AT Commands Examples

Examples for
u-blox wireless modules
Application Note

locate, communicate, accelerate

Abstract

This document provides detailed examples of how to use AT commands with u-blox wireless modules.

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Document Information

Title	AT Commands Examples
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Document status information

Objective Specification	This document contains target values. Revised and supplementary data will be published later.
Advance Information	This document contains data based on early testing. Revised and supplementary data will be published later.
Preliminary	This document contains data from product verification. Revised and supplementary data may be published later.
Released	This document contains the final product specification.

Contents

1 Introduction

This document provides examples of using AT commands. For more details on AT command description please refer to u-blox AT Commands Manual [1]. The following symbols are used to highlight important information within the document:

☞ An index finger points out key information pertaining to integration and performance.

⚠ **A warning symbol indicates actions that could negatively impact performance or damage the device.**

☞ This document addresses the following products:
- LEON-G100 series
- LEON-G200 series
- LISA-U1/LISA-H1 series

These icons will be used to indicate applicability to the related products:

- **LEON** : LEON-G100 / LEON-G200 series

- **LISA** : LISA-U1/LISA-H1 series

If the subchapter applies to a specific product the related icon will be provided there.

2 Storing parameters

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Save parameters in the Non Volatile Memory (NVM). Retrieve parameters from NVM. For further details refer to the command description of AT+CPWROFF, AT&V, AT&W, ATY in the u-blox AT Commands Manual [1].

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages.
AT&K3	OK	Enable RTS/CTS DTE flow control for the current profile. NOTE: this is the default value saved in profiles 0 and 1. If no changes have been previously done to AT&K values in the stored profiles this step is not mandatory.
AT&Y1	OK	Select the default profile that will be automatically loaded after the next hardware reset (in this example profile #1).
AT&W1	OK	Store the current settings into profile 1.

Command	Response	Description
AT&V	ACTIVE PROFILE: &C1, &D1, &S1, &K3, E1, Q0, V1, X4,S00:000, S02:043, S03:013, S04:010,S05:008, S07:060, +CBST:007, 000,001, +CRLP:061, 061, 048, 006, +CR:000, +CRC:000, +IPR:0,+COPS:0,0,FFFFF, +ICF:3,1, +UPSV: 0,+CMGF:0, +CNMI:1,0,0,0,0, +USTS: 0 STORED PROFILE 0: &C1, &D1, &S1, &K3, E1, Q0, V1, X4,S00:000, S02:043, S03:013, S04:010, S05:008, S07:060, +CBST:007, 000, 001, +CRLP:061, 061, 048, 006, +CR:000, +CRC:000, +IPR:0, +COPS:0,0,FFFFF, +ICF:3,1, +UPSV: 0, +CMGF:0, +CNMI:1,0,0,0,0, +USTS: 0 STORED PROFILE 1: &C1, &D1, &S1, &K3, E1, Q0, V1, X4, S00:000, S02:043, S03:013, S04:010, S05:008, S07:060, +CBST:007, 000, 001, +CRLP:061, 061, 048, 006, +CR:000, +CRC:000, +IPR:0, +COPS:0,0,FFFFF, +ICF:3,1, +UPSV: 0, +CMGF:0, +CNMI:1,0,0,0,0, +USTS: 0 OK	Display both the current profile and the user profiles stored in memory. NOTE: this example refers to LEON-G100 / LEON-G200 modules, different values will be shown on LISA-U1 / LISA-H1 series modules
AT+CPWROFF	OK	To save the stored configuration it is needed to switch off the module.
AT+CFUN=15	OK	To save the stored configuration and reboot the module without needing to switch the module off and back on.

3 Network registration and configuration

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3.1 Steps performed to register the module to a GSM/UMTS network

The following steps are necessary to register the module on a GSM/UMTS network:

1. Set verbose error messages

2. Check the PIN

3. Check network registration status

3.1.1 Preliminary operations

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages. Note: This step is not mandatory.

Command	Response	Description
AT+CPIN?	+CPIN: SIM PIN OK	Check the PIN.
AT+CPIN="1234"	OK	Define PIN.
AT+CPIN?	+CPIN: READY OK	Check PIN. Note: OK, the PIN is ready.

3.1.2 Network registration: GSM module

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3.1.2.1 Check network registration (first scenario, autoregistration)

Command	Response	Description
AT+COPS?	+COPS: 0,0,"vodafone IT" OK	Check network registration status. Note: OK, the module is registered to GSM service.
AT+CGATT?	+CGATT: 1 OK	Check GPRS attach status. Note: OK, the module is GPRS attached.

3.1.2.2 Check network registration (second scenario, without autoregistration)

Command	Response	Description
AT+COPS?	+COPS: 2 OK	Check network registration status. Note: OK, the module is not registered to GSM service.
AT+COPS=0	OK	Force network registration.
AT+COPS?	+COPS: 0,0,"vodafone IT" OK	Check network registration status. Note: OK, the module is registered to GSM service.

3.1.2.3 GSM Band change

Command	Response	Description
AT+UBANDSEL?	+UBANDSEL: 900, 1800	Check the current selected GSM bands
AT+COPS=2	OK	Force network deregistration if the module was previously registered or registration is pending.
AT+UBANDSEL=850,1900	OK	Change the operating GSM bands Note: the new configuration is saved in NVM for future registration attempts
AT+COPS=0	OK	Force network registration.

3.1.3 Network registration: UMTS module

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3.1.3.1 Preliminary information about Radio Access Technology (RAT) configuration

☞ Default RAT configuration is GSM / UMTS Dual Mode with UMTS preferred access technology.

Command	Response	Description
AT+URAT?	+URAT: 1,2 OK	The Default RAT configuration is GSM / UMTS Dual mode Radio Access technology with UMTS preferred access technology. With this configuration the module can access both GSM and UMTS networks, UMTS networks are preferred.

☞ Any change in the RAT selection has to be done when the module is deregistered from the network. Before changing the RAT deregister the module with **AT+COPS=2** command.

☞ After changing the RAT configuration to ensure that the new settings are saved in the NVM it's necessary to power off the module (**AT+CPWROFF**). Then switch on the module and repeat the steps listed in chapter 3.1.1.

☞ When a new RAT setting is saved in the NVM it's not possible to load the RAT factory defined configuration. You can restore this by performing the following steps:

Command	Response	Description
AT+COPS=2	OK	Deregister the module from the network. This operation must only be performed if the module is registered on the network.
AT+URAT=1,2	OK	Select GSM / UMTS Dual mode Radio Access technology with UMTS networks preferred. This is the RAT factory defined configuration.
AT+CPWROFF	OK	Switch off the module.

3.1.3.2   Selection of Radio Access technology

GSM Single Mode Radio Access technology

Command	Response	Description
AT+URAT=0,0	OK	Select GSM Single Mode Radio Access technology.
AT+URAT?	+URAT: 0,0 OK	With this configuration the module can access only GSM networks.
AT+COPS=0	OK	Start automatic network registration.
AT+COPS?	+COPS: 0,0,"vodafone IT",0 OK	Check network registration status. Last parameter (0 in this case) indicates the module is registered to GSM service (as expected considering that module is not allowed to access to UMTS networks).

GSM / UMTS Dual mode Radio Access technology

Command	Response	Description
AT+URAT=1,0	OK	Select GSM / UMTS Dual mode Radio Access technology. GSM is the preferred access technology.
AT+URAT?	+URAT: 1,0 OK	With this configuration the module can access both GSM and UMTS networks, GSM networks are preferred.
AT+URAT=1,2	OK	Select GSM / UMTS Dual mode Radio Access technology. UMTS is the preferred access technology.
AT+URAT?	+URAT: 1,2 OK	With this configuration the module can access both GSM and UMTS networks, UMTS networks are preferred.
AT+COPS=0	OK	Start automatic network registration.

Command	Response	Description
AT+COPS?	+COPS: 0,0,"vodafone IT",2 OK	Check network registration status. Last parameter (2 in this case) indicates the module is registered to UMTS service.
AT+COPS?	+COPS: 0,0,"vodafone IT",0 OK	Module is also allowed to access GSM networks. This will be the module response if it has registered to GSM service.

UMTS Single Mode Radio Access technology

Command	Response	Description
AT+URAT=2,2	OK	Select UMTS Single Mode Radio Access technology.
AT+URAT?	+URAT: 2,2 OK	With this configuration the module can access only UMTS networks.
AT+COPS=0	OK	Start automatic network registration.
AT+COPS?	+COPS: 0,0,"vodafone IT",2 OK	Check network registration status. Last parameter (2 in this case) indicates the module is registered to UMTS service (as expected considering that module is not allowed to access to GSM networks).

☞ If the module is registered in GSM / UMTS Dual Mode (**AT+URAT=1,0** or **AT+URAT=1,2**) it is possible to change preferred RAT technology but the new setting will take effect only after a period of lost network coverage or if the module is deregistered and registered again on the network.

Command	Response	Description
AT+URAT=1,0	OK	Select GSM / UMTS Dual mode Radio Access technology. GSM is the preferred access technology.
AT+URAT?	+URAT: 1,0 OK	With this configuration the module can access both GSM and UMTS networks, GSM networks are preferred.
AT+COPS=0	OK	Start automatic network registration.
AT+COPS?	+COPS: 0,0,"vodafone IT",0 OK	Check network registration status. Last parameter (0 in this case) indicates the module is registered to GSM service.
AT+URAT=1,2	OK	Select GSM / UMTS Dual mode Radio Access technology. UMTS is the preferred access technology.
AT+URAT?	+URAT: 1,2 OK	With this configuration the module can access both GSM and UMTS networks, UMTS networks are preferred.
AT+COPS?	+COPS: 0,0,"vodafone IT",0 OK	Last parameter (0 in this case) indicates the module is still registered to GSM service although UMTS is now the preferred access technology.
AT+COPS=2	OK	Deregister the module from the network.
AT+COPS=0	OK	Start automatic network registration.
AT+COPS?	+COPS: 0,0,"vodafone IT",2 OK	Last parameter (2 in this case) indicates the module is registered to UMTS service. Note: this is only an example. Remember that with URAT=1,2 UMTS is the preferred and not the only allowed RAT. If the UMTS network coverage is weak the module will register again on GSM network.

☞ **AT+URAT=0,2** and **AT+URAT=2,0** are allowed but the second parameter is ignored. The second parameter is applied by the module only in GSM / UMTS Dual mode Radio Access technology (first parameter equal to 1).

3.1.3.3 UMTS Band change

Command	Response	Description
AT+URAT?	+URAT: 1,2	Check that the module is configured in dual mode or 3G only.
	OK	Note: alternative answers may be +URAT: 2,0 or URAT: 1,0.
AT+COPS?	+COPS: 0,0,"vodafone IT",2	If the module is registered, check that it is in UMTS RAT
AT+UBANDSEL?	+UBANDSEL: 2100,1900,850	Check current 3G bands
AT+COPS=2	OK	Force network deregistration
AT+UBANDSEL=800,900	OK	Change the operating 3G bands Note: the new configuration is saved in NVM for future registration attempts
AT+COPS=0	OK	Force network registration.

3.1.3.4 Check current network registration status

Command	Response	Description
AT+UREG?	+UREG: 0,1	Check current network registration status.
	OK	The second parameter (1 in this example) indicates that the device is attached to GPRS network.
AT+UREG?	+UREG: 0,2	Check current network registration status.
	OK	2 means the module is registered and EDGE attached.
AT+UREG?	+UREG: 0,3	Check current network registration status.
	OK	3 means the module is registered and WCDMA attached.
AT+UREG?	+UREG: 0,4	Check current network registration status.
	OK	4 means the module is registered and HSDPA attached.
AT+UREG=1		It is possible to enable a network registration attach status URC.
	+UREG: 1,2	A URC will be generated by DUT when network attach status changes. The second parameter (in this example 2) indicates the new network attach status
	OK	The first parameter is 1 meaning URC is still enabled.

☞ In this table each row represents a possible combination of +URAT, +COPS and +UREG values. Other combinations are not possible.

RAT configuration	Operator	Network registration status
+URAT: 0,0	+COPS: 0,0,"vodafone IT",0	+UREG: 0,1
+URAT: 0,0	+COPS: 0,0,"vodafone IT",0	+UREG: 0,2
+URAT: 1,0	+COPS: 0,0,"vodafone IT",0	+UREG: 0,1
+URAT: 1,0	+COPS: 0,0,"vodafone IT",0	+UREG: 0,2
+URAT: 1,0	+COPS: 0,0,"vodafone IT",2	+UREG: 0,3

RAT configuration	Operator	Network registration status
+URAT: 1,0	+COPS: 0,0,"vodafone IT",2	+UREG: 0,4
+URAT: 1,2	+COPS: 0,0,"vodafone IT",0	+UREG: 0,1
+URAT: 1,2	+COPS: 0,0,"vodafone IT",0	+UREG: 0,2
+URAT: 1,2	+COPS: 0,0,"vodafone IT",2	+UREG: 0,3
+URAT: 1,2	+COPS: 0,0,"vodafone IT",2	+UREG: 0,4
+URAT: 2,2	+COPS: 0,0,"vodafone IT",2	+UREG: 0,3
+URAT: 2,2	+COPS: 0,0,"vodafone IT",2	+UREG: 0,4

4 GPRS connection

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4.1 Context Activation

In order to use FTP, HTTP, SMTP and TCP/IP commands the following steps are necessary to establish a data connection:

Command	Response	Description
AT+CGATT?	+CGATT: 1 OK	Check GPRS attach status. Note: OK, the module is GPRS attached.
		Create a GPRS connection profile for TCP/IP with the +UPSD command. This will be made in 2 steps: 1. Setup APN 2. Specify to use the dynamic IP address assignment It is possible to configure up to 6 GPRS connection profiles. Each profile is identified by a GPRS connection profile identifier (an integer value from 0 to 6). The profile identifier is the first parameter of AT+UPSND, AT+UPSD, AT+UPSDA commands. Note: AT+UPSD command does not affect the GPRS profiles created with +CGDCONT command.
AT+UPSND=0,8	+UPSND: 0,8,0 OK	Check if the GPRS connection profile associated to GPRS connection profile identifier "0" is active. In this case it's not active. Note: this step is not mandatory.
AT+UPSD=0,1,"web.omnitel.it"	OK	Setup APN for GPRS connection profile "0". Note: APN "web.omnitel.it" is an example only. Use your operator APN.
AT+UPSD=0,7,"0.0.0.0"	OK	Setup the dynamic IP address assignment.
AT+UPSDA=0,1	OK	Save GPRS profile in the NVM. Note: this step is not mandatory.
AT+UPSDA=0,3	OK	Activate the GPRS connection.
AT+UPSND=0,8	+UPSND: 0,8,1 OK	Check if the GPRS connection profile associated to GPRS connection profile identifier "0" is now active. In this case it's active. Note: this step is not mandatory.
AT+UPSND=0,0	+UPSND: 0,0,"93.68.225.175" OK	Check the assigned IP address. Note: in this example is requested the assigned dynamic IP address.

4.2 Context Deactivation

4.2.1 Context Deactivation by the network

Command	Response	Description
	`+UUPSDD: 0`	URC indicating that PDP context #0 is closed by the network.

4.2.1 Context Deactivation by the module

Command	Response	Description
`AT+UPSDA=0,4`	`OK`	Detach the GPRS connection identified by integer number 0 with the +UPSDA command. Note: the specified profile will be deactivated.

5 TCP/IP AT commands

Before doing this example, verify that the module is registered on the network, and a GPRS connection is active. Follow the steps in "Network Registration and Configuration" (chapter 3).

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5.1 Socket Connect

Command	Response	Description
`AT+USOCR=6`	`+USOCR: 0` `OK`	Create TCP socket. In this example Socket #0 is created. +USOCR: 0 response returns the created socket identifier (in this example #0). If a new socket is created (without closing the already existent), a new socket identifier will be returned.
`AT+USOCR=6`	`+USOCR: 1` `OK`	Create another socket. This socket has the ID #1.
`AT+USOCL=1`	`OK`	Close socket #1. Socket #1 is free.
`AT+UDNSRN=0,"ftp.test.neonseven.com"`	`+UDNSRN: "151.9.34.66"` `OK`	DNS resolution of the URL "ftp.test.neonseven.com".
`AT+USOCO=0,"151.9.34.66",444`	`OK`	Connect socket #0 to port 444 of a remote host with IP address 151.9.34.66. **The connection is now uniquely associated to the socket. Socket is now ready for read / write operations.**

`AT+USOCO=0,"151.9.34.66",444`	`ERROR`
	
	`+UUSOCL: 0`
		If the connection is not successful, an ERROR response is returned and the socket used for the connection attempt <u>is closed</u>. The notification is provided by the URC +UUSOCL.

5.2 Socket Listening

Command	Response	Description
AT+USOCR=6	+USOCR: 0 OK	Create a TCP socket with ID #0.
AT+USOLI=0,1099	OK	Set socket in listening mode on port 1099. **WARNING: The ability to reach the opened port on the server depends also on the network operator. Some network operators will not allow incoming connection on opened TCP port.**
	+UUSOLI: 1,"151.9.34.66",39912,0, "151.9.34.74",1099	When a connections request arrives from a remote host, a new socket is created with the first integer identifier available. In this example socket ID is #1. +UUSOLI indicates: **1**: the new socket created.. Incoming data from the established connection will be received on this socket. Data to be sent over the connection must be written into this socket **151.9.34.66**: IP of the remote server **39912**: port of service **0**: listening socket. It is the socket identifier specified with the AT+USOLI command **151.9.34.74**: IP address of the module **1099**: listening port assigned to the connection. Returned with AT+USOLI command Socket #1 is now ready for reading/writing data
	+UUSORD: 1,18	18 bytes of incoming data over the previously established connection. Note that data arrives on socket identified by integer number 1 not on socket identified by integer number 0. The incoming data will be sent always on the related socket.

5.3 Socket Write

5.3.1 Binary mode

Command	Response	Description
AT+USOWR=0,2	@	Request to write 2 data bytes into socket #0. Wait "@" symbol indicating the data prompt is now open (AT commands are not allowed in data prompt).

Command	Response	Description
12	+USOWR: 0,2 OK	Write data bytes. **It is not allowed to write fewer bytes than previously specified with AT+USOWR command.** **If more bytes are written with respect to the threshold, the remaining bytes will be truncated.** **The interface is blocked until all bytes are written.** URC +USOWR: 0,2 and OK are returned. This means that data is sent to lower level of protocol stack. **This is not a notification of an acknowledgment received from the remote host data bytes have been sent to.**

5.3.2 Base syntax

Command	Response	Description
AT+USOWR=0,2,"12"	+USOWR: 0,2 OK	Write 2 data bytes data on socket #0. URC +USOWR: 0,2 and OK are returned. This means that data is sent to lower level of protocol stack. **This is not a notification of an acknowledgment received from the remote host data bytes have been sent to.** Note: Some characters are not allowed in Base syntax mode. Check the AT manual for the allowed characters.

5.3.3 Queue FULL

Command	Response	Description
AT+USOWR=0,2,"12"	ERROR	If socket buffer is FULL data bytes inserted in data prompt will be discarded. This may happen in case of network congestion or in case of network coverage lost. **In this case ERROR indication is returned.**
AT+USOCTL=0,10	+USOCTL: 0,10,4 OK	In case of ERROR response it's recommended to query the state of TCP connection associated to the socket in order to verify the socket is still connected. The third parameter of URC +USOCTL is the state; its value is supposed to be 4 that means connection ESTABILISHED.

Command	Response	Description

`AT+USOCTL=0,11`	`+USOCTL: 0,11,0`
	
	`OK`
		It's also possible to query for TCP outcoming unacknowledged data of the socket (this command is valid only for TCP socket).
		
		In this case 0 byte of data are unacknowledged.

5.3.4 GSM network coverage lost

5.3.4.1 First scenario: Network coverage lost after AT+USOWR command

Command	Response	Description
`AT+CREG=1`	`OK`	Enable network registration URC.
`AT+USOCO=0,"151.9.34.66",444`	`OK`	Connect socket #0 to port 444 of a remote host with IP address 151.9.34.66. **In this example a server that echoes data packets it receives is used as remote host.** The socket is now ready for read / write data.
`AT+USOWR=0,3`	`@`	Request to write 3 data bytes on socket #0. Wait for "@" symbol indicating the data prompt is now open (AT commands are not allowed in data prompt).
`123`	`+USOWR: 0,3` `OK`	Write data bytes. It is not allowed to write fewer bytes than previously specified with AT+USOWR command. If more bytes are written with respect to the threshold, the remaining bytes will be truncated. The interface is blocked until all bytes are written. URC +USOWR: 0,2 and OK are returned. This means that data is sent to lower level of protocol stack. **This is not a notification of an acknowledgment received from the remote host data bytes have been sent to.**
	`+UUSORD: 0,3`	Remote TCP test server sent back data.
	`+CREG: 2`	Coverage lost may be simulated by disconnecting the antenna from the module. In this case it is not possible to have GSM&GPRS signal coverage. Module is not registered on a mobile network. Currently in "search"-mode.
`AT+USOWR=0,2`	`@`	Request to write 2 data bytes into socket #0. Wait for "@" symbol indicating the data prompt is now open (AT commands are not allowed in data prompt).

Command	Response	Description
12	+USOWR: 0,2 OK	Write data. After the last byte the data prompt is closed. Note: It is not allowed to write fewer bytes than previously specified with AT+USOWR command. Note: If more bytes are written with respect to the threshold, the remaining bytes will be truncated. The interface is blocked until all bytes are written. URC +USOWR: 0,2 and OK are returned. This means that data is sent to lower level of protocol stack. **This is not a notification of an acknowledgment received from the remote host data bytes have been sent to.** The interface is blocked until all bytes are written.
		Coverage lost may be simulated by disconnecting the antenna from the module.
	+CREG: 1	Module found network and is registered.
	+UUSORD: 0,2	Remote TCP test server sent back data. **This means data has been sent immediately after network coverage has been reestablished.**

5.3.4.2 Second scenario: Network coverage lost during an AT+USOWR command

Command	Response	Description
AT+CREG=1	OK	Enable network registration URC.
AT+USOCO=0,"151.9.34.66",444	OK	Connect socket #0 to the remote host with IP address 151.9.34.66 on port 444. **In this example a server that echoes data packets it receives is used as remote host.** The socket is now ready for read / write data.
AT+USOWR=0,100	@	Request to write 100 data bytes into socket #0. Wait for "@" symbol indicating the data prompt is now open (AT commands are not allowed in data prompt).
ggggggggggggggggggggggggggg	+CREG: 2	Module loses the network while writing data in data prompt mode. If URC is enabled a URC is returned in the byte stream.

Command	Response	Description
gggggggggggggggggggggggggggggg gggggggggggggggggggggggggggggg gggggggggggggggg	+USOWR: 0,100 OK	Continue writing data. After the last byte the data prompt is closed. The command is blocking until the data writing is not finished. URC +USOWR: 0,2 and OK are returned. This means that data is sent to lower level of protocol stack. **This is not a notification of an acknowledgment received from the remote host data bytes have been sent to.**
	+CREG: 1	Module found network and is registered.
	+UUSORD: 0,100	Remote TCP test server sent back data. **This means data has been sent immediately after network coverage has been reestablished.**

5.4 Socket operations with "Keep Alive" option

☞ In "Keep Alive" mode, the module periodically sends dummy TCP packets to prevent the network from closing the inactive context. The network operator may close inactive TCP connections without notification to the mobile.

Command	Response	Description
AT+USOCR=6	+USOCR: 0 OK	Create a TCP socket #0.
AT+USOSO=0,65535,8,1	OK	Enable "keep alive" option. This socket option enables the module to send dummy IP packets to keep the connection alive. **0**: socket number to be set to enable keep alive option **65535**: specify socket level option **8**: specify the "Keep Alive" option **1**: enable the keep alive (set to 0 to disable it)
AT+USOSO=0,6,2,30000	OK	Set the inactivity timeout after which the module will start to send "keep alive" packets. **0**: socket number to be set to enable keep alive option **6**: specify TCP level option **2**: specify option TCP "keep alive" timer option **30000**: module will send dummy TCP packets every 30000 milliseconds

5.5 Socket Read

First scenario

Command	Response	Description
	+UUSORD: 0,2	Remote server sends 2 data bytes on socket #0. A URC is returned indicating the socket on which the data is received and the total amount of data received.
AT+USORD=0,2	+USORD: 0,2,"ar" OK	Read data. Data is returned between quotation marks.

Second scenario

Command	Response	Description
	+UUSORD: 0,30	Remote server sends 30 data bytes on socket #0. If a socket buffer is empty URC +UUSORD indicates a TCP packet has been received from the remote host the socket is connected to and the amount of data bytes of the packet.
AT+USORD=0,10	+USORD: 0,10,"hfgyrhgfty" OK	Read only part of data (in this example 10 bytes of data are read). Data is returned between quotation marks.
	+UUSORD: 0,20	URC +UUSORD indicates the total amount of data bytes stored in the buffer after last AT+USORD execution. In this example 20 bytes are stored in the buffer.

Third scenario

Command	Response	Description
	+UUSORD: 0,30	Remote server sends 30 data bytes on socket #0. If a socket buffer is empty URC +UUSORD indicates a TCP packet has been received from the remote host the socket is connected to and the amount of data bytes of the packet.
AT+USORD=0,10	+USORD: 0,10,"hfgyrhgfty" OK	Only part of the data bytes (in this example 10 bytes) are read. Data is returned between quotation marks.
	+UUSORD: 0,25	Remote server sent more data after the first part was received. URC +UUSORD indicates the total amount of data bytes stored the buffer after the last AT+USORD execution. In this example 25 bytes are stored in the buffer.
AT+USORD=0,10	+USORD: 0,10,"hfgbchs7[o" OK	Only part of the data bytes (in this example 10 bytes) are read. Data is returned between quotation marks.
	+UUSORD: 0,34	Remote server sent more data. URC +UUSORD indicates the total amount of data bytes stored the buffer after the last AT+USORD execution. In this example 34 bytes are stored in the buffer.

Command	Response	Description
AT+USORD=0,34	+USORD: 0,34,"jghfbv74ksHDFUEçpjè0'@è pyujfnvhfyù" OK	All data bytes are read.
AT+USORD=0,0	+USORD: 0,0 OK	Verifies how much unread data is in the buffer. In this example 0 bytes are in socket #0.

Fourth scenario

Command	Response	Description
	+UUSORD: 0,30	Remote host sends 30 bytes of data on socket #0. If a socket buffer is empty URC +UUSORD indicates a TCP packet has been received from the remote host the socket is connected to and the amount of data bytes of the packet.
AT+USORD=0,10	+USORD: 0,10,"hfgyrhgfty" OK	Only part of the data bytes (in this example 10 bytes) are read. Data is returned between quotation marks.
	+UUSORD: 0,25	Remote server sent other data after the first data bytes had been received. URC +UUSORD indicates the total amount of data bytes stored the buffer after last AT+USORD execution. In this example 25 bytes are in the buffer.
		Remote host closes the TCP connection associated to socket #0.
AT+USOWR=0,3	@	Request to write 3 data bytes into socket #0. Wait for "@" symbol indicating the data prompt is now open.
123	+USOWR: 0,0 OK	Write data. After the last byte the data prompt is closed. Note: It is not allowed to write fewer bytes than previously specified with AT+USOWR command. Note: If more bytes are written with respect to the threshold, the remaining bytes will be truncated. The interface is blocked until all bytes are written. URC +USOWR: 0,0 indicates 0 bytes have been sent to remote host. **This means the TCP connection is now closed.**
AT+USORD=0,25	+USORD: 0,25,"23dfgt5uhj89ikdftevlpaz we" OK	Read the remaining data bytes still stored in the buffer of socket #0.
	+UUSOCL: 0	This URC indicates the TCP connection associated to socket #0 is now closed and socket #0 is cleared.

5.6 Socket State

Command	Response	Description
AT+USOCTL=0,0	+USOCTL:0,0,6 OK	Query the socket type of socket #0. The socket type is TCP (<param_id> = 6).
AT+USOCTL=0,10	+USOCTL: 0,10,4 OK	It's possible to query the state of TCP connection associated to the socket, in this example socket #0 (this command is valid only for TCP socket). The third parameter of URC +USOCTL is the state; in this example 4 means ESTABILISHED.
AT+USOCTL=0,10	+USOCTL: 0,10,7 OK	In this example 7 means CLOSE_WAIT. If the socket state is 7 it means a TCP connection termination procedure is being performed. For a detailed description of TCP socket states see +USOCTL command description in u-blox AT Commands Manual [1].
AT+USOCTL=0,11	+USOCTL:0,11,0 OK	Query for TCP outcoming unacknowledged data of socket #0 (this command is valid only for TCP socket). In this case 0 bytes of data are unacknowledged.
AT+USOCTL=0,1	+USOCTL:0,1,0 OK	Query for the last socket error for socket #0. 0: no errors.

5.7 Socket Close

By remote server

Command	Response	Description
	+UUSOCL: 1	This URC indicates the TCP connection associated to socket 1 is closed. Socket 1 is cleared. **WARNING: After this indication has been received the socket buffer is cleared.**

By the module

Command	Response	Description
AT+USOCL=0	OK	Socket closed by the module (socket #0). **WARNING: No URC +UUSOCL is returned.**

5.8 Direct Link

5.8.1 Enter and exit from Direct Link Mode

Command	Response	Description
AT+USOCR=6	+USOCR: 0 OK	Create a TCP socket. In this example Socket #0 is created. +USOCR: 0 response returns the created socket identifier (in this example #0). If a new socket is created (without closing the already existent), a new socket identifier will be returned.
AT+USOCO=0,"151.9.34.66",444	OK	Connect socket #0 to port 444 of a remote host with IP address 151.9.34.66. The connection is now uniquely associated to the socket. Socket is now ready for read / write operations.
AT+USODL=0	CONNECT	Activate direct link mode for socket #0. Once user gets the response CONNECT, this means that a transparent end to end communication has been established with the previous connected TCP socket via the serial interface. Now data received on socket #0 will be redirected to the serial port and data written on serial port will sent to socket #0.
+++	DISCONNECT OK	Exit from direct link mode; **this will not close the TCP connection**. Now you are in command mode. Data can be read or written on socket #0 using usual TCP commands (+USOWR, +USORD). Note: DISCONNECT message is provided on LEON-G100-04x/LEON-G200-04x and subsequent versions and LISA-U1 / LISA-H1 series
AT+USODL=0	CONNECT	Reactivate direct link mode for socket #0. Now data received on socket #0 will be redirected to the serial port and data written on serial port will sent to socket #0.

5.8.2 Closing a connection

Command	Response	Description
+++	DISCONNECT OK	First Exit from direct link mode; this will not close the TCP connection. Now you are in command mode. Note: DISCONNECT message is provided on LEON-G100-04x/LEON-G200-04x and subsequent versions and LISA-U1 / LISA-H1 series
AT+USOCL=0	OK	Clear the socket the connection is associated to.

5.8.3 Connection closed by remote host

Command	Response	Description
	DISCONNECT OK +UUSOCL: 0	If remote host closes the connection while a socket is in direct link mode module exits from direct link mode. OK and the indication of the number of the socket has been closed is returned. If data is stored in the socket buffer when remote host closes the connection, all data will be received through the serial port before the closure notification. Note: DISCONNECT message is provided on LEON-G100-04x/LEON-G200-04x and subsequent versions and LISA-U1 / LISA-H1 series

☞ For more details on "+++" escape sequence please refer to chapter 7.1.4.

☞ If a context deactivation occurs open sockets become invalid. Close them and reinitialize TCP connections.

6 UDP/IP AT commands

LEON   LISA

6.1 Socket Write (+USOST)

Command	Response	Description
AT+USOCR=17	+USOCR: 0 OK	Create a UDP socket. In this example Socket #0 is created. +USOCR: 0 response returns the created socket identifier (in this example #0). If a new socket is created (without closing the already existent), a new socket identifier will be returned.

Command	Response	Description
`AT+USOCR=17,12000`	`+USOCR: 0,12000` `OK`	It's possible to create a UDP socket specifying the local port to be used while sending data. In this example Socket #0 is created and bound with port 12000. Data written on socket #0 will be sent from this specific port.
`AT+USOST=0,"151.9.34.66",454,2`	`@`	Request to write 2 bytes of data into socket #0 specifying IP address and UDP port of the remote host UDP packet has to be sent to. Wait for "@" symbol indicating the data prompt is now open (AT commands are not allowed in data prompt).
`12`	`+USOST: 0,2` `OK`	Write data. After the last data byte is written, the prompt is closed. Note: It is not allowed to write fewer bytes than previously specified with AT+USOST command. Note: If more bytes are written with respect to the threshold, the remaining bytes will be truncated. The interface is blocked until all bytes are written. URC +USOST: 0,2 and OK are returned. This means the data is sent to lower level of protocol stack. This is not an acknowledgment, UDP is a connectionless protocol.

6.2 Socket Read (+USORF)

Command	Response	Description
	`+UUSORD: 0,2`	A UDP packet with 2 data bytes has been received

`AT+USORF=0,2`	`+USORF:`
	`0,"151.9.34.66",454,2,"12"`
	`OK`
		Read data.
		+USORF indicates:
		• ID of read socket
		• Remote IP address
		• Remote UDP port
		• Number of read data bytes
		• Read data bytes (between quotation marks)

	`+UUSORD: 0,20`	UDP packet with 20 data bytes has been received from remote server.

`AT+USORF=0,10`	`+USORF:`
	`0,"151.9.34.66",454,2,"123456`
	`7890"`
	`OK`
	
	`+UUSORD: 0,10`
		Read 10 data bytes. URC +UUSORD indicates that 10 bytes are still unread.
		
		Remote host sends a UDP packet with 20 data bytes.

Command	Response	Description

`AT+USORF=0,10`	`+USORF:`
	`0,"151.9.34.66",454,2,"123456`
	`7890"`
	`OK`
		Read the remaining 10 data bytes of the previous packet. URC indicates 20 data bytes has been received and are still stored in the socket buffer.

	`+UUSORD: 0,20`	Note: after the first URC has been returned, a second URC is returned (only after a reading operation) indicating: • If a reading operation of a packet is not finished it will be provided the remaining data of the specific packet • Otherwise it will provide the number of data bytes of packets stored in the socket buffer

☞ If the UDP socket is not set in listening mode (see +USOLI) it won't be possible to receive any packet if a previous write operation is not performed.

☞ Due to the UDP specific AT commands, this command should be considered obsolete and it is strongly recommend avoiding its usage while working with UDP sockets. The command's functionality for UDP socket is maintained for backward compatibility only, please consider to use +USOST and +USORF command instead of +USOCO with +USOWR and +USORD.

6.3 Socket Write (+USOWR)

Command	Response	Description
`AT+USOCR=17`	`+USOCR: 0` `OK`	Create a UDP socket. In this example Socket #0 is created. +USOCR: 0 response returns the created socket identifier (in this example #0). If a new socket is created (without closing the already existent), a new socket identifier will be returned.
`AT+USOCR=17,12000`	`+USOCR: 0,12000` `OK`	It's possible to create a UDP socket specifying the local port to be used while sending data. In this example Socket #0 is created and bound with port 12000. Data written on socket #0 will be sent from this specific port.
`AT+USOCO=0,"151.9.34.66",443`	`OK`	Specify IP address of the remote server and TCP port where UDP packets have to be sent. **UDP is a connectionless protocol, reception of UDP packets is not guaranteed, +USOCO does not establish a connection.** Socket is now ready to send data to the remote server or for receiving data from the remote server.
`AT+USOWR=0,2`	`@`	Request to write 2 bytes of data into socket #0.Wait for "@" symbol indicating the data prompt is now open (AT commands are not allowed in data prompt).

Command	Response	Description
`12`	`+USOWR: 0,2` `OK`	Write data. After the last byte the data is written, the prompt is closed. Note: It is not allowed to write fewer bytes than previously specified with AT+USOWR command. Note: If more bytes are written with respect to the threshold, the remaining bytes will be truncated. The interface is blocked until all bytes are written. URC +USOWR: 0,2 and OK are returned. This means the data is sent to lower level of protocol stack. This is not an acknowledgment.

6.4 Socket Read (+USORD)

Command	Response	Description
	`+UUSORD: 0,2`	A UDP packet with 2 data bytes has been received from remote server.
`AT+USORD=0,2`	`+USORD: 0,2,"23"` `OK`	Read the data.
	`+UUSORD: 0,20`	A UDP packet with 2 data bytes has been received from remote server.

`AT+USORD=0,10`	`+USORD: 0,10,"1234567890"`
	`OK`
	
	`+UUSORD: 0,10`
		Read 10 bytes of data. URC indicates that 10 bytes are still unread.
		
		UDP packet with 20 byte of data received from remote server.

`AT+USORD=0,10`	`+USORD: 0,10,"1234567890"`
	`OK`
	
	`+UUSORD: 0,20`
		Read the remaining 10 data bytes of the previous packet. URC indicates 20 data bytes has been received and are still stored in the socket buffer.
		
		Note: after the first URC has been returned, a second URC is returned (only after a reading operation) indicating:
		
		• If a reading operation of a packet is not finished it will be provided the remaining data of the specific packet
		• Otherwise it will provide the number of data bytes of packets stored in the socket buffer

☞ If the UDP socket is not set in listening mode (see +USOLI) it won't be possible to receive any packet if a previous write operation is not performed.

7 FTP AT commands

LEON

Make sure to follow the steps in "Network Registration and Configuration" (chapter 3) before using the AT commands in this chapter.

First do preliminary configuration:

1. Set verbose error messages
2. Check the PIN
3. Attach to the network

Command	Response	Description
		Configure the parameters needed to connect to the FTP server using the +UFTP command. These parameters will be set:
`AT+UFTP=1,"ftp.test.neonseven.com"`	OK	• FTP server hostname
`AT+UFTP=2,"anonymous"`	OK	• FTP username
`AT+UFTP=3,"user@somedomain.com"`	OK	• FTP password
`AT+UFTP=6,0`	OK	• FTP connection mode (ACTIVE connection)
`AT+UDNSRN=0,"ftp.test.neonseven.com"`	`+UDNSRN:"216.239.59.147"` OK	Resolve the hostname.
		Connect to the server and manage the FTP Connection using the +UFTPC command. Let's start connecting to the server.
`AT+UFTPC=1`	OK `+UUFTPCR: 1,1`	Note: URC +UUFTPCR is returned when the connection is established.

`AT+UFTPC=13`	OK
	`+UUFTPCD: 13,194,"-rw-r--r--`
	`1 ftp      ftp         1037`
	`Aug  5 09:45 dat_000`
	`-rw-r--r--  1 ftp      ftp`
	`21041 Aug  5 09:12 data.zip`
	`-rw-r--r--  1 ftp      ftp`
	`12 Aug  5 09:42 xlog.zip`
	`"`
	
	`+UUFTPCR: 13,1`
		Request the file-list on the server.

`AT+UFTPC=10,"uploads"`	OK `+UUFTPCR: 10,1`	Create a new directory on the FTP server.

`AT+UFTPC=13`	OK
	
	`+UUFTPCD: 13,258,"-rw-r--r--`
	`1 ftp      ftp         1037`
	`Aug  5 09:45 dat_000`
	`-rw-r--r--  1 ftp      ftp`
	`21041 Aug  5 09:12 data.zip`
	`drwxr-xr-x  2 ftp      ftp`
	`4096 Aug  5 09:48 uploads`
	`-rw-r--r--  1 ftp      ftp`
	`12 Aug  5 09:42 xlog.zip`
	`"`
	
	`+UUFTPCR: 13,1`
		Request again the file list.

Command	Response	Description
		Change directory to directory name "uploads".
AT+UFTPC=8,"uploads"	OK +UUFTPCR: 8,1	Note: to return back in the parent directory use AT+UFTPC=8,"..".
AT+UFTPC=5,"gps_positions","gps_positions"	OK +UUFTPCR: 5,1	Upload a file from the module to FTP server from local file system of the module (in this example filename "gps_positions").
AT+UFTPC=13	OK +UUFTPCD: 13,70,"-rw-r--r-- 1 ftp ftp 176673 Aug 5 10:03 gps_positions" +UUFTPCR: 13,1	Request the file list.
AT+UFTPC=8,".."	OK +UUFTPCR: 8,1	Return to the parent directory.
AT+UFTPC=4,"data.zip","data.zip"	OK +UUFTPCR: 4,1	Download a file from the FTP server to the local file system of the module.
AT+UFTPC=0	OK +UUFTPCR: 0,1	Disconnect from FTP server.
AT+UPSDA=0,4	OK	Detach the GPRS connection with the +UPSDA command. Note: the specified profile will be deactivated.

☞ To list and view all files stored in the wireless module file system, refer to chapter 14.

7.1 Direct Link

7.1.1 Retrieve a file from FTP server

Command	Response	Description
		Configure the parameters needed to connect to the FTP server using the +UFTP command. These parameters will be set:
AT+UFTP=1,"ftp.test.neonseven.com"	OK	• FTP server hostname
AT+UFTP=2,"anonymous"	OK	• FTP username
AT+UFTP=3,"user@somedomain.com"	OK	• FTP password
AT+UFTP=6,0	OK	• FTP connection mode (ACTIVE connection)
AT+UDNSRN=0,"ftp.test.neonseven.com"	+UDNSRN:"216.239.59.147" OK	Resolve the hostname.
		Connect to the server and manage the FTP Connection using the +UFTPC command. Let's start connecting to the server.
AT+UFTPC=1	OK +UUFTPCR: 1,1	Note: URC +UUFTPCR is returned when the connection is established.

Command	Response	Description
`AT+UFTPC=6,"file_to_retrieve"`	`CONNECT`	Send to FTP server a RETRIEVE file request for `file_to_retrieve`. Once user gets the response CONNECT direct link mode is activated. Data received from FTP connection will be redirected to the serial port.

`+++`	`DISCONNECT`
	
	`OK`
	
	`+UUFTPCR: 6,1`
		WARNING: When the file has entirely been retrieved module does not exit from direct link mode. It's necessary to exit manually using "+++" escape sequence.
		
		URC +UUFTPCR notifies if retrieve operation has been concluded successfully.
		
		Note: DISCONNECT message is provided on LEON-G100-04x/LEON-G200-04x and subsequent versions and LISA-U1 / LISA-H1 series

7.1.2 Aborting retrieve file request

Command	Response	Description

`+++`	`DISCONNECT`
	
	`OK`
	
	`+UUFTPCR: 6,0`
		If entering "+++" escape sequence before the requested file has been entirely retrieved from FTP server, module exits from direct link and URC +UUFTPCR notifies that retrieve operation hasn't been concluded successfully.
		
		Note: DISCONNECT message is provided on LEON-G100-04x/LEON-G200-04x and subsequent versions and LISA-U1 / LISA-H1 series

7.1.3 Store a file on FTP server

Command	Response	Description
		Configure the parameters needed to connect to the FTP server using the +UFTP command. These parameters will be set:
`AT+UFTP=1,"ftp.test.neonseven.com"`	`OK`	• FTP server hostname
`AT+UFTP=2,"anonymous"`	`OK`	• FTP username
`AT+UFTP=3,"user@somedomain.com"`	`OK`	• FTP password
`AT+UFTP=6,0`	`OK`	• FTP connection mode (ACTIVE connection)
`AT+UDNSRN=0,"ftp.test.neonseven.com"`	`+UDNSRN:"216.239.59.147"` `OK`	Resolve the hostname.
		Connect to the server and manage the FTP. Connection using the +UFTPC command. Let's start connecting to the server.

Command	Response	Description
`AT+UFTPC=1`	`OK` `+UUFTPCR: 1,1`	Note: URC +UUFTPCR is returned when the connection is established.
`AT+UFTPC=7,"file_to_store"`	`CONNECT`	Send to FTP server a STORE file request for `file_to_store`. Once user gets the response CONNECT direct link mode is activated. Data sent through the serial port will be redirected to FTP server through the FTP connection.

`+++`	`DISCONNECT`
	
	`OK`
	
	`+UUFTPCR: 7,1`
		When data upload is concluded use "+++" escape sequence for exiting from direct link mode.
		
		The URC +UUFTPCR notifies if STORE operation has been concluded successfully.

7.1.4 About "+++" escape sequence usage

To switch from data mode to command mode a proper escape sequence shall be sent by the application to the module. The application can configure the escape sequence by means of the following:

- ATS2: this command is used to set the character used as the escape character (default is '+')
- ATS12: this command is used to set the escape prompt delay (T_{EPD}) timer (default is 1 s)

For more details on the AT commands please refer to u-blox AT Commands Manual [1].

The escape sequence must follow certain timing constraints to be distinguished from generic data.
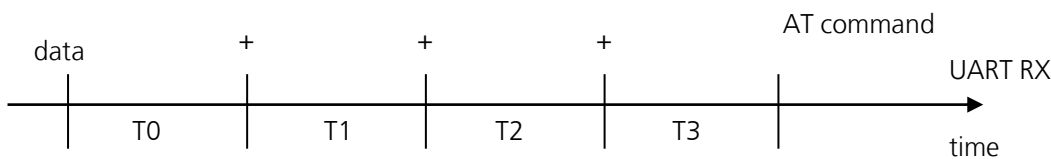
- T0 > T_{EPD}: there must be at least T_{EPD} seconds after the last data byte and the first escape character
- T1 < T_{EPD}: the second escape character must be sent within T_{EPD} seconds after the first escape character
- T2 < T_{EPD}: the third escape character must be sent within T_{EPD} seconds after the second escape character
- T3 > T_{EPD}: There must be at least T_{EPD} seconds after the last escape character and the first AT command

8 SMTP AT commands

LEON

Make sure to follow the steps in "Network Registration and Configuration" (chapter 3) before using the AT commands in this chapter.

Command	Response	Description
		Set up the necessary parameters for SMTP using the +USMTP.
`AT+USMTP=1,"smtp.mail.yahoo.com"`	OK	1. SMTP server hostname
		2. Authentication type (no authentication)
`AT+USMTP=4,0`	OK	3. Inactivity timeout
`AT+USMTP=5,3600`	OK	
`AT+UDNSRN=0, "smtp.mail.yahoo.com"`	`+UDNSRN:"69.147.102.58"` OK	Resolve the hostname.
		Prepare the mail envelope and body using the +USMTPM command.
`AT+USMTPM`	OK	4. Reset all the parameters
`AT+USMTPM=0,"test.sender@yahoo.com"`	OK	5. Set up mail sender address
		6. Set up the reply-to mail address
`AT+USMTPM=1,"test.sender@yahoo.com"`	OK	7. Set up the mail receiver address
`AT+USMTPM=2,"receiver@somedomain.com"`	OK	Note: the specified mail addresses only examples. Use real email addresses.
`AT+USMTPM=3,"This is the subject of the email"`	OK	8. Set up the mail subject
`AT+USMTPM=4,"This is the body text of the email"`	OK	9. Set up the mail text
`AT+USMTPM=5,"screenshot.jpg", 2,"jpg"`	OK	10. Set up the attachment stored in file system Note: "screenshot.jpg" is a filename for example only. Specify filenames stored into the file system.
		Send the email using the +USMTPC command. To send an email it is needed to:
`AT+USMTPC=1`	OK `+UUSMTPCR: 1,1`	1. Connect to the SMTP server
`AT+USMTPC=2`	OK `+UUSMTPCR: 2,1`	2. Send the email
		3. Disconnect from the SMTP server
`AT+USMTPC=0`	OK `+UUSMTPCR: 0,1`	Note: the notification of the success of the operation is provided by the reception of the URC +UUSMTPCR.
`AT+USMTPM`	OK	Reset the mail parameters.
`AT+UPSDA=0,4`	OK	Finally detach the GPRS connection with the +UPSDA command. Note: the specified profile will be deactivated.

9 HTTP AT commands

LEON

Make sure to follow the steps in "Network Registration and Configuration" (chapter 3) before using the AT commands in this chapter.

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages.
AT+UHTTP=0	OK	Reset HTTP profile #0.
AT+UHTTP=0,1,"www.test.neonseven.com" AT+UHTTP=0,4,80	OK OK	Set the server domain name and port.
AT+UDNSRN=0, "www.test.neonseven.com"	+UDNSRN: "151.9.34.66" OK	DNS resolution of www.test.neonseven.com.
AT+UHTTPC=0,0,"/","head.ffs"	OK +UUHTTPCR=0,0,1	HEAD request of default page and store the result into the "head.ffs" file on local file system of the module. +UUHTTPCR notifies success/failure of the operation (in this example: success).
AT+UHTTPC=0,1,"/","get.ffs"	OK +UUHTTPCR=0,1,1	GET request of default page and store the result into the "get.ffs" file on local file system of the module. +UUHTTPCR notifies success/failure of the operation (in this example: success).
AT+UHTTPC=0,5,"/test/plain/method_post.php","post.ffs","name_post=MyName&age_post=30",0	OK +UUHTTPCR=0,5,1	POST request sending data using content type application/x-www-form-urlencoded. The result is saved in "post.ffs" file on local file system of the module. +UUHTTPCR notifies success/failure of the operation (in this example: success).
AT+UHTTP=0,2,"test_user" AT+UHTTP=0,3,"P455w0rd" AT+UHTTP=0,4,1	OK OK OK	Set authentication for HTTP server: • HTTP server username • HTTP server password • HTTP server authentication method (basic authentication) The 6th character of the password is a zero.
at+uhttpc=0,5,"/test/auth/method_post.php","post_auth.ffs","name_post=MyName&age_post=26",0	OK +UUHTTPCR=0,5,1	POST request sending data using content type application/x-www-form-url encoded. The page requires basic authentication. The result is saved in "post_auth.ffs" file on local file system of the module. +UUHTTPCR notifies success/failure of the operation (in this example: success).

☞ To list and view all files stored in the wireless module file system, refer to chapter 14.

10 Network Congestion Detection AT commands

LEON

10.1 GSM module

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages.
AT+UCD=1,12,18	OK	Enable and configure the congestion detection.
	+UCD: 1	If congestion is detected (depends on the +UCD configuration) a URC (+UCD) is raised.
AT+UCD=0	OK	Disable network congestion detection.

11 ADC AT commands (if supported)

LEON

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages.
AT+UADC=?	+UADC: (0) OK	Check the current values of ADC parameters.
AT+UADC=0	+UADC: 0,473 OK	Check the current value (in milliVolts) of the specified ADC.

12 GPIO AT commands

LEON   LISA

For more details about GPIO pin mapping please refer to LEON-G100 / LEON-G200 System Integration Manual [3].

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages.
AT+UGPIOR=?	+UGPIOR: (20, 21) OK	GPIO pin numbers.
AT+UGPIOC=20,0,0 AT+UGPIOC=21,1	OK OK	Set up the GPIO input / output mode: • GPIO1 in output mode with default value 0 • GPIO2 in input mode (no default value can be set)
AT+UGPIOR=20 AT+UGPIOR=21	+UGPIOR: 20,0 OK +UGPIOR: 21,1 OK	Read the GPIO status.
AT+UGPIOW=20,1	OK	Write (set) the GPIO status. Note: only GPIO configured in output mode can be written.

Command	Response	Description
AT+UGPIOC=21,2	OK	Configure GPIO2 to be used as network indication.
AT+UGPIOC=?	+UGPIOC: (20, 21),(0-3),(0-1) 20, 0, 1 21, 2 OK	Provides GPIO status (GPIO1 is an output with value 0 and GPIO2 is set as network configuration).
AT+UGPIOW=21,1	+CME ERROR: Write GPIO error	Write into a GPIO in input mode. Error is returned.

13 MUX AT commands

LEON   LISA

There are 6 virtual channels for the MUX. CHANNEL 0 is used for the MUX control channel, Channels 1 to 5 can be used for AT commands or GSM/GPRS data (note there can be only 1 data channel). GPS in tunneling mode will use Channel #6.

☞   AT+CMUX command has to be sent by the mux driver on host. When the control channel is closed the mux is disabled. To close the mux channel it is necessary to stop the mux driver; after this the channel #0 will not be seen as a virtual port.

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages.
AT+CMUX=0,0,0,1400,253,3,254, 0,0	OK	Enable the MUX on the module. Once the MUX is started you need to handle the connection using the multiplexing protocol as defined in 3GPP 27.010 [2].

14 File System AT commands

LEON   LISA

☞   Commands in this chapter refer to the local file system on the module. The size of the file system is limited by the available memory. Refer to u-blox AT Commands Manual [1].

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages.
AT+ULSTFILE=	+ULSTFILE:"a_file","another_f ile","mydata" OK	List all the files in the file system.
AT+ULSTFILE=1	+ULSTFILE: 1012131 OK	Get free space in the file system (in bytes).
AT+ULSTFILE=2,"a_file"	+ULSTFILE: 24365 OK	Get file size of "a_file" file (in bytes).
AT+ULSTFILE=2,"some_name"	+ULSTFILE: 0 OK	If the specified file does not exist a 0 bytes dimension is returned.

Command	Response	Description
AT+UDWNFILE="new_file",12	>	Request the creation of a new file on file system specifying file name and file size (in bytes).
		Wait for "˃" symbol indicating the data prompt is now open (AT commands are not allowed in data prompt).
Hello World!	OK	Send to serial port the bytes to be written in the specified file.
		Note: It is not possible to write fewer bytes than previously specified with AT+UDWNFILE command.
		Note: If more bytes are written with respect to the threshold, the remaining bytes will be truncated.
		The interface is blocked until all bytes are written.
		When the requested number of bytes is written module exits from data prompt, OK is returned if no error occurred during file creation.
AT+ULSTFILE=	+ULSTFILE:"a_file","another_file","mydata","new_file" OK	List again all the files in the file system.
AT+URDFILE=2,"new_file"	+URDFILE: 12 OK	Get file size of "new_file" file (in bytes). The size is exactly the size requested when file was created with +UDWNFILE.
AT+URDFILE="new_file"	+URDFILE: new_file,12,"Hello World!" OK	Read the just created file ("new_file").
AT+UDELFILE="new_file"	OK	Delete the file called "new_file".
AT+ULSTFILE=	+ULSTFILE:"a_file","another_file","mydata" OK	List all the file in the file system.

15 SIM Toolkit

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SIM Application Toolkit (SAT) is a set of commands and procedures which may be used during a GSM session. The SAT provides mechanisms which allow applications, existing in the SIM, to interact and operate with any MT, which supports the specific mechanisms required by the application.

The specifications related to SIM toolkit are u-blox AT Commands Manual [1], 3GPP TS 27.010 [2], 3GPP TS 11.11 [4] and 3GPP TS 11.14 [5].

The SAT can be activated by sending +CFUN=6, this enables the SIM-toolkit interface and fetching of proactive commands by SIM-APPL from the SIM-card. After the activation of the SIM toolkit interface, the setup menu may be displayed via +STKPRO URC when available from the SIM (immediately or after PIN insertion).

The commands in this section work properly only if the SIM toolkit interface has been activated by the DTE. Otherwise the SIM-toolkit processing will be blocked.

15.1 Profile download

Profile downloading provides a mechanism for the MT to tell the SIM what it is capable of, and the SIM can then limit its instruction range accordingly. If no command is sent by the MT, the SIM shall assume that the MT does not support SIM Application Toolkit.

The Terminal Profile can be queried by +STKPROF and the result is the list of SAT facilities that are supported by the MT, as specified in 3GPP Technical Specification 11.14 [5].

Command	Response	Description
AT+CFUN=6	OK	Activate the SAT (if not already enabled).
AT+STKPROF?	+STKPROF: 17,"FFFFFFFF7F0300DF7F0000000 0010A0003" OK	The reading result of the terminal profile data.

☞ The terminal profile is sent at power up from MT to SIM, no matter if SAT is enabled or not.

15.2 Proactive SIM

A proactive SIM is a SIM which is capable of issuing commands to the MT within the T=0 protocol, which is specified in ISO/IEC 7816-3 [6]. The MT is always the "master" and initiates commands to the SIM, and therefore there is no mechanism for the SIM to initiate a communication with the MT. This limits the possibility of introducing new SIM features requiring the support of the MT, as the MT needs to know in advance what actions it should take. The SIM shall execute all SAT proactive commands or procedures in such a way as not to jeopardise, or cause suspension, of service provisioning to the user.

Proactive SIM gives a mechanism whereby the SIM can initiate actions to be taken by the MT. These actions include:

- Displaying text from the SIM to the MT
- Sending a short message
- Setting up a voice call to a number held by the SIM
- Setting up a data call to a number and bearer capabilities held by the SIM
- Sending a SS control or USSD string
- Playing tone in earpiece

- Initiating a dialogue with the user
- SIM initialization request and notification of changes to EF(s)
- Providing local information from the MT to the SIM
- Communicating with the additional card(s) (if class "a" is supported)
- Providing information about the additional card reader(s) (if class "a" is supported)
- Managing timers running physically in the MT
- Running an AT command received from the SIM, and returning the result to the SIM (if class "b" is supported)
- Sending DTMF
- Requesting the MT to launch the browser corresponding to a URL (if class "c" is supported)
- Establishing and managing a bearer independent protocol (if class "e" is supported)

The list of the supported proactive commands can be queried by sending +STKPRO in test command syntax.

Command	Response	Description
`AT+CFUN=6`	`OK`	Activate the SAT (if not already enabled).

`AT+STKPRO=?`	`+STKPRO=01,05,16,17,18,19,20,`
	`21,32,33,34,35,36,37,38,40,53`
	`OK`
		Displays the list of supported proactive commands.

Referring to 3GPP TS 11.14 [5], this means that the module supports the following proactive commands:
- 01 (0x01) – REFRESH
- 05 (0x05) – SETUP EVENT LIST
- 16 (0x10) – SETUP CALL
- 17 (0x11) – SEND SS
- 18(0x12) – SEND USSD
- 19(0x13) – SEND SMS
- 20(0x14) – SEND DTMF
- 21(0x15) – LAUNCH BROWSER
- 32 (0x20) – PLAY TONE
- 33 (0x21) – DISPLAY TEXT
- 34 (0x22) – GET INKEY
- 35 (0x23) – GET INPUT
- 36 (0x24) – SELECT ITEM
- 37 (0x25) – SETUP MENU
- 38 (0x26) – PROVIDE LOCAL INFO
- 40 (0x28) – SETUP IDLE MODE TEXT
- 53 (0x35) – LANGUAGE NOTIFICATION

15.3 Example

15.3.1 Enable the SAT and terminal response

Command	Response	Description
AT+CFUN=6	OK	Activate the SAT (if not already enabled).
	+STKPRO: 37,"STK-JavaCard",1,1,"AA",0	SAT URC which displays to user the SAT main menu.
AT+STKTR=37,0	OK	Response to the previous SIM Toolkit proactive command which has been displayed by the URC +STKPRO.
	+STKCNF: 37,0,255,144	URC displaying the SAT proactive session status: • 37: set up menu • 0: command performed successfully • 255: no additional info • 144: normal ending of the command

15.3.2 Changing the terminal profile

Command	Response	Description
AT+CFUN=6	OK	Activate the SAT (if not already enabled).
	+STKPRO: 37,"STK-JavaCard",1,1,"AA",0	SAT URC which displays to user the SAT main menu.
AT+STKTR=37,0	OK	Response to the previous SIM Toolkit proactive command which has been displayed by the URC +STKPRO.
	+STKCNF: 37,0,255,144	URC displaying the SAT proactive session status: • 37: set up menu • 0: command performed successfully • 255: no additional info • 144: normal ending of the command
AT+STKPROF?	+STKPROF: 17,"FFFFFFFF7F0300DF7F00000000010A0003" OK	The reading result of the terminal profile data.
AT+STKPROF=2,"FF03"	OK	Modify the terminal profile value.
AT+CPWROFF	OK	Power off the module to store the changes in EEP.
(powering on module again)		
AT+STKPROF?	+CME ERROR: operation not allowed	The SAT must be activated at next power up.
AT+CFUN=6	OK	Activate the SAT (if not already enabled).
AT+STKPROF?	+STKPROF: 2,"FF03" OK	The reading result of the terminal profile data.
AT+STKPROF=0	OK	forces a reset to the default terminal profile stored in the MT.
AT+STKPROF?	+STKPROF: 17,"FFFFFFFF7F0300DF7F00000000010A0003" OK	The reading result of the terminal profile data.
AT+CPWROFF	OK	Power off the module to store the changes in EEP.

15.3.3 Entering SAT menu and selecting an item

Command	Response	Description
`AT+CFUN=6`	`OK`	Activate the SAT (if not already enabled).
	`+STKPRO: 37,"STK-JavaCard",1,1,"AA",0`	SAT URC which displays to user the SAT main menu.
`AT+STKTR=37,0`	`OK`	response to the previous SIM Toolkit proactive command which has been displayed by the URC +STKPRO.
	`+STKCNF: 37,0,255,144`	URC displaying the SAT proactive session status: • 37: set up menu • 0: command performed successfully • 255: no additional info • 144: normal ending of the command
`AT+STKENV=211,1`	`+STKCNF: 129,0,255,145` `OK`	Send command "Menu Selection" to the SIM. The proactive session status is displayed by +STKCNF: • 129: end of proactive session • 0: command performed successfully • 255: no additional info • 145: normal ending of the command

	`+STKPRO: 36,"Commands",1,6,"SIM - ME",0,0`
	
	`+STKPRO: 36,"Commands",2,6,"SIM - Display",0,0`
	
	`+STKPRO: 36,"Commands",3,6,"SIM - Earpiece",0,0`
	
	`+STKPRO: 36,"Commands",4,6,"SIM - Network",0,0`
	
	`+STKPRO: 36,"Commands",5,6,"SIM - Card reader",0,0`
	
	`+STKPRO: 36,"Commands",6,6,"Special",0,0`
		SAT submenu consisting in 6 items of type "Select item".

`AT+STKTR=36,0,0,0,0,"02"`	`OK`	Terminal response: select item '2'.
	`+STKCNF: 36,0,255,144`	Proactive session status.

	`+STKPRO: 36,"Display Text",1,3,"ASCII 7 bit",0,0`
	
	`+STKPRO: 36,"Display Text",2,3,"UCS2",0,0`
	
	`+STKPRO: 36,"Display Text",3,3,"Icon",0,0`
		SAT submenu consisting in 3 items of type "Select item".

15.3.4 Call setup

Command	Response	Description
`AT+CFUN=6`	`OK`	Activate the SAT (if not already enabled).
	`+STKPRO: 37,"STK-JavaCard",1,1,"AA",0`	SAT URC which displays to user the SAT main menu.
`AT+STKTR=37,0`	`OK`	Response to the previous SIM Toolkit proactive command which has been displayed by the URC +STKPRO.
	`+STKCNF: 37,0,255,144`	URC displaying the SAT proactive session status: • 37: set up menu • 0: command performed successfully • 255: no additional info • 144: normal ending of the command
`AT+STKENV=211,1`	`+STKCNF: 129,0,255,145` `OK`	Send command "Menu Selection" to the SIM. The proactive session status is displayed by +STKCNF: • 129: end of proactive session • 0: command performed successfully • 255: no additional info • 145: normal ending of the command

	`+STKPRO:`
	`36,"Commands",1,6,"SIM - ME",0,0`
	
	`+STKPRO:`
	`36,"Commands",2,6,"SIM - Display",0,0`
	
	`+STKPRO:`
	`36,"Commands",3,6,"SIM - Earpiece",0,0`
	
	`+STKPRO:`
	`36,"Commands",4,6,"SIM - Network",0,0`
	
	`+STKPRO:`
	`36,"Commands",5,6,"SIM - Card reader",0,0`
	
	`+STKPRO:`
	`36,"Commands",6,6,"Special",0,0`
		SAT submenu consisting in 6 items of type "Select item".

`AT+STKTR=36,0,0,0,0,"04"`	`OK`	Terminal response: select item '4'.
	`+STKCNF: 36,0,255,144`	Proactive session status.

	`+STKPRO: 36,"SIM - Network",1,5,"DTMF",0,0`
	
	`+STKPRO: 36,"SIM - Network",2,5,"SMS",0,0`
	
	`+STKPRO: 36,"SIM - Network",3,5,"Send SS",0,0`
	
	`+STKPRO: 36,"SIM - Network",4,5,"USSD",0,0`
	
	`+STKPRO: 36,"SIM - Network",5,5,"Setup Call",0,0`
		SAT submenu consisting in 5 items of type "Select item".

Command	Response	Description
AT+STKTR=36,0,0,0,0,"05"	OK	Terminal response: select item '4'
	+STKCNF: 36,0,255,144	Proactive session status
	+STKPRO: 35,0,4,"456E746572206469616C2 06E6F2E",20,2,,0	SAT requires GET INPUT (35); <hex_string> is "Enter dial no."
AT+STKTR=35,0,0,0,4,"31323334 35"	OK	Terminal response GET INPUT (calling number is "12345")
	+STKCNF: 35,0,255,145	Proactive session status
	+STKCC: 1,0,,"12345"	URC displaying contrl status
	+STKPRO: 16,"12345","",0,"calling...", 0,,0	Proactive session transaction
AT+STKTR=16,0	OK	Terminal response to SETUP CALL
	NO CARRIER	(in this test no GSM network available)
	+STKCNF: 16,32,4,145	Proactive session status: • 16: setup call • 32: MT currently unable to process command • 4: No service (refer to 3GPP TS 11.14 [5], additional result) • 145: normal ending of the command
	+STKPRO: 33,129,4,"526573756C743A20323 0",0,0	Proactive session transaction: DISPLAY TEXT. Text is "Result: 20"
	+STKCNF: 33,18,255,144	Proactive session status: • 33: display text • 18: no response from user • 255: no additional info • 144: normal ending of the command

16 SMS AT Commands

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16.1 Read all messages or one single message

Command	Response	Description
AT+CMGF=1	OK	Set preferred message format to text mode
AT+CPMS?	+CPMS: "ME",3,300,"ME",3,300,"ME",3, 300 OK	Check which memories are active for reading, deleting, storing, sending and receiving messages
AT+CPMS="MT"	+CPMS: 5,350,3,300,3,300 OK	Set preferred message storage to "MT" (that means SIM Card + module file system) for read and delete cases
AT+CMGL	+CMGL: 1,"REC READ","12345",,"10/09/09,15:0 6:30+08" Test message 1 +CMGL: 2,"STO SENT","67890",, abcdefghijklmnopqrstuvwxyz +CMGL: 3,"STO UNSENT","",, Test message 2 +CMGL: 301,"REC READ","54321",,"08/08/09,10:0 1:38+08" Hello world +CMGL: 302,"REC UNREAD","9876",,"09/08/09,10: 05:40+08" Test message 3 OK	Display the message list (both on module file system and SIM Card)
AT+CMGR=301	+CMGR: "REC READ","54321",,"08/08/09,10:0 1:38+08" Hello world OK	Read a single message from SIM Card since the index is greater than 300 (number of SMS stored in the module file system)
AT+CMGR=2	+CMGR: "STO SENT","67890" abcdefghijklmnopqrstuvwxyz OK	Read a single message from module file system since the index is lower than 300 (number of SMS stored in the module file system)

16.2 Delete one single message or multiple messages

Command	Response	Description
AT+CMGF=1	OK	Set preferred message format to text mode

Command	Response	Description

`AT+CPMS?`	`+CPMS: "ME",3,300,"ME",3,300,"ME",3,300`
	
	`OK`
		Check which memories are active for reading, deleting, storing, sending and receiving messages

`AT+CPMS="MT"`	`+CPMS: 5,350,3,300,3,300`
	
	`OK`
		Set preferred message storage to "MT" (that means SIM Card + module file system) for read and delete cases

`AT+CMGD=3`	`OK`	Delete single message from module file system since the index is lower than 300 (number of SMS stored in the module file system)
`AT+CMGD=302`	`OK`	Delete single message from SIM Card since the index is greater than 300 (number of SMS stored in the module file system)

`AT+CMGL`	`+CMGL: 1,"REC READ","12345",,"10/09/09,15:06:30+08"`
	`Test message 1`
	
	`+CMGL: 2,"STO SENT","67890",,`
	`abcdefghijklmnopqrstuvwxyz`
	
	`+CMGL: 301,"REC READ","54321",,"08/08/09,10:01:38+08"`
	`Hello world`
	
	`OK`
		Display the message list (both on module file system and SIM Card) to check the remaining messages

`AT+CMGD=1,1`	`OK`	Delete all read messages, leaving unread and stored (whether sent or not) messages untouched

`AT+CMGL`	`+CMGL: 2,"STO SENT","67890",,`
	`abcdefghijklmnopqrstuvwxyz`
	
	`OK`
		Display the message list (both on module file system and SIM Card) to check the remaining messages

16.3 Write and/or send one single message

Command	Response	Description
`AT+CMGF=1`	`OK`	Set preferred message format to text mode

`AT+CPMS?`	`+CPMS: "ME",3,300,"ME",3,300,"ME",3,300`
	
	`OK`
		Check which memories are active for reading, deleting, storing, sending and receiving messages

`AT+CPMS=,"SM"`	`+CPMS: 3,300,0,50,3,300`
	
	`OK`
		Set preferred message storage to "SM" (that means SIM Card) for write and send cases

`AT+CMGW="12345"<CR>`
`This is a test message<Ctrl-Z>`
	`+CMGW: 301`
	
	`OK`
		Store a new message (without sending it to the network) on the SIM Card

`AT+CMSS=301`	`+CMSS: 5`
	
	`OK`
		Send message from SIM Card since the index is greater than 300 (number of SMS stored in the module file system)

`AT+CMGS="67890"<CR>`
`Hello world<Ctrl-Z>`
	`+CMGS: 6`
	
	`OK`
		Send directly a new message without stored it.

16.4 Read all messages or one single message (concatenated SMS related commands)

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Command	Response	Description
AT+CMGF=1	OK	Set preferred message format to text mode
AT+CPMS?	+CPMS: "ME",4,300,"ME",4,300,"ME",4, 300 OK	Check which memories are active for reading, deleting, storing, sending and receiving messages
AT+CPMS="MT"	+CPMS: 6,350,4,300,4,300 OK	Set preferred message storage to "MT" (that means SIM Card + module file system) for read and delete cases
AT+UCMGL	+UCMGL: 1,"REC READ","12345",,"10/09/09,15:0 6:30+08" Test message 1 +UCMGL: 2,"STO SENT","67890",,,1,2,0,201 While some observers suggest the new plan shows government's determination to cool down the property market, several developers disagree, saying prices a +UCMGL: 3,"STO SENT","67890",,,2,2,0,201 re determined by the economy. +UCMGL: 4,"STO UNSENT","",, Test message 2 +UCMGL: 301,"REC READ","54321",,"15/10/09,13:0 1:00+08",1,2,8,3840 The government will study whether the former chief executive of the West Kowloon Cultural District authority, Graham Sheffield, has breached his contrac +UCMGL: 302,"REC READ","54321",,"15/10/09,13:0 2:40+08",2,2,8,3840 t by taking up a new position at the British Council in London. OK	Display the message list (both on module file system and SIM Card) The messages of index 2 and 3 (stored on module file system) are the two parts of a "8-bit reference number" type concatenated SMS (they have the same reference number = 201) The messages of index 301 and 302 (stored on SIM Card) are the two parts of a "16-bit reference number" type concatenated SMS (they have the same reference number = 3840) ☞ Also the +CMGL command shows all the SMS, parts of concatenated messages included, but there are no additional information about which of them are linked together
AT+UCMGR=302	+UCMGR: "REC READ","54321",,"15/10/09,13:0 2:40+08",2,2,8,3840 t by taking up a new position at the British Council in London. OK	Read a single message from SIM Card. This is the part 2 of 2 of a "16-bit reference number" type concatenated SMS

Command	Response	Description
AT+UCMGR=2	+UCMGR: "STO SENT","67890",1,2,0,201 While some observers suggest the new plan shows government's determination to cool down the property market, several developers disagree, saying prices a OK	Read a single message from module file system. This is the part 1 of 2 of a "8-bit reference number" type concatenated SMS

16.5 Write and/or send a concatenated SMS message

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Command	Response	Description
AT+CMGF=1	OK	Set preferred message format to text mode
AT+CPMS?	+CPMS: "ME",3,300,"ME",3,300,"ME",3, 300 OK	Check which memories are active for reading, deleting, storing, sending and receiving messages
AT+CPMS=,"SM"	+CPMS: 3,300,0,50,3,300 OK	Set preferred message storage to "SM" (that means SIM Card) for write and send cases
AT+UCMGW="12345",,,1,3,0,25<CR> He turned and ran up the steps to the highest point of his rocky islet, and climbed upon the stone platform he had built long ago. A quick look around sh<Ctrl-Z>	+UCMGW: 301 OK	Store (without sending it to the network) a new "8-bit reference number" type concatenated message (consisting of three parts) on the SIM Card Actually all parts need to be created separately
AT+UCMGW="12345",,,2,3,0,25<CR> owed only emptiness, save for the two smaller islets of the group, dim in the distance on either side. They bounded his world. Beyond them, and all aroun<Ctrl-Z>	+UCMGW: 302 OK	
AT+UCMGW="12345",,,3,3,0,25<CR> d in the mist-haunted sea, nothing was visible, not even the horizon.<Ctrl-Z>	+UCMGW: 303 OK	
AT+CMSS=301	+CMSS: 10 OK	Send the concatenated message from storage (SIM Card in this case)
AT+CMSS=302	+CMSS: 11 OK	All parts need to be sent separately
AT+CMSS=303	+CMSS: 12 OK	

Command	Response	Description
AT+UCMGS="67890",,1,2,8,1024<CR>	+UCMGS: 13	Send directly a new "16-bit reference number" type concatenated message (consisting of two parts)
He turned and ran up the steps to the highest point of his rocky islet, and climbed upon the stone platform he had built long ago. A quick look around s<Ctrl-Z>	OK	All parts need to be sent separately
		The messages are only sent and not stored
AT+UCMGS="67890",,2,2,8,1024<CR>	+UCMGS: 14	
howed only emptiness, save for the two smaller islets of the group, dim in the distance on either side. <Ctrl-Z>	OK	

17 SIM Lock AT commands

LEON

17.1 SIM Lock activation and deactivation

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages
AT+USIMLCK=?	+USIMLCK: ("PN","PU","PS"),"","",(0-1) OK	Test SIM lock allowed
AT+CPIN="1234"	OK	Check the PIN
AT+CLCK="PN",2	+CLCK: 0 OK	Check the SIM lock status; the network facility is not enabled
AT+USIMLCK ="PN","123.45","12345678",1	OK	Feature configured and enabled
AT+CLCK="PN",2	+CLCK: 1 OK	Check the SIM lock status; the network facility is enabled
AT+CLCK="PN",0,"12345678"	OK	Verify and de-active the personalization
AT+CLCK="PN",2	+CLCK: 0 OK	Check the SIM lock status; the network facility is not enabled

17.2 SIM Lock Enabling and Activation

Command	Response	Description
AT+CMEE=2	OK	Set verbose error messages
AT+USIMLCK=?	+USIMLCK: ("PN","PU","PS"),"","",(0-1) OK	Test SIM lock allowed
AT+CPIN="1234"	OK	Check the PIN
AT+CLCK="PN",2	+CLCK: 0 OK	Check the SIM lock status; the network facility is not enabled
AT+USIMLCK ="PN","123.45","12345678",0	OK	Feature configured but disabled
AT+CLCK="PN",2	+CLCK: 0 OK	Check the SIM lock status; the network facility is not enabled
AT+CLCK="PN",1,"12345678"	OK	Active the personalization
AT+CLCK="PN",2	+CLCK: 1 OK	Check the SIM lock status; the network facility is enabled

Appendix

A List of Acronyms

Abbreviation / Term	Explanation / Definition
3GPP	3rd Generation Partnership Project
ADC	Analog to Digital Converter
APN	Access Point Name
AT	AT Command Interpreter Software Subsystem, or attention
CI	Cell Identity
CTS	Clear To Send
DLC	Data Link Connection
DNS	Domain Name System
DTE	Data Terminal Equipment
DUT	Device Under Test
EDGE	Enhanced Data rates for GSM Evolution
FTP	File Transfer Protocol
GPIO	General Purpose Input Output
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile Communication
HSDPA	High Speed Downlink Packet Access
HTTP	HyperText Transfer Protocol
I^2C	Inter-Integrated Circuit
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Station Identity
IP	Internet Protocol
LAC	Location Area Code
MCC	Mobile Country Code
MNC	Mobile Network Code
MT	Mobile Terminal
NVM	Non Volatile Memory
PDP	Parallel Data Processing
PIN	Personal Identification Number
RAT	Radio Access Technology
RTS	Request To Send
SAT	SIM Application Toolkit
SIM	Subscriber Identification Module
SV	Satellite in View
SMTP	Simple Mail Transfer Protocol

Abbreviation / Term	Explanation / Definition
TA	Timing Advance
TCP	Transmission Control Protocol
TTFF	Time To First Fix
UDP	User Datagram Protocol
UMTS	Universal Mobile Telecommunications System
URC	Unsolicited Result Code
URL	Uniform Resource Locator
WCDMA	Wideband CODE Division Multiple Access

Related documents

[1]   u-blox AT Commands Manual, Docu. No WLS-SW-11000 available on our homepage (http://www.u-blox.com).

[2]   3GPP TS 27.010 - Terminal Equipment to User Equipment (TE-UE) multiplexer protocol (Release 1999)

[3]   LEON-G100/G200 System Integration Manual, Docu. No. GSM.G1-HW-09002 available on our homepage (http://www.u-blox.com).

[4]   3GPP TS 11.11 - Specification of the Subscriber Identity Module - Mobile Equipment (SIM-ME) Interface (Release 1999).

[5]   3GPP TS 11.14 - Specification of the SIM Application Toolkit (SAT) for the Subscriber Identity Module - Mobile Equipment (SIM-ME) Interface (Release 1999).

[6]   ISO/IEC 7816-3 - Identification cards - Integrated circuit cards Part 3: Cards with contacts: Electronic signals and transmission protocols.

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Revision history

Revision	Date	Name	Status / Comments
-	28/06/2011	lpah	Document replaces GSM.G1-CS-09003-C2 Added LISA-U1 LISA-H1 series Added examples on SMS and SIM Lock AT commands

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