPDU Octet 12 bits	Value (hex F5)	Description	Status
7	1	TP-Data-Coding-Scheme used in TP-User-Data, consists of one octet. See the GSM 03.38 specification.	Functionality (bits 7 and 6) related to usage of bits 4-0.
6	1		Functionality (bits 7 and 6) related to usage of bits 4-0.
5	1		Indicates that text is compressed.
4	1		Indicates that bits 1 and 0 have message class meaning.
3	0	Alphabet being used (bits 3 and 2)	Bit 3 is reserved, set to 0.
2	1	Alphabet being used (bits 3 and 2)	8-bit data.
1	0	Message class (bits 1 and 0)	Class 1, Default meaning: ME-specific.
0	1	Message class (bits 1 and 0)	Class 1, Default meaning: ME-specific.
TPDU Octet 13	Value	Description	Status
	A7	TP-Validity-Period (Relative format). For details, see the GSM 03.40 specification, version 7.2.0, page 55.	A7 -> 24 hours.

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TPDU Octet 14	Value	Description	Status
	5D	TP-User-Data-Length	Parameter indicating the length of the TP-User-Data field to follow. Represented as a number of octets (integer). 55 hex -> 93 octets. The length includes the user data header and the data itself.
TPDU Octets 15-107	Value	Description	Status
	0B0504C3 4FC00200 03040202 296A0101 86071103 68747470 3A2F2F77 61702E64 6B0001C6 08018715 11034142 43205365 72766963 65000101 C67F0187 15110341 42432057 61700001 87171103 68747470 3A2F2F77 61702E64 6B000101 01	TP-User-Data	The user data. The format of the user data depends on what type of message is sent. This WAP OTA service settings message includes user data headers and the user data itself.

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5. TP-USER DATA OF THE EXAMPLE WAP OTA SERVICE SETTINGS MESSAGE

MIME-type used: **application/x-wap-prov.browser-settings**.

5.1. XML document content of the example WAP OTA service settings message

```
<?xml version="1.0"?>
<!DOCTYPE CHARACTERISTIC-LIST SYSTEM "file:///c:/settingspush/settings.dtd" >
<CHARACTERISTIC-LIST>
  <CHARACTERISTIC TYPE="ADDRESS">
    <PARAM NAME="BEARER" VALUE="GSM/CSD"/>
    <PARAM NAME="PROXY" VALUE="123.45.123.67"/>
    <PARAM NAME="CSD_DIALSTRING" VALUE="+4583572"/>
    <PARAM NAME="PPP_AUTHTYPE" VALUE="PAP"/>
    <PARAM NAME="PPP_AUTHNAME" VALUE="wapuser"/>
    <PARAM NAME="PPP_AUTHSECRET" VALUE="wappassw"/>
    <PARAM NAME="CSD_CALLTYPE" VALUE="ANALOGUE"/>
    <PARAM NAME="CSD_CALLSPEED" VALUE="AUTO"/>
  </CHARACTERISTIC>
  <CHARACTERISTIC TYPE="URL" VALUE=" http://wap.dk "/>
  <CHARACTERISTIC TYPE="NAME">
    <PARAM NAME="NAME" VALUE="ABC Service"/>
  </CHARACTERISTIC>
  <CHARACTERISTIC TYPE="BOOKMARK">
    <PARAM NAME="NAME" VALUE="Wap"/>
    <PARAM NAME="URL" VALUE="http://wap.dk "/>
  </CHARACTERISTIC>
</CHARACTERISTIC-LIST>
```

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5.2. Binary encoding of the XML document with the example WAP OTA service settings message

SMS CONTENT – SMS 1/2

Binary value	Meaning	Description
0B	User-Data-Header (UDHL) Length = 11 bytes	WDP layer (start WDP headers)
05	UDH IE identifier: Port numbers	
04	UDH port number IE length	
C3	Destination port (high)	Port number 49999
4F	Destination port (low)	
C0	Originating port (high)	
02	Originating port (low)	
00	UDH IE identifier: SAR	
03	UDH SAR IE length	
04	Datagram ref no.	
02	Total no. of segments in datagram	
01	Segment count	WDP layer (end WDP headers)
01	Transaction ID / Push ID	WSP layer (start WSP headers)
06	PDU type (push)	
2C	Header length (content type+headers)	
1F	value length quote	length greater than 30
2A	value length (value name not used)	
61,70,70,6C,69,63,61,74,69,6F,6E,2F,78,2D,77,61,70,2D,70,72,6F,76,2E,62,72,6F,77,73,65,72,2D,73,65,74,74,69,6E,67,73	'a','p','p','l','i','c','a','t','i','o','n','/','x','-','w','a','p','-','p','r','o','v','i','d','e','r','o','w','s','e','r','v','i','c','e','s'	MIME-Type = browser settings
00	Null termination of content type string	
81	charset (well known PARM.(short integer))	
EA	UTF-8 (using short integer)	WSP layer (end WSP headers)
01	Version	WBXML 1.1
01	Unknown public identifier	
6A	Charset	UTF-8
00	string table length	
45	CHARACTERISTIC_LIST with content	tag
C6	CHARACTERISTIC with content and attributes	tag
06	TYPE=ADDRESS	attribute name with prefix
01	end (attributes)	
87	PARM with attributes	tag

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12	NAME=BEARER	attribute name with prefix
45	VALUE=GSM/CSD	attribute name with prefix
01	end (PARAM)	
87	PARAM with attributes	tag
13	NAME=PROXY	attribute name with prefix
11	VALUE	attribute name
03	Inline string	attribute value
31, 32, 33, 2E, 34, 35, 2E, 31, 32, 33, 2E, 36, 37	'1', '2', '3', '.', '4', '5', '.', '1', '2', '3', '.', '6', '7'	
00	end inline string	
01	end (PARAM)	
87	PARAM with attributes	tag
21	NAME=CSD_DIALSTRING	attribute name with prefix
11	VALUE	attribute name
03	inline string	attribute value
2B, 34, 35, 38, 33, 35, 37, 32	+', '4', '5', '8', '3', '5', '7', '2'	
00	end inline string	
01	end (PARAM)	
87	PARAM with attributes	tag
22	NAME=PPP_AUTHTYPE	attribute name with prefix
70	VALUE=PAP	attribute name with prefix
01	end (PARAM)	
87	PARAM with attributes	tag
23	NAME=PPP_AUTHNAME	attribute name with prefix
11	VALUE	attribute name
03	inline string	attribute value
77, 61, 70, 75, 73, 65, 72	'w', 'a', 'p', 'u', 's', 'e', 'r'	
00	end inline string	
01	end (PARAM)	
87	PARAM with attributes	tag
24	NAME=PPP_AUTHSECRET	attribute name with prefix
11	VALUE	attribute name
03	inline string	attribute value
77, 61, 70, 70, 61, 73, 73, 77	'w', 'a', 'p', 'p', 'a', 's', 's', 'w'	
00	end inline string	
01	end (PARAM)	
87	PARAM with attributes	tag
28	NAME=CSD_CALLTYPE	attribute name with prefix
72	VALUE=ANALOGUE	attribute name with prefix
01	end (PARAM)	
87	PARAM with attributes	tag

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SMS CONTENT – SMS 2/2

Binary value	Meaning	Description
0B	User-Data-Header (UDHL) Length = 11 bytes	WDP layer (start WDP headers)
05	UDH IE identifier: Port numbers	
04	UDH port number IE length	
C3	Destination port (high)	Port number 49999
4F	Destination port (low)	
C0	Originating port (high)	
02	Originating port (low)	
00	UDH IE identifier: SAR	
03	UDH SAR IE length	
04	Datagram ref no.	
02	Total no. of segments in datagram	
02	Segment count	WDP layer (end WDP headers)
29	NAME=CSD_CALLSPEED	attribute name with prefix
6A	VALUE=AUTO	attribute name with prefix
01	end (PARAM)	
01	end (CHARACTERISTIC)	
86	CHARACTERISTIC with attributes	tag
07	TYPE=URL	attribute name with prefix
11	VALUE	attribute name
03	inline string	attribute value
68, 74, 74, 70, 3A, 2F, 2F, 77, 61, 70, 2E, 64, 6B	'h', 't', 't', 'p', ':', '/', '/', 'w', 'a', 'p', ':', 'd', 'k'	
00	end inline string	
01	end (attributes)	
C6	CHARACTERISTIC with content and attributes	tag
08	TYPE=NAME	attribute name with prefix
01	end attributes	
87	PARAM with attributes	tag
15	NAME=NAME	attribute name with prefix
11	VALUE	attribute name
03	inline string	attribute value
41, 42, 43, 20, 53, 65, 72, 76, 69, 63, 65	'A', 'B', 'C', ' ', 'S', 'e', 'r', 'v', 'i', 'c', 'e'	
00	end inline string	
01	end (PARAM)	
01	end (CHARACTERISTIC)	
C6	CHARACTERISTIC with content and attributes	tag
7F	TYPE=BOOKMARK	attribute name with prefix
01	end attributes	

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87	PARM with attributes	tag
15	NAME=NAME	attribute name with prefix
11	VALUE	attribute name
03	inline string	attribute value
41, 42, 43, 20, 57, 61, 70	'A', 'B', 'C', ' ', 'W', 'a', 'p'	
00	end inline string	
01	end (PARM)	
87	PARM with attributes	tag
17	NAME=URL	attribute name with prefix
11	VALUE	attribute name
03	inline string	attribute value
68, 74, 74, 70, 3A, 2F, 2F, 77, 61, 70, 2E, 64, 6B	'h', 't', 't', 'p', ':', '/', '/', 'w', 'a', 'p', ':', 'd', 'k'	
00	end inline string	
01	end (PARM)	
01	end (CHARACTERISTIC)	
01	end (CHARACTERISTIC_LIST)	