



GPRS Interface

Teldat-Dm 747-I

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Chapter 1 Introduction

1.1 Description

GPRS: General Packet Radio Service.

This is a radio interface designed for data transmission, using packet switching, taking advantage of the existing GSM infrastructure with new nodes.

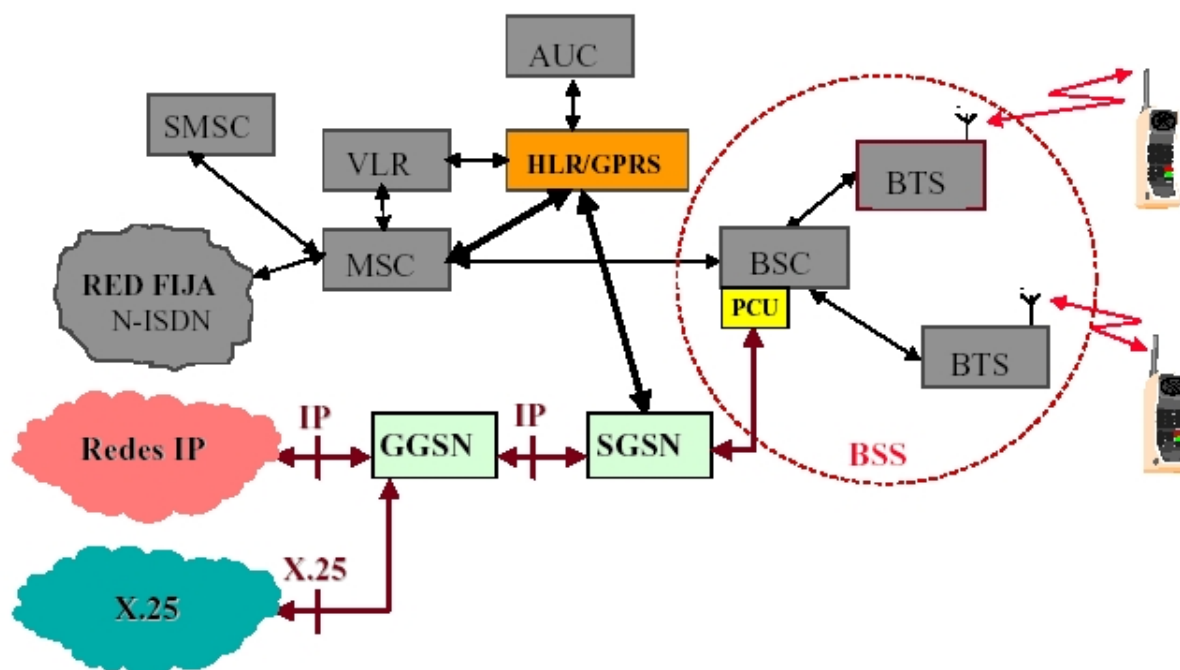
The use of packet switching permits flexible reservation of two radio channels, depending on the requirements and the number of users. Each data packet is independently dealt with and each network elements knows how to handle each packet.

GPRS transmission is oriented to data burst transmission (periods of data with periods of inactivity). This makes better use of the radio bandwidth, which is shared with the rest of the users.

GPRS provides a permanent data carrier service between an MS (mobile station) and another terminal, connected to a GPRS network or an external data transmission network (PDN). The user perceives an IP network from his/her terminal.

A further characteristic is billing by data volume.

The GPRS system architecture is as follows:



GPRS system architecture

The network elements are:

MS: **Mobile System**. This is composed of:

TE: **Terminal Equipment**, in our device this is the router.

ME: **Mobile Equipment**, in our device this is the GPRS module installed in its interior.

Internal communication between these two elements is carried out through **AT** commands during idle time and connection and through PPP protocol for data transfer.

BTS: **Base Transceiver System**. Provides the physical layer link.

BSC: **Base Station Controller**.

PCU: **Packet Control Unit**. Element that sends and deals with the data packets towards the GPRS network.

BSS: **Base Station System**. Group made up of the previous three elements.

HLR: **Home Location Register**. GPRS network node where the subscription data is permanently stored.

Location information at the GPRS user SGSN layer.

User Status.

Subscription information (quality, fixed IP addresses, subscription permissions etc).

SGSN: **Serving GPRS Support Node.** Entity responsible for communication (data packet routing and transmission) between the GPRS network and the GPRS users within the service area.

Provides security in the radio access (encryption and authentication).

This handles the mobility management (communication with the GSM network nodes).

GGSN: **Gateway GPRS Support Node.** This is the GPRS network gateway towards other external networks (IP or X.25). It is capable of translating packets received from the SGSN to the external network format.

In the same way, this handles the translation of IP addresses into the mobile address destination.

Provides dynamic assignment of IP addresses and carries out security functions towards the external networks.

1.2 Broadband and Throughput

The broadband available in GPRS depends on various factors.

Firstly, it depends on the encoding used in the radio interface. The ETSI defines four encoding levels, (CS - **Coding Scheme**), from CS1 (better protection against errors, lower speed) to CS4 (lower protection against errors, higher speed). CS-2 is normally used in the network.

The second part depends on the number of slots used in both transmission directions (reception – Downlink, transmission – Uplink). The timeslots are dynamically assigned and depend on availability.

The following table shows the maximum theoretical broadband (in Kbps), depending on the timeslots and the used encoding scheme.

	CS-1	CS-2	CS-3	CS-4
1 TimeSlot	9.05	13.4	15.6	21.4
2 TimeSlot	18.01	26.8	31.2	42.8
3 TimeSlot	27.15	40.2	46.8	64.2
4 TimeSlot	36.2	53.6	62.4	85.6

The modules used in the Teldat devices are known as Class 8, i.e. use up to four timeslots Downstream and 1 Upstream, the theoretical limit in this case would be with a CS-2 encoding at 13.4 Kbps for transmission and 53.6 Kbps for reception.

The user will always perceive a lower speed. This is due to the Overhead introduced by the various protocols participating in the data transmission.

GPRS is an extension of GSM and uses the same frequencies, transport protocols and the same cells as GSM; consequently the GPRS encoding schemes must fulfill the same requirements as GSM. As a result, the data must be encapsulated in "GPRS Radio Blocks" of 456 bits, the same as GSM. You must include the protocol overheads within these bits (RLC, TCP/IP, etc.).

An initial estimation, due to RLC (Radio Link Control). The speed for each used timeslot, depending on the encoding scheme looks like this:

	CS-1	CS-2	CS-3	CS-4
RLC Data Unit (bits)	160	240	288	400
RLC Overhead (bits)	21	28	24	28
Total (bits)	181	268	312	428
Data Rate (Kbps)	9.05	13.4	15.6	21.4
Effective Rate (Kbps)	8.00	12.0	14.4	20.0

Each block (**Radio Block**) is sent in four bursts, in the same way as GSM. It's the BSC PCU (**Packet Control Unit**) that decides to send this either via the GSM network (voice call) or over the GPRS to SGSN (GPRS packets).

The third implicated factor is the type of data itself used by the user.

Supposing that the user sends 1000 http or FTP bytes. There are various intermediate protocols that add to the overhead before sending the data to the radio link. In cases of a TCP/IP over PPP transmission, the overhead, in bytes,

could be:

Protocol	Overhead
TCP	24
IP	20
SNDCP	4
LLC	7
Total	55

This means that for each 1000 bytes, 1055 must go in each RLC packet. This determines how many Radio Blocks are necessary.

	CS-1	CS-2	CS-3	CS-4
User Data (bytes)	1000	1000	1000	1000
Total Data (bytes)	1055	1055	1055	1055
RLC Data (bytes)	20	30	36	50
Radio Blocks Req.	53	36	30	22

Assuming a CS2 encoding, the speed for the entire RLC block (268 bits) is 12.4 Kbps.

Of these 268 block bits, 240 are RLC **Data Unit**, which are transmitted at an effective rate of 12.0 Kbps. A formula to calculate the average speed of the user data, for a timeslot is as follows:

$$R \text{ (Kbps)} = D \text{ (bytes)} \times E \text{ (Kbps)} / N / P \text{ (bytes)}$$

Where:

D # Quantity of data to be sent.

N # Number of Radio Blocks ($N = D + O / P$, rounding up to the nearest whole number).

O # Overhead of the protocols (in this case 55).

E # Effective speed for the used encoding scheme.

P # Maximum payload.

Chapter 2 Configuration

2.1 Introduction

The GPRS interface control is carried out through a set of **AT** commands internally generated by the device and cannot be modified by the user. The only ones the user may modify are the PIN value (**Personal Identification Number**).

The rest of the particular connection parameters are programmed in the dial and PPP protocol profiles

Before carrying out configuration, you need to know the data provided by the carrier to configure the connection. The following table provides an example of VPN access from a fictitious carrier. Please remember that both lower and upper case letters are sensitive i.e. they must be written as given.

	VPN
APN	apnname
PDP-Type	IP
Login	OPERADOR_LOGIN
Password	OPERADOR_PASS

Another piece of data that we must bear in mind is that if you require a permanent connection (from device startup), idle-time = 0, or on demand with a determined release time, idle-time = x.

Additionally we need to know the SIM PIN value going to be used. For those cases where the SIM is not blocked (i.e. PIN is not required), you do not need to configure it.

The steps needed to fully configure a connection will be shown further on in this manual.

2.2 DIAL Connection Profile

The following values can be programmed:

remote-address:

The remote-address value is always the same (*99***1#) and is the number providing access to the GPRS network. In cases where the connection is GPRS (i.e. with an APN configured), you do not need to program this value. Should the connection be CSD (**Circuit-Switched-Data**) then this value must be programmed.

3gpp-apn:

This is the GPRS node through which the connection is carried out. This value depends on the carrier.

3gpp-pdp-type:

Programs the type of Protocol Data Packet to be used in the connection. This depends on the service provided by the carrier. Normally this is the IP which coincides with the default value.

3gpp-accessibility-control:

Permits you to enable connectivity control over the profile. This also permits different accessibility controls for different profiles. This is explained in more detail further on in this manual.

3gpp-bearer-service:

Permits programs for CSD connections (i.e. connections for a number, not connections for an APN) to have a series of characteristics, allowing you to program type of norm, speed, etc., provided the inserted module supports this. This is explained in more detail further on in this manual.

idle-time:

Indicates the time period where disconnection is carried out due to absence of

data.

A 0 idle time value means the device will immediately execute the GPRS connection. Any other value programs the disconnection without data period.

Example:

```
Config>global-profiles dial

-- DIAL PROFILE Configuration --
DIALPROF config>
DIALPROF config>profile GPRS default
DIALPROF config>profile GPRS dialout
DIALPROF config>profile GPRS 3gprs-apn apnname.es
DIALPROF config>profile GPRS 3gpp-accessibility-control traffic 6 all
DIALPROF config>profile GPRS idle-time 60
DIALPROF config>
DIALPROF config>exit
Config>
```

2.2.1 3GPP-ACCESSIBILITY-CONTROL

One of the drawbacks to GPRS connections is verifying GPRS availability.

As already mentioned, the mechanism the PPP protocol has for point-to-point connection control (Echo-request/Echo-reply) is ineffective in these connections as it is only significant at a "local" level i.e. between the router and the connected module.

Various mechanisms have been implemented to verify the connection status. These can be grouped into two types, intrusive (originating data traffic on line and therefore billable) and non-intrusive (does not originate data traffic).

Each of the described mechanisms can be independently configured over each profile configured in the interface.

Intrusive

2.2.1.1 3GPP-ACCESSIBILITY-CONTROL PING

Once the GPRS connection has been established, pings are sent every so many seconds, indicated in the command, to the configured IP address.

If this times out without having received a response from the remote, a second ping is sent and a response is expected within 10 seconds. If no response is received, two more pings are sent every 5 seconds. If no response is received, the device disconnects.

The command is: *3gpp-accessibility-control ping <A.B.C.D> <timer>*

<A.B.C.D>: IP Address where the pings are sent.

<timer>: Time between pings.

Example:

```
Dial Profiles config>profile X 3gpp-accessibility-control ping 10.10.1.1 60
Dial Profiles config>
```

2.2.1.2 3GPP-ACCESSIBILITY-CONTROL TRACE

Identical to the above, but this sends an ICMP trace route.

The command is *3gpp-accessibility-control trace <A.B.C.D> <timer>*

<A.B.C.D>: IP address where the traces are sent

<timer>: Time between them.

Example:

```
Dial Profiles config>profile X 3gpp-accessibility-control trace 10.10.1.1 60
Dial Profiles config>
```

Non-Intrusive

2.2.1.3 3GPP-ACCESSIBILITY-CONTROL TIMER

Independently to the idle-time value configured in the connection profile, disconnection is carried out when the configured timer value times out.

The command is: *3gpp-accessibility-control timer <value>*

<value>: Timer value between 60 and 86399 seconds.

Example:

```
Dial Profiles config>profile X 3gpp-accessibility-control timer 60
Dial Profiles config>
```

2.2.1.4 3GPP ACCESSIBILITY-CONTROL TRAFFIC

This consists of monitoring the data flow in both directions at the IP layer, TCP or any.

The mechanism initiates from the fact that when there is outgoing traffic, there will always be incoming. A counter for sent frames starts (depending on the type). This value resets each time there are incoming frames, independently of the type.

The command is: *3gpp-accessibility-control traffic <counter> <type>*

<counter>: represents the limit for the outgoing packets (sent to the network) for the type configured without receiving incoming packets. Once this value has been reached, the link disconnection process activates in order to try a new connection.

<type>: Type of monitored outgoing traffic.

IP: All IP traffic (TCP, UDP, etc).

TCP: Only considers TCP traffic for connection control.

ALL: Considers all traffic including non-IP traffic.

Example:

```
Dial Profiles config>accessibility-control traffic 6 IP
Dial Profiles config>
```

2.2.1.5 3GPP-ACCESSIBILITY-CONTROL RX-TIMER

This consists of monitoring the incoming data flow and permits a maximum time without receiving data. Once this time without receiving data has timed out, the router assumes the connection is down.

This type of monitoring is useful in scenarios where an incoming data flow is always maintained. Depending on the type of application you will need to adjust the programmed time value.

The command is *3gpp-accessibility-control rx-timer <time>*

<time>: This parameter indicates the period of time the router can remain without receiving incoming data in order not to start the disconnection process. Once this has timed out, the link disconnection process is activated in order to try a new connection. This can take values between 1 and 86399.

Example:

```
Dial Profiles config>profile X 3gpp-accessibility-control rx_timer 120
Dial Profiles config>
```

2.2.2 3GPP-BEARER-SERVICE-TYPE

The following commands appear in this profile:

```
Dial Profiles config> profile X 3gpp-bearer-service speed <value>
Dial Profiles config> profile X 3gpp-bearer-service name <value>
Dial Profiles config> profile X 3gpp-bearer-service name <value >
Dial Profiles config>
```

These commands allow CSD calls (i.e. those for a number, not those for an APN) to take a series of characteristics.

You can for example, and if the module supports this, execute calls to ISDN destination numbers (numbers which indicate V.110 in speed), etc.

Values that appear as value are those defined by the 3GPP TS 27.007 for CSD calls norm.

Not all the values are possible; this depends on the module and the network. If this is incorrectly programmed, the module will return an error but will try and execute the call anyway. You need to be very careful when using this command.

The following command will appear before making an ATDXXXXXXX call when the events are enabled:

AT+CBST=speed,name,ce

Default is 0,0,1 --> Automode.

To find out the values which permit a determined module or card, enter the commands mode, as explained in the section on monitoring, and enter **AT+CBST=?**.

The MC45 and MC75 modules support the following values:

Speed:

- 0 Autobauding
- 1 300 bps (V.21)
- 2 1200 bps (V.22)
- 4 2400 bps (V.22bis)
- 6 4800 bps (V.32)
- 7 9600 bps (V.32)
- 14 14400 bps (V.34)
- 65 300 bps (V.110)
- 66 1200 bps (V.110)
- 68 2400 bps (V.110)
- 70 4800 bps (V.110)
- 71 9600 bps (V.110)
- 75 14400 bps (V.110)

Name:

- 0 Asynchronous modem.

CE:

- 1 Non-transparent .Transparent mode is not supported.

2.3 Configuring PPP

Add a PPP interface.

Example:

```
Config>add device ppp 1
Added PPP interface ppp1
Config>
```

2.3.1 Base Interface

Configure the **PPP** parameters related to the base interface going to be used.

Example:

```
Config>network gprs0/0
```

```
-- Interface at. Configuration -
gprs0/0 AT config>
gprs0/0 AT config>ppp lcp-options acfc
gprs0/0 AT config>ppp lcp-options pfc
gprs0/0 AT config>ppp lcp-options accm a0000
gprs0/0 AT config>exit
Config>
```

2.3.2 PPP Connection Profile

Here we must indicate that the PPP interface must use the GPRS interface as the base interface (*base-interface gprs0/0 link* command) and use the GPRS profile for dialing (*base-interface gprs0/0 profile GPRS* command).

Similarly, program the appropriate parameters for the protocol.

The user and password sent during authentication must be appropriate for the carrier and the service being used to connect (*authentication sent-user XXXXXX password YYYYYY* command). These are simply examples.

The IP address is normally assigned during the negotiation phase (*ipcp local address assigned* command).

Echo functionality is not required (*lcp echo-req off* command). The PPP is only significant locally, i.e. between the router and the connected GPRS module. The echo DOES NOT detect link drops nor loss of signal.

Similarly, the extreme remote IP address that appears during negotiation is the module internal IP address, which again makes no sense to have in the routing table. This can be ignored by using the *no ipcp peer-route* command.

Example:

```
Config>network pppl

-- Generic PPP User Configuration --
pppl config> base-interface

-- Base Interface Configuration --
pppl Base IFC config>
pppl Base IFC config>base-interface gprs0/0 link
pppl Base IFC config>base-interface gprs0/0 profile GPRS
pppl Base IFC config>
pppl Base IFC config> ppp

-- PPP Configuration --
pppl PPP config>
pppl PPP config> authentication sent-user MOVISTAR password MOVISTAR
pppl PPP config> ipcp local address assigned
pppl PPP config> lcp echo-req off
pppl PPP config> no ipcp peer-route
pppl PPP config>
pppl PPP config>exit
pppl config>
pppl config>exit
Config>
```

2.4 Configuring the GPRS interface

There are certain commands which are common for all the device's interfaces. These commands are described in the manual on configuring common interfaces (*Dm772-I Common Configurations for Interfaces*).

The GPRS interface is an **AT** commands interface. The available programming commands are:

Command	Function
<i>?(HELP)</i>	Lists the available commands or their options.
<i>ADDITIONAL-CONTROL-COM.</i>	Additional AT commands to configure the modem.
<i>ALWAYS-ATTACHED</i>	Attach/detach control for the module to the network.
<i>COVERAGE-TIMER</i>	Configures the sampling time for the quality parameters.
<i>DISABLE</i>	Disables functionalities.
<i>ENABLE</i>	Enables functionalities.

FRAME-SIZE	Configures the base interface frame size.
GPRS-AUTHENTICATION	Selects the register mode in the network.
NO	Permits you to configure default values or negate a command.
PIN	Programs the PIN number for the SIM module used.
SIM-SELECT	Permits you to select the active SIM or in cases where the hardware supports two SIMs, the main SIM.
SIM	Configures parameters relative to managing two SIMs in cases where the hardware supports this.
SMS	Permits you to configure SMS control parameters.
WAIT-TIME	Configures the maximum wait time for physical connection.
WAKEUP-CALLER	Configures the device as caller (wakeup) for Teldat management.
EXIT	Returns to the configuration menu.

2.4.1 ? (HELP)

Displays a list of the available commands or their options.

Syntax:

```
gprs0/0 AT config>?
```

Example:

```
gprs0/0 AT config>?
additional-control-command  Set additional AT commands
always-attached             In PDP context disconnection not perform detach
coverage-timer              Set timer for coverage measure
description                  Enter interface description
disable                      Disable some features
enable                       Enable some features
frame-size                   Set frame size
gprs-authentication          Selects module authentication type
no                            Negate a command or set its defaults
pin                           Set PIN number for active SIM
shutdown                     Change state to administratively down
sim                           Double SIM management parameters
sim-select                   Set active/main SIM
sms                           SMS configuration
update                       Update a level indicator
wait-time                    Set maximum connection time
wakeup-caller                Enable GPRS wakeup caller device
exit                          Return to previous menu
gprs0/0 AT config>
```

2.4.2 ADDITIONAL-CONTROL

Configures additional **AT** commands for modem configuration. Admits a string of up to 59 characters. By default, nothing is configured. This command is sent to the module after the last initialization command.

Syntax:

```
gprs0/0 AT config>additional-control-command ?
no-command      No command for this action
<word>          Text
```

Example 1:

```
gprs0/0 AT config>additional-control-command i
```

Example 2:

```
gprs0/0 AT config>additional-control-command no-command
```

2.4.3 ALWAYS-ATTACHED

When configured internally the modules normally execute an Attach in the network.

The **attach** process is a mechanism through which the module registers in the data network and reports it is available. We should not confuse the register in the data network with the register in the mobile network.

Each time a disconnection of a determined context is executed, you can opt to **deregister** the data network module (**detach**) or permit it to always remain registered. This is achieved through the **ALWAYS-ATTACHED** command.

Example:

```
gprs0/0 AT config>always-attached
```

2.4.4 COVERAGE-TIMER

Permits you to select the frequency that the reception sample quality (+CSQ) and the data for network connection is automatically executed and which subsequently can be monitored through the **GPRS LIST** command. You can select from 10 seconds up to 255 seconds, default being 60 seconds.

Example:

```
gprs0/0 AT config>coverage-timer 10
```

2.4.5 DISABLE

The **DISABLE** command permits you to disable the modem flow control.

Syntax:

```
gprs0/0 AT config>disable <parameter>
```

Example:

```
gprs0/0 AT config>disable ?
  flow-ctrl-option      Enable flow control
gprs0/0 AT config>
```

2.4.5.1 DISABLE FLOW-CTRL-OPTION

Disables the flow control. When this parameter is disabled, flow control in the interface is not available. By default this parameter is disabled.

Syntax:

```
gprs0/0 AT config>disable flow-ctrl-option
```

Example:

```
gprs0/0 AT config>disable flow-ctrl-option
gprs0/0 AT config>
```

2.4.6 ENABLE

The **ENABLE** command permits you to enable modem flow control.

Syntax:

```
gprs0/0 AT config>enable <parameter>
```

Example:

```
gprs0/0 AT config>enable ?
  flow-ctrl-option      Enable flow control
gprs0/0 AT config>
```

2.4.6.1 ENABLE FLOW-CTRL-OPTION

Enables the flow control. When this parameter is enabled, flow control in the interface is available. By default this parameter is disabled.

Syntax:

```
gprs0/0 AT config>enable flow-ctrl-option
```

Example:

```
gprs0/0 AT config>enable flow-ctrl-option
gprs0/0 AT config>
```

2.4.7 FRAME-SIZE

Configures the maximum size of the base interface frame between 576 and 4096 bytes.

Example:

```
gprs0/0 AT config>frame-size 2048
```

2.4.8 GPRS-AUTHENTICATION

Selects the authentication mode in the network when the contexts activate.

Syntax:

```
gprs0/0 AT config>gprs-authentication <mode>
```

Example:

```
gprs0/0 AT config>gprs-authentication ?
chap      Module authentication chap
default   Module authentication default
pap       Module authentication pap
gprs0/0 AT config>gprs-authentication chap
```

2.4.9 NO

Configures the default values.

Syntax:

```
gprs0/0 AT config>no <command>
```

Example:

```
gprs0/0 AT config>no ?
additional-control-command  Set additional AT commands
always-attached             In PDP context disconnection not perform detach
coverage-timer              Set timer for coverage measure
description                  Enter interface description
frame-size                  Set frame size
pin                          Set PIN number for active SIM
shutdown                    Change state to administratively down
sim                          Double SIM management parameters
sms                          SMS configuration
update                       Update a level indicator
wait-time                   Set maximum connection time
wakeup-caller                Enable GPRS wakeup caller device
```

2.4.10 PIN

Configures the PIN number for the SIM inserted in the module.

Example:

```
gprs0/0 AT config>pin plain 1235
```

**Note**

On listing the interface configuration, the PIN value is displayed in encrypted mode. For the previous example:

Example:

```
gprs0/0 AT config>show conf
; Showing Menu and Submenus Configuration ...
; ATLAS Router 2 8 Version 10.5.1-Alfa

pin ciphered 0xFEC7DB8210108C93
```

2.4.11 SIM

Configures double SIM management in cases where the hardware supports this. The SIMs are identified through the SIM port where they're located. Depending on the hardware, the SIMs are identified as internal SIM and external SIM, or as SOCKET-1 and SOCKET-2. You need to open up the device in order to handle the internal SIM but not with the external SIM.

The double SIM management/supervision identifies a main SIM and a backup SIM. The main SIM is identified through the **SIM-SELECT** command in this interface and is the one that's initially used. You can establish a series of criteria to supervise the main SIM and in cases where one of them matches, the backup SIM is used. You can also define some criteria in order to use the backup SIM so when one of these matches the device returns from backup.

When the main SIM is active, the NSM/NSLA poll status can be supervised. When the backup SIM is active, the criteria for return from backup are: interface inactivity time (i.e. time when calls are not processed), the status of an NSM/NSLA poll and a time condition (the SIM is used during a given maximum time or up to a given time). For further information on polls, please manuals *Dm749-I NSM* and *Dm754-I NSLA*.

The parameters are checked every 30 seconds. When configuring the supervision parameters, you need to bear in mind that the switch from one SIM to another is a slow process.

Syntax:

```
gprs0/0 AT config>sim ?
external-socket-1      Set external/socket 1 SIM parameters
internal-socket-2      Set internal/socket 2 SIM parameters
nsla-criteria          Use a NSLA Advisor as supervision criteria
connection-timeout     Set SIM connection timeout in seconds
return-criteria        Set return conditions to main SIM
supervision            Set global SIM management parameters
```

When a switch has occurred, this is reported through the WWAN subsystem events.

There are specific and non-configurable situations that provoke a switch from one SIM to another: if a fault in the access to the SIM is detected or the SIM is blocked and requires the PUK. In the same way, there are situations that pause the switch process: when an erroneous PIN is configured.

This command is not available in interfaces whose hardware does not have a double SIM or in interfaces that are not either the base or the main interface.

2.4.11.1 SIM EXTERNAL-SOCKET-1

Configures the data the external SIM or the SIM in the SIM1 port uses.

If you don't configure the PIN and LOCAL-ADDRESS fields together with those for the internal SIM/SIM-2-port you cannot enable management/supervision for the double SIM and consequently the **SIM SUPERVISION** command is not available. In the same way, if one of these parameters is deleted, the management/supervision is automatically disabled.

Syntax:

```
gprs/0 AT config>sim external-socket-1 ?
pin                PIN number
local-address      SIM telephone number
network-mode       Network technology mode
```

2.4.11.1.1 SIM EXTERNAL-SOCKET-1 PIN

Configures the PIN number associated to the external SIM/SIM-1-port. You can configure this in plain through the **SIM EXTERNAL-SOCKET-1 PIN PLAIN** command or encrypted through the **SIM EXTERNAL-SOCKET-1 PIN CIPHERED** command.

Syntax:

```
gprs0/0 AT config>sim external-socket-1 pin ?
```



```
plain      readable number
ciphered   ciphered number
```

By default this is not configured.

The PIN is always displayed encrypted for security reasons.

Example:

```
gprs0/0 AT config>sim external-socket-1 pin plain 1234
gprs0/0 AT config>show config
; Showing Menu and Submenus Configuration for access-level 15 ...

      sim external-socket-1 pin ciphered 0x4698601DE5BFA77D
gprs0/0 AT config>
```

2.4.11.1.2 SIM EXTERNAL-SOCKET-1 LOCAL-ADDRESS

Configures the telephone number associated to the external SIM/SIM-1-port. This number is used to:

- Associate dial interfaces to the said SIM so the interfaces using this SIM are available or UP when the SIM is active. When it is inactive, the interfaces are DOWN or unavailable.
- Routes the incoming audio calls in VoIP context.

The association between SIM and the dial interfaces (FR, PPP, etc.) is executed through the profiles configured in GLOBAL-PROFILES DIAL and the LOCAL-ADDRESS field for these: when a SIM is active, all the dial interfaces that it has as base interface and that use profiles whose local-address coincides with the active SIM's activate. Those interfaces that fulfill the first condition but not the second see the base interface as down and remain DOWN or not available

Syntax:

```
gprs0/0 AT config>sim external-socket-1 local-address ?
<1..23 chars>      Text
```

Default is no number configured.

2.4.11.1.3 SIM EXTERNAL-SOCKET-1 NETWORK-MODE

This command is not used in GPRS interfaces.

This command is only meant for devices that have a module with technology higher than 2G incorporated, i.e. UMTS, HSPA, LTE...

2.4.11.2 SIM EXTERNAL-SOCKET-2

Configures the data the internal SIM or the SIM in the SIM2 port uses.

Si no se configuran los campos PIN y LOCAL-ADDRESS junto con los del SIM interno/porta-SIM-1 If this data is not configured together with the external SIM/SIM-1-port data, you cannot enable management/supervision for the double SIM and consequently the **SIM SUPERVISION** command is not available. In the same way, if one of these parameters is deleted, the management/supervision is automatically disabled.

Syntax:

```
gprs0/0 AT config>sim internal-socket-2 ?
pin                PIN number
local-address      SIM telephone number
network-mode       Network technology mode
```

2.4.11.2.1 SIM INTERNAL-SOCKET-2 PIN

Configures the PIN number associated to the internal SIM/SIM-2-port. You can configure this in clear through the **SIM INTERNAL-SOCKET-2 PIN PLAIN** command or encrypted through the **SIM INTERNAL-SOCKET-2 PIN CIPHERED** command.

Syntax:

```
gprs0/0 AT config>sim internal-socket-2 pin ?
plain      readable number
ciphered   ciphered number
```

By default this is not configured.

The PIN is always displayed encrypted for security reasons.

Example:

```
gprs0/0 AT config>sim internal-socket-2 pin plain 1234
gprs0/0 AT config>show config
; Showing Menu and Submenus Configuration for access-level 15 ...

    sim internal-socket-2 pin ciphred 0x4698601DE5BFA77D
gprs0/0 AT config>
```

2.4.11.2.2 SIM INTERNAL-SOCKET-2 LOCAL-ADDRESS

Configures the telephone number associated to the internal SIM/SIM-2-port. This number is used to:

- Associate dial interfaces to the said SIM so the interfaces using this SIM are available or UP when the SIM is active. When it is inactive, the interfaces are DOWN or unavailable.
- Routes the incoming audio calls in VoIP context.

The association between SIM and the dial interfaces (FR, PPP, etc.) is executed through the profiles configured in GLOBAL-PROFILES DIAL and the LOCAL-ADDRESS field for these: when a SIM is active, all the dial interfaces that it has as base interface and that use profiles whose local-address coincides with the active SIM's activate. Those interfaces that fulfill the first condition but not the second see the base interface as down and remain DOWN or not available

Syntax:

```
gprs0/0 AT config>sim internal-socket-2 local-address ?
<1..23 chars>    Text
```

Default is no number configured.

2.4.11.2.3 SIM INTERNAL-SOCKET-2 NETWORK-MODE

This command is not used in GPRS interfaces.

This command is only meant for devices that have a module with technology higher than 2G incorporated, i.e. UMTS, HSPA, LTE...

2.4.11.3 SIM NSLA-CRITERIA

Configures an NSM/NSLA poll as supervision criteria for the main SIM. This criterion is useful to use when you want to supervise an IP connection at a given point through the main SIM. This connection not only implies a wireless connection but also the whole connection with the required destination.

The NSM/NSLA poll is made up of an NSM poll which sends a type of IP traffic to a known destination through an active interface when the main SIM is active. The sent traffic permits taking measurements that the NSLA Advisor uses and it is this latter that decides if the connection is valid or not. If the connection isn't valid then switch to SIM backup is executed. This parameter configures the NSLA-Advisor that determines if the connection is valid or not. For further information on configuring polls, please see manuals *Dm749-I NSM* and *Dm754-I NSLA*.

Syntax:

```
gprs0/0 AT config>SIM nsla-criteria nsla-advisor <id>
```

Admits a value between 0 and 65535. A 0 value disables this parameter as supervision criteria for the main SIM. Default is that this criterion is not enabled for main SIM supervision.

You need to remember that when using NSM/NSLA polls, the NSM poll doesn't stop sending traffic under any circumstances and therefore still sends traffic when the active SIM is the backup one.

Another detail for the use of NSLA-Advisors for this task is that the NSLA-Advisor, the NSLA-Alarm and the NSLA-Filter used activate and deactivate depending on the main SIM state, therefore we recommend that they are not used for other tasks.

An application example can be found in the appendix on examples.

2.4.11.4 SIM CONNECTION-TIMEOUT

This parameter sets the maximum time permitted to establish the data communication through the GPRS interface, for the SIM operating at that point. This parameter must be set because of the way the NSLA polls operate. Under certain circumstances if you only use NSLA polls you may not detect data link failure or drop. Consequently you must configure this parameter if configuring NSL polls.

This parameter affects the two SIMs. It only activates when the double SIM supervision activation option is configured through the **SIM SUPERVISION ENABLE** command.

The parameter is associated to a timer, which permits you to control the maximum wait time from the point where a SIM switch is executed until the associated NSLA poll indicates there is connectivity. If this timer times out the poll hasn't detected connectivity, SIM switch occurs. Also given the nature of the NSLA polls, as soon as the timer times out, the state of the poll is verified again. This permits you to rule out poll trigger problems when the SIMs are switching from one to the other.

This timer starts up when the GPRS interface has initialized correctly i.e. when this is able to establish a data connection.

This parameter is **unique and the same** for both SIMs. It only activates if the NSLA poll associated to the SIM has been configured.



Note

You must be particularly care when configuring the NSLA polls associated to each SIM as the detection time must always be less than the connection-timeout. Contrariwise it's possible that the SIMs will switch as when the timer times out, the poll will not have detected connectivity.

Syntax:

```
gprs0/0 AT config>sim connection-timeout ?
<0s..1200s>   Time value
```

This admits values between 0 and 1200 seconds. A 0 value disables this parameter as a supervision criteria for the active SIM. Default is 300 seconds.

2.4.11.5 SIM RETURN-CRITERIA

Configures the return to main SIM criteria. The return criterion is: physical interface inactivity (made up of the base interface and the secondary interface if there is one), the state of an NSM/NSLA poll, the state of registration in the base station and the time the backup SIM has been used.

Syntax:

```
gprs0/0 AT config>sim return-criteria ?
inactivity           Max no-calls time the backup SIM is maintained
nsla-advisor         Use a NSLA Advisor as return criteria
time                 Max time the backup SIM is used
```

By default, the return criterion is not configured.

2.4.11.5.1 SIM RETURN-CRITERIA INACTIVITY OVER

Configures the minimum time in minutes that the physical interface can be without calls as return to main SIM criteria.

Syntax:

```
gprs0/0 AT config>sim return-criteria inactivity over ?
<2..65535>   Value in the specified range
```

Admits time values between 0 and 180. A 0 time value disables this parameter as a return to main SIM criteria. By default this criteria is not enabled for return to main SIM.

2.4.11.5.2 SIM RETURN-CRITERIA NSLA-ADVISOR

Configures an NSM/NSLA poll as a return to main SIM criteria. This criterion is useful to use when you want to supervise an IP connection at a given point through the backup SIM. This connection not only implies a wireless connection but also the whole connection with the required destination.

The NSM/NSLA poll is made up of an NSM poll which sends a type of IP traffic to a known destination through an

active interface when the backup SIM is active. The sent traffic permits taking measurements that the NSLA Advisor uses and it is this latter that decides if the connection is valid or not. If the connection isn't valid then switch to main SIM is executed. This parameter configures the NSLA-Advisor that determines if the connection is valid or not. For further information on configuring polls, please see manuals *Dm749-I NSM* and *Dm754-I NSLA*.

Syntax:

```
gprs0/0 AT config>sim return-criteria nsla-advisor ?
<0..65535> Value in the specified range
```

You need to remember that the NSM poll doesn't stop sending traffic under any circumstances and therefore still sends traffic when the active SIM is the main one.

Another detail for the use of NSLA-Advisors for this task is that the NSLA-Advisor, the NSLA-Alarm and the NSLA-Filter used activate and deactivate depending on the backup SIM state, therefore we recommend that they are not used for other tasks.

An application example can be found in the appendix on examples.

2.4.11.5.3 SIM RETURN-CRITERIA TIME

This criterion controls the time that the backup SIM uses. By default the criteria is disabled.

Syntax:

```
gprs0/0 AT config>sim return-criteria time ?
ignore Main SIM is never used again
after Main SIM is used after the configured minutes
at Main SIM is used at the configured time
```

SIM RETURN-CRITERIA TIME IGNORE

Disables the time criteria as the return to main SIM criteria.

Syntax:

```
gprs0/0 AT config>sim return-criteria time ignore
```

SIM RETURN-CRITERIA TIME AFTER

Configures that the backup SIM is used as a maximum for the indicated minutes. Once this has timed out, switch to main SIM is executed whether there are calls being processed or not.

Syntax:

```
gprs0/0 AT config>sim return-criteria time after ?
<1..65535> Value in the specified range
```

Admits time values between 65535.

SIM RETURN-CRITERIA TIME AT

Configures that the backup SIM is used as a maximum for the indicated hour and minutes whether there are calls being processed or not.

Syntax:

```
gprs0/0 AT config>sim return-criteria time at ?
<00:00..24:00> Time value
```

2.4.11.6 SIM SUPERVISION

Configures the global parameters for double SIM management/supervision. By default double SIM management/supervision is disabled. The available parameters are:

Syntax:

```
gprs0/0 AT config>sim supervision ?
enable Enable SIM socket management
```

2.4.11.6.1 SIM SUPERVISION ENABLE

Enables the double SIM management/supervision. This command is not available until the data for the two SIMs has been obtained: pin and local-address. For further information, please see the **SIM EXTERNAL-SOCKET-1 PIN**, **SIM EXTERNAL-SOCKET-1 LOCAL-ADDRESS**, **SIM INTERNAL-SOCKET-2 PIN**, **SIM INTERNAL-SOCKET-2 LOCAL-ADDRESS** commands. If one of these commands is deleted, supervision is automatically disabled.

Syntax:

```
gprs0/0 AT config>sim supervision enable
```

If supervision is dynamically disabled, the interface starts to use the global PIN and local-address again. In cases where this occurs when the backup SIM is active, then the main SIM is automatically switched back to.

2.4.12 SIM-SELECT

Permits you to select the active SIM or the main SIM in cases where there is double SIM management. This is only available if the hardware supports it.

Syntax:

```
gprs0/0 AT+sim-select ?
external-socket-1   Externally removable/socket 1 SIM
internal-socket-2   Internally removable/socket 2 SIM
```

2.4.13 SMS

The router permits SMS to be used for those interfaces which support this (e.g. ARLY).

The only parameters which need to be configured to enable SMS reception are the SIM card PIN number and the SMS services center telephone number. Both parameters must be obtained from the mobile telephone service provider.



Note

For Spain, if you service provider is Movistar, the service center number is +34609090909, if it's Vodafone +34607003110 and if it's Orange +34656000311.

The configuration commands for a device whose PIN is 2808 and the services center is +34656000311 are shown below.

```
gprs1/0 AT config>pin plain 2808

gprs1/0 AT config>sms reception
gprs1/0 AT config>sms service-center-address +34656000311
gprs1/0 AT config>
gprs1/0 AT config>show config
; Showing Menu and Submenus Configuration ...
; Visor Alarm Router 2 16 Version 10.3.4

pin ciphred 0x3BEB2E351FDDE243
sms reception
sms service-center-address +34656000311
gprs1/0 AT config>exit
Config>
```

2.4.14 WAIT-TIME

Permits you to configure the maximum connection wait time when the connections are GSM.

Example:

```
gprs0/0 AT config>wait-time ?
<0..65535>   Value in the specified range
gprs0/0 AT config>wait-time 60
```

2.4.15 WAKEUP-CALLER

Permits you to configure the device as a GPRS caller for management functions, master router.

Example:

```
gprs0/0 AT config>wakeup-caller
```

2.4.16 EXIT

Returns to the previous menu.

Example:

```
gprs0/0 AT config>exit
Config>
```

2.5 Configuring IP

The GPRS connection assigns an IP address (public or private) to the device for each connection.

Configure the IP addresses so that the default route is towards the GPRS interface.

Example:

```
Config>network pppl

-- Generic PPP User Configuration --
pppl config>ip address unnumbered
pppl config>exit
Config>
Config>network ethernet0/0

-- Ethernet Interface User Configuration --
ethernet0/0 config>ip address 172.24.79.12 255.255.0.0
ethernet0/0 config>exit
Config>exit
Config>protocol ip

-- Internet protocol user configuration --
IP config>
IP config>route 0.0.0.0 0.0.0.0 pppl 1
IP config>
IP config>classless
IP config>
IP config>
IP config>exit
```

2.6 Events

Optional, but useful to determine problems.

Example:

```
Config>event

-- ELS Config --
ELS config>
ELS config>enable trace subsystem PPP ALL
ELS config>enable trace subsystem AT ALL
ELS config>exit
Config>
```

2.7 Saving the configuration

The configuration should be saved and the device restarted so the new configuration activates.

Example:

```
Config>save
Save configuration [n]? y

Performing memory requirements calculations, please wait
Building system configuration, please wait
Configuration built, saving ...
OK on Flash
Config>
```

2.8 Checking the connection

Once the configuration has been carried out and the device restarted, you need to check the connection is operating.

Check that the card is accessible and that the PPP interface initializes:

```
*p 2
11/02/04 13:35:51 AT.020 CTS change OFF --> ON intf gprs0/0
11/02/04 13:35:52 AT.020 ATCMD-->AT+CMEE=1 intf gprs0/0
11/02/04 13:35:53 AT.020 ATCMD-->AT+CPIN? intf gprs0/0
11/02/04 13:35:54 AT.020 PIN is required intf gprs0/0
11/02/04 13:35:54 AT.020 ATCMD-->AT+CPIN=**** intf gprs0/0
11/02/04 13:35:56 AT.020 PIN successful intf gprs0/0
11/02/04 13:35:56 AT.020 Wakeup started on intf gprs0/0
11/02/04 13:35:57 AT.020 Setup SIEMENS MC35i on intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT&F intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT&C1&S0&D2\Q3 intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT^SSYNC=1 intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT^SGAUTH=1 intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT+CGMI intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT+CGMM intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT+GMR intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT+CGSN intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT+CIMI intf gprs0/0
11/02/04 13:35:57 AT.020 ATCMD-->AT^SCID intf gprs0/0
11/02/04 13:35:59 AT.001 Modem initialized successfully intf gprs0/0
11/02/04 13:36:04 PPP.001 Interface ppp1 ready
```

Execute a ping to a known IP address and monitor the events.

```
*ping 216.239.37.99

PING 216.239.37.99: 56 data bytes
09/05/03 11:27:23 AT.020 ATCMD-->AT+CGDCONT=1,"IP","movistar.es" intf gprs0/0
09/05/03 11:27:23 AT.020 ATCMD-->AT+CGATT=1 intf gprs0/0
09/05/03 11:27:24 AT.020 ATCMD-->ATDT*99***1# intf gprs0/0
09/05/03 11:27:24 AT.006 Dial Req Call, addr = *99***1# intf gprs0/0
09/05/03 11:27:24 AT.020 DCD change OFF --> ON intf gprs0/0
09/05/03 11:27:24 AT.007 Out Call *99***1# establ intf gprs0/0
09/05/03 11:27:24 PPP.087 ppp1:gprs0/0 LCP Negotiation started
09/05/03 11:27:24 PPP.051 ppp1:gprs0/0 LCP Out CONF-REQ [starting] id 1 len 20
09/05/03 11:27:24 PPP.053 ppp1:gprs0/0 LCP AsyncMap 0 (0x020600000000)
09/05/03 11:27:24 PPP.055 ppp1:gprs0/0 LCP MagicNumber 9ff33810 (0x05069ff33810)
09/05/03 11:27:25 PPP.056 ppp1:gprs0/0 LCP ProtComp available (0x0702)
09/05/03 11:27:25 PPP.057 ppp1:gprs0/0 LCP AddrCtrlComp available (0x0802)
09/05/03 11:27:25 PPP.011 ppp1:gprs0/0 In frame, type 0xc021, size 12
09/05/03 11:27:25 PPP.051 ppp1:gprs0/0 LCP In CONF-REJ [req-sent] id 1 len 10
09/05/03 11:27:25 PPP.055 ppp1:gprs0/0 LCP MagicNumber 9ff33810 (0x05069ff33810)
09/05/03 11:27:25 PPP.051 ppp1:gprs0/0 LCP Out CONF-REQ [req-sent] id 2 len 14
09/05/03 11:27:25 PPP.053 ppp1:gprs0/0 LCP AsyncMap 0 (0x020600000000)
```

```
09/05/03 11:27:25 PPP.056 ppp1:gprs0/0 LCP ProtComp available (0x0702)
09/05/03 11:27:25 PPP.057 ppp1:gprs0/0 LCP AddrCtrlComp available (0x0802)
09/05/03 11:27:25 PPP.011 ppp1:gprs0/0 In frame, type 0xc021, size 16
09/05/03 11:27:25 PPP.051 ppp1:gprs0/0 LCP In CONF-ACK [req-sent] id 2 len 14
09/05/03 11:27:25 PPP.053 ppp1:gprs0/0 LCP AsyncMap 0 (0x020600000000)
09/05/03 11:27:25 PPP.056 ppp1:gprs0/0 LCP ProtComp available (0x0702)
09/05/03 11:27:25 PPP.057 ppp1:gprs0/0 LCP AddrCtrlComp available (0x0802)
09/05/03 11:27:27 PPP.011 ppp1:gprs0/0 In frame, type 0xc021, size 24
09/05/03 11:27:27 PPP.051 ppp1:gprs0/0 LCP In CONF-REQ [ack-rcvd] id 1 len 22
09/05/03 11:27:27 PPP.052 ppp1:gprs0/0 LCP MRU 1500 (0x010405dc)
09/05/03 11:27:27 PPP.053 ppp1:gprs0/0 LCP AsyncMap 0 (0x020600000000)
09/05/03 11:27:27 PPP.056 ppp1:gprs0/0 LCP ProtComp available (0x0702)
09/05/03 11:27:27 PPP.057 ppp1:gprs0/0 LCP AddrCtrlComp available (0x0802)
09/05/03 11:27:27 PPP.054 ppp1:gprs0/0 LCP AuthProt PAP (0x0304c023)
09/05/03 11:27:27 PPP.051 ppp1:gprs0/0 LCP Out CONF-ACK [ack-rcvd] id 1 len 22
09/05/03 11:27:27 PPP.052 ppp1:gprs0/0 LCP MRU 1500 (0x010405dc)
09/05/03 11:27:27 PPP.053 ppp1:gprs0/0 LCP AsyncMap 0 (0x020600000000)
09/05/03 11:27:27 PPP.056 ppp1:gprs0/0 LCP ProtComp available (0x0702)
09/05/03 11:27:27 PPP.057 ppp1:gprs0/0 LCP AddrCtrlComp available (0x0802)
09/05/03 11:27:27 PPP.054 ppp1:gprs0/0 LCP AuthProt PAP (0x0304c023)
09/05/03 11:27:27 PPP.087 ppp1:gprs0/0 LCP Negotiation successful
09/05/03 11:27:27 PPP.084 ppp1:gprs0/0 PAP required by peer
09/05/03 11:27:27 PPP.063 ppp1:gprs0/0 PAP Out AUTH-REQ [closed] id 201 len 22
09/05/03 11:27:27 PPP.064 ppp1:gprs0/0 PAP Peer-Id OPERADOR
09/05/03 11:27:27 PPP.065 ppp1:gprs0/0 PAP Password *****
09/05/03 11:27:27 PPP.011 ppp1:gprs0/0 In frame, type 0xc023, size 15
09/05/03 11:27:27 PPP.063 ppp1:gprs0/0 PAP In AUTH-ACK [ack-sent] id 201 len 13
09/05/03 11:27:27 PPP.066 ppp1:gprs0/0 PAP Message: Welcome!
09/05/03 11:27:27 PPP.088 ppp1:gprs0/0 IPCP Negotiation started
09/05/03 11:27:27 PPP.072 ppp1:gprs0/0 IPCP Out CONF-REQ [starting] id 1 len 10
09/05/03 11:27:27 PPP.073 ppp1:gprs0/0 IPCP Address 0.0.0.0 (0x030600000000)
09/05/03 11:27:27 PPP.011 ppp1:gprs0/0 In frame, type 0x8021, size 12
09/05/03 11:27:27 PPP.011 ppp1:gprs0/0 In frame, type 0x8021, size 12
09/05/03 11:27:27 PPP.072 ppp1:gprs0/0 IPCP In CONF-REQ [req-sent] id 1 len 10
09/05/03 11:27:27 PPP.073 ppp1:gprs0/0 IPCP Address 192.168.111.111 (0x0306c0
a86f6f)
09/05/03 11:27:27 PPP.072 ppp1:gprs0/0 IPCP Out CONF-ACK [req-sent] id 1 len 10
09/05/03 11:27:27 PPP.073 ppp1:gprs0/0 IPCP Address 192.168.111.111 (0x0306c0
a86f6f)
09/05/03 11:27:27 PPP.072 ppp1:gprs0/0 IPCP In CONF-NAK [ack-sent] id 1 len 10
09/05/03 11:27:27 PPP.073 ppp1:gprs0/0 IPCP Address 80.27.51.58 (0x0306501b33
3a)
09/05/03 11:27:27 PPP.072 ppp1:gprs0/0 IPCP Out CONF-REQ [ack-sent] id 2 len 10
09/05/03 11:27:27 PPP.073 ppp1:gprs0/0 IPCP Address 80.27.51.58 (0x0306501b33
3a)
09/05/03 11:27:27 64 bytes from 216.239.37.99: PPP.011 ppp1:gprs0/0 In frame, t
ype 0x8021, size 12
09/05/03 11:27:27 PPP.072 ppp1:gprs0/0 IPCP In CONF-ACK [ack-sent] id 2 len 10
09/05/03 11:27:27 PPP.073 ppp1:gprs0/0 IPCP Address 80.27.51.58 (0x0306501b33
3a)
09/05/03 11:27:27 PPP.088 ppp1:gprs0/0 IPCP Negotiation successful
09/05/03 11:27:29 PPP.011 ppp1:gprs0/0 Out frame, type 0x0021, size 85
09/05/03 11:27:29 PPP.012 ppp1:gprs0/0 In PFC frame, 0x21 [OK]
09/05/03 11:27:29 PPP.011 ppp1:gprs0/0 In frame, type 0x0021, size 85
icmp_seq=6. time=733. ms
09/05/03 11:27:31 PPP.011 ppp1:gprs0/0 Out frame, type 0x0021, size 85
09/05/03 11:27:31 PPP.012 ppp1:gprs0/0 In PFC frame, 0x21 [OK]
09/05/03 11:27:31 PPP.011 ppp1:gprs0/0 In frame, type 0x0021, size 85
64 bytes from 216.239.37.99: icmp_seq=7. time=905. ms
09/05/03 11:27:31 PPP.011 ppp1:gprs0/0 Out frame, type 0x0021, size 85
09/05/03 11:27:33 PPP.012 ppp1:gprs0/0 In PFC frame, 0x21 [OK]
09/05/03 11:27:33 PPP.011 ppp1:gprs0/0 In frame, type 0x0021, size 85
64 bytes from 216.239.37.99: icmp_seq=8. time=944. ms
09/05/03 11:27:33 PPP.011 ppp1:gprs0/0 Out frame, type 0x0021, size 85
09/05/03 11:27:33 PPP.012 ppp1:gprs0/0 In PFC frame, 0x21 [OK]
09/05/03 11:27:33 PPP.011 ppp1:gprs0/0 In frame, type 0x0021, size 85
64 bytes from 216.239.37.99: icmp_seq=9. time=769. ms
```



```
---216.239.37.99 PING Statistics---  
10 packets transmitted, 4 packets received, 60% packet loss  
round-trip (ms)  min/avg/max = 733/837/944  
*hide
```

2.9 Configuration Templates

In this section, there are various configuration template examples in order to simplify the configuration for the user. The data here can be edited and modified according to individual requirements.

2.9.1 G4 with ATM over VPN

```

log-command-errors
no configuration
add device ppp 1
add device xot
set data-link at gprs0/0
set data-link x25 serial0/0
global-profiles dial
; -- Dial Profiles Configuration --
  profile GPRS default
  profile GPRS dialout
  profile GPRS 3gpp-apn internet
;
exit
;
  network gprs0/0
; -- Interface AT. Configuration --
  ppp lcp-options acfc
  ppp lcp-options pfc
  ppp lcp-options accm a0000
  exit
;
;
network ethernet0/0
; -- Ethernet Interface User Configuration --
  ip address 172.24.79.1 255.255.0.0
;
;
;
;
exit
;
network serial0/0
; X25 serial line configuration
  set svc high 105
exit
;
network gprs0/0
; -- Interface AT. Configuration --
  pin plain 1234
exit
;
network pppl
; -- Generic PPP User Configuration --
  ip address unnumbered
;
;
;
;
  ppp
; -- PPP Configuration --
  authentication sent-user cajerol@miemepresa password CAJERO1
  ipcp local address assigned
  lcp echo-req off
  exit
;
  base-interface
; -- Base Interface Configuration --
  base-interface gprs0/0 link
  base-interface gprs0/0 profile GPRS
;
...exit
;
exit
;

```

```
event
; -- ELS Config --
  enable trace subsystem PPP ALL
  enable trace subsystem AT ALL
exit
;
node x25
;
  routing 1 port xot na-value XXXXXXXXXXXXXXXX
;
exit
;
;
protocol ip
; -- Internet protocol user configuration --
;
  route 0.0.0.0 0.0.0.0 pppl 1
;
;
;
exit
;
dump-command-errors
end
; --- end ---
```

2.9.2 G3 with POSs through GPRS

```
log-command-errors
no configuration
add device ppp 1
set data-link at gprs0/0
set data-link udafo uart0/0
set data-link udafo uart0/1
set data-link udafo uart0/2
set data-link udafo uart0/3
global-profiles dial
; -- Dial Profiles Configuration --
  profile GPRS default
  profile GPRS dialout
  profile GPRS 3gpp-apn internet
;
exit
...network gprs0/0
; -- Interface AT. Configuration --
  ppp lcp-options acfc
  ppp lcp-options pfc
  ppp lcp-options accm a0000
  exit
;
;
network ethernet0/0
; -- Ethernet Interface User Configuration --
  ip address 172.24.79.1 255.255.0.0
;
;
;
exit
network uart0/0
; -- UDAFO Interface Configuration --
  enable signal-control
  set protocol dat
exit
;
network uart0/1
; -- UDAFO Interface Configuration --
  enable signal-control
  set protocol dat
exit
;
network uart0/2
; -- UDAFO Interface Configuration --
  enable signal-control
  set protocol dat
exit
;
network uart0/3
; -- UDAFO Interface Configuration --
  enable signal-control
  set protocol dat
exit
;
network gprs0/0
; -- Interface AT. Configuration --
  pin plain 1234
exit
;
network pppl
; -- Generic PPP User Configuration --
  ip address unnumbered
;
```

```

;
;
;
ppp
; -- PPP Configuration --
    authentication sent-user OP_USER password OP_PASS
    ipcp local address assigned
    lcp echo-req off
    exit
;
    base-interface
; -- Base Interface Configuration --
    base-interface gprs0/0 link
    base-interface gprs0/0 profile GPRS
;
    exit
;
exit
;
event
; -- ELS Config --
    enable trace subsystem PPP ALL
    enable trace subsystem AT ALL
exit
;
;
protocol ip
; -- Internet protocol user configuration --
;
    route 0.0.0.0 0.0.0.0 ppp1 1
;
    classless
;
;
exit
;
dump-command-error
end
; --- end ---

```

2.9.3 Double SIM management

This example shows the capacity of double SIM management/supervision. Two NSM/NSLA polls are used to supervise the SIMs and the use of the backup SIM is limited to 4 minutes.

The NSM polls checks the connection through pins to a known address at a rate of once per 5 seconds. One poll is used for the main SIM and another for the backup SIM.

The configuration is as follows:

```

log-command-errors
no configuration
set hostname GPRS-SIMM
add device ppp 1
add device ppp 2
set data-link at gprs0/0
set data-link at gprs0/1
global-profiles dial
; -- Dial Profiles Configuration --
    profile GPRS1 default
    profile GPRS1 dialout
    profile GPRS1 local-address 616000111
    profile GPRS1 3gpp-apn company1.es
    profile GPRS1 idle-time 300
;
    profile GPRS2 default
    profile GPRS2 dialout
    profile GPRS2 local-address 616000222

```

```

profile GPRS2 3gpp-apn company2.es
profile GPRS2 idle-time 300
;
exit
;
network gprs0/0
; -- Interface AT. Configuration --
ppp lcp-options acfc
ppp lcp-options pfc
ppp lcp-options accm a0000
exit
;
;
;
network ethernet0/0
; -- Ethernet Interface User Configuration --
ip address 172.24.78.94 255.255.0.0
exit
;
;
network gprs0/0
; -- Interface AT. Configuration --
sim-select internal-socket-2
;
sim external-socket-1 local-address 616000222
sim external-socket-1 pin ciphered 0x4698601DE5BFA77D
sim internal-socket-2 local-address 616000111
sim internal-socket-2 pin ciphered 0x5F03923F51F2AA1D
sim supervision enable
sim ns-la-criteria ns-la-advisor 5
sim return-criteria time after 4
sim return-criteria ns-la-advisor 7
sim connection-timeout 120s
;
exit
;
;
network pppl
; -- Generic PPP User Configuration --
ip address unnumbered
;
ppp
; -- PPP Configuration --
authentication sent-user COMPANY1 password PSSWRD1
ipcp local address assigned
no ipcp peer-route
lcp echo-req off
exit
;
base-interface
; -- Base Interface Configuration --
base-interface gprs0/1 link
base-interface gprs0/1 profile GPRS1
;
exit
;
exit
;
;
network ppp2
; -- Generic PPP User Configuration --
ip address unnumbered
;
;
;
ppp

```

```
; -- PPP Configuration --
    authentication sent-user COMPANY2 password PSSWRD2
    ipcp local address assigned
    no ipcp peer-route
    lcp echo-req off
    exit
;
    base-interface
; -- Base Interface Configuration --
    base-interface gprs0/1 link
    base-interface gprs0/1 profile GPRS2
;
    exit
;
    event
; -- ELS Config --
    enable trace event PPP.001
    enable trace event PPP.002
    enable trace subsystem NSLA ALL
    enable trace subsystem WWAN ALL
    enable filter
    ev-buffer 3000 200
    filter 1 default
    filter 1 text "SIM"
    filter 1 action cyan
    exit
;
;
    protocol ip
; -- Internet protocol user configuration --
    route 0.0.0.0 0.0.0.0 ppp1
    route 0.0.0.0 0.0.0.0 ppp2 2
;
    classless
;
    exit
;    feature nsm
; -- Network Service Monitor configuration --
    operation 1
; -- NSM Operation configuration --
    type echo ipicmp 10.26.4.66
    frequency 5
    timeout 1000
    exit
;
    operation 2
; -- NSM Operation configuration --
    type echo ipicmp 10.26.3.28
    frequency 5
    timeout 1000
    exit
;
    schedule 1 life forever
    schedule 1 start-time now
    exit
;
    feature nsla
; -- Feature Network Service Level Advisor --
    enable
;
    filter 5 nsm-op 1 rtt
    filter 5 significant-samples 2
    filter 5 activation threshold timeout
    filter 5 activation sensibility 100
    filter 5 activation stabilization-time 60
```

```

filter 5 deactivation threshold 200
filter 5 deactivation sensibility 80
filter 5 deactivation stabilization-time 1

;

filter 7 nsm-op 2 rtt
filter 7 significant-samples 2
filter 7 activation threshold 1000
filter 7 activation sensibility 80
filter 7 activation stabilization-time 1
filter 7 deactivation threshold timeout
filter 7 deactivation sensibility 100
filter 7 deactivation stabilization-time 1

;

alarm 5 filter-id 5

;

alarm 7 filter-id 7

;

advisor 5 alarm-id 5

;

advisor 7 alarm-id 7

;

exit

;

dump-command-errors

end

```

On device start up, a check is made to ensure that only NSLA 5 is active; this is the one associated to the main SIM.

```

11/30/07 11:08:50 NSLA.005 advisor/5 client (0x0018dc58 0x010cd3c0) mutated to zombie
11/30/07 11:08:50 NSLA.005 advisor/7 client (0x0018de38 0x010cd3c0) mutated to zombie
11/30/07 11:08:51 NSLA.002 filter/5 creation ok
11/30/07 11:08:51 NSLA.002 filter/7 creation ok
11/30/07 11:08:51 NSLA.002 filter/5 client (0x0043c530 0x0132b790 0x00) registration ok
11/30/07 11:08:51 NSLA.004 alarm/5 registration in filter 5 ok
11/30/07 11:08:51 NSLA.004 alarm/5 creation ok
11/30/07 11:08:51 NSLA.002 filter/7 client (0x0043c530 0x0132b710 0x00) registration ok
11/30/07 11:08:51 NSLA.004 alarm/7 registration in filter 7 ok
11/30/07 11:08:51 NSLA.004 alarm/7 creation ok
11/30/07 11:08:51 NSLA.004 alarm/5 client (0x0043ee08 0x0132b690 0x00) registration ok
11/30/07 11:08:51 NSLA.005 advisor/5 registration in alarm 5 ok
11/30/07 11:08:51 NSLA.005 advisor/5 creation ok
11/30/07 11:08:51 NSLA.005 advisor/5 client (0x0018dc58 0x010cd3c0) zombie reanimated
11/30/07 11:08:51 NSLA.004 alarm/7 client (0x0043ee08 0x0132b610 0x00) registration ok
11/30/07 11:08:51 NSLA.005 advisor/7 registration in alarm 7 ok
11/30/07 11:08:51 NSLA.005 advisor/7 creation ok
11/30/07 11:08:51 NSLA.005 advisor/7 client (0x0018de38 0x010cd3c0) zombie reanimated
11/30/07 11:08:51 NSLA.005 advisor/5 ioctl DEACTIVE
11/30/07 11:08:51 NSLA.002 filter/5 ioctl DEACTIVE
11/30/07 11:08:51 NSLA.004 alarm/5 ioctl DEACTIVE
11/30/07 11:08:51 NSLA.005 advisor/7 ioctl DEACTIVE
11/30/07 11:08:51 NSLA.002 filter/7 ioctl DEACTIVE
11/30/07 11:08:51 NSLA.004 alarm/7 ioctl DEACTIVE
11/30/07 11:08:51 NSLA.002 filter/5 client (0x0043c530 0x0132b790 0x00) notification FALSE
11/30/07 11:08:51 NSLA.004 alarm/5 notification from filter 5: FALSE
11/30/07 11:08:51 NSLA.002 filter/7 client (0x0043c530 0x0132b710 0x00) notification FALSE
11/30/07 11:08:51 NSLA.004 alarm/7 notification from filter 7: FALSE
11/30/07 11:08:51 NSLA.004 alarm/5 client (0x0043ee08 0x0132b690 0x00) notification FALSE
11/30/07 11:08:51 NSLA.005 advisor/5 notification from alarm 5: FALSE
11/30/07 11:08:51 NSLA.004 alarm/7 client (0x0043ee08 0x0132b610 0x00) notification FALSE
11/30/07 11:08:51 NSLA.005 advisor/7 notification from alarm 7: FALSE
11/30/07 11:08:51 NSLA.005 advisor/5 client (0x0018dc58 0x010cd3c0) notification FALSE
11/30/07 11:08:51 NSLA.005 advisor/7 client (0x0018de38 0x010cd3c0) notification FALSE
11/30/07 11:09:09 NSLA.005 advisor/5 ioctl ACTIVE
11/30/07 11:09:09 NSLA.002 filter/5 ioctl ACTIVE
11/30/07 11:09:09 NSLA.004 alarm/5 ioctl ACTIVE

```


Also on activating the main SIM, a check is made that only the PPP1 interface is UP as this is the one that uses the said SIM.

```
GPRS-SIMM *p 3
Console Operator

GPRS-SIMM +conf

Teldat's Router, Super 5 82 S/N: 442/15998
P.C.B.=52 Mask=0502 Microcode=0000 CLK=49152 KHz BUSCLK=49152 KHz PCICLK=327
68 KHz
ID: TM-4F32R-4TI L5.82

Boot ROM release:
  BIOS CODE VERSION: 01.10.03 Jul 6 2007 13:07:21
  gzip Apr 17 2007 09:17:18
  io1 Jul 6 2007 13:07:13
  io2 Jul 6 2007 13:07:13
  io3 Jul 6 2007 13:07:14
  START FROM FLASH L1 Watchdog timer Enabled

Software release: 10.7.11-Alfa TG Nov 28 2007 12:32:41
Compiled by MBERROJO on MBERROJO

Hostname: GPRS-SIMM Active user:
Date: Monday, 00/00/00 Time: 00:04:35
Router uptime: 36s

Num Name Protocol
0 IP DOD-IP
3 ARP Address Resolution Protocol
6 DHCP Dynamic Host Configuration Protocol
11 SNMP SNMP
13 RIP Route Information Protocol
28 PPPoE Point-to-Point Protocol Over Ethernet
33 BFD Bidirectional Forwarding Detection

11 interfaces:
Connector Interface MAC/Data-Link Status
LAN1 ethernet0/0 Ethernet/IEEE 802.3 Testing
T1/UART1 uart0/0 UDAFO system Up
T2/UART2 uart0/1 UDAFO system Up
T3/UART3 uart0/2 UDAFO system Up
T4/UART4 uart0/3 UDAFO system Up
ANT gprs0/0 Async serial line Up
ANT gprs0/1 Async serial line Up
BRI/ISDN1 bri0/0 BRI Net Testing
--- x25-node internal Up
--- ppp1 PPP Up
--- ppp2 PPP Down

SNMP OperStatus:
Interface OperStatus
ethernet0/0 Down
uart0/0 Up
uart0/1 Up
uart0/2 Up
uart0/3 Up
gprs0/0 Up
gprs0/1 Up
bri0/0 Down
x25-node Up
ppp1 Dormant (Up)
ppp2 Dormant (Down)
GPRS-SIMM +
```

The poll begins to check the connection as soon as the router boots and begins to count faults until the PPP has

been negotiated and established and they begin to respond to the NSM poll pins. From this point, the NSLA-Advisor 5 indicates that the condition to switch event is not given.

```
11/30/07 11:09:12 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:09:12 NSLA.002 filter/5 act cond detected
11/30/07 11:09:16 PPP.001 Interface ppp1 ready
11/30/07 11:09:16 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:09:21 PPP.001 Interface ppp1 ready
11/30/07 11:09:21 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:09:27 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:09:31 NSLA.003 filter/5 sample = 121 -> DEACTIVE
11/30/07 11:09:31 NSLA.002 filter/5 act cond removed
11/30/07 11:09:31 NSLA.002 filter/5 deact cond detected
11/30/07 11:09:36 NSLA.003 filter/5 sample = 138 -> DEACTIVE
11/30/07 11:09:41 NSLA.003 filter/5 sample = 136 -> DEACTIVE
11/30/07 11:09:46 NSLA.003 filter/5 sample = 134 -> DEACTIVE
11/30/07 11:09:51 NSLA.003 filter/5 sample = 132 -> DEACTIVE
11/30/07 11:09:55 NSLA.006 filter/5 output FALSE
11/30/07 11:09:55 NSLA.002 filter/5 client notification bypassed
11/30/07 11:09:55 NSLA.003 filter/5 sample = 129 -> DEACTIVE
11/30/07 11:10:01 NSLA.003 filter/5 sample = 127 -> DEACTIVE
11/30/07 11:10:06 NSLA.003 filter/5 sample = 125 -> DEACTIVE
11/30/07 11:10:11 NSLA.003 filter/5 sample = 133 -> DEACTIVE
11/30/07 11:10:16 NSLA.003 filter/5 sample = 130 -> DEACTIVE
11/30/07 11:10:21 NSLA.003 filter/5 sample = 138 -> DEACTIVE
11/30/07 11:10:26 NSLA.003 filter/5 sample = 136 -> DEACTIVE
11/30/07 11:10:31 NSLA.003 filter/5 sample = 144 -> DEACTIVE
```

If the connection drops (because the antenna has been removed from the device, as we have done in this example), the poll begins to fail and once the establishment time has timed out, the switch to backup SIM is executed. The change and the cause are reported through events.

```
11/30/07 11:13:26 NSLA.003 filter/5 sample = 121 -> DEACTIVE
11/30/07 11:13:32 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:13:32 NSLA.002 filter/5 act cond detected
11/30/07 11:13:32 NSLA.002 filter/5 deact cond removed
11/30/07 11:13:37 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:13:42 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:13:47 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:13:52 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:13:57 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:14:02 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:14:07 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:14:12 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:14:17 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:14:22 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:14:27 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:14:32 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:14:32 NSLA.006 filter/5 output TRUE
11/30/07 11:14:32 NSLA.002 filter/5 client (0x0043c530 0x0132b790 0x00) notification TRUE
11/30/07 11:14:32 NSLA.004 alarm/5 notification from filter 5: TRUE
11/30/07 11:14:32 NSLA.004 alarm/5 filter map change (0xffff --> 0xffff)
11/30/07 11:14:32 NSLA.007 alarm/5 output TRUE
11/30/07 11:14:32 NSLA.004 alarm/5 client (0x0043ee08 0x0132b690 0x00) notification TRUE
11/30/07 11:14:32 NSLA.005 advisor/5 notification from alarm 5: TRUE
11/30/07 11:14:32 NSLA.005 advisor/5 alarm map change (0x0000 --> 0x0001)
11/30/07 11:14:32 NSLA.008 advisor/5 output TRUE11/30/07 11:14:32 NSLA.005 advisor/5 client
(0x0018dc58 0x010cd3c0) notification TRUE
11/30/07 11:14:32 WWAN.014 Criteria NSLA met, switch to backup SIM (external/socket 1) intf gprs0/0

11/30/07 11:14:32 NSLA.005 advisor/5 ioctl DEACTIVE
11/30/07 11:14:32 NSLA.002 filter/5 ioctl DEACTIVE
11/30/07 11:14:32 NSLA.004 alarm/5 ioctl DEACTIVE
11/30/07 11:14:32 WWAN.009 CHNGD SIM to external/socket 1 sckt intf gprs0/0
11/30/07 11:14:32 WWAN.013 Backup SIM (external/socket 1) is active intf gprs0/0
```

The PPP1 interface drops and the PPP2 interface associated to the backup SIM is put UP. When this is up and re-

spending the the NSM pins, the NSLA-Advisor 7 reports that the condition to return to main SIM is not given.

```

11/30/07 11:14:48 PPP.002 Interface ppp1 down
11/30/07 11:15:01 NSLA.005 advisor/7 ioctl ACTIVE
11/30/07 11:15:01 NSLA.002 filter/7 ioctl ACTIVE
11/30/07 11:15:01 NSLA.004 alarm/7 ioctl ACTIVE
11/30/07 11:15:03 NSLA.003 filter/7 sample = timeout -> ACTIVE
11/30/07 11:15:03 NSLA.002 filter/7 act cond detected
11/30/07 11:15:07 PPP.001 Interface ppp2 ready
11/30/07 11:15:07 NSLA.003 filter/7 sample = timeout -> ACTIVE
11/30/07 11:15:12 PPP.001 Interface ppp2 ready
11/30/07 11:15:12 NSLA.003 filter/7 sample = timeout -> ACTIVE
11/30/07 11:15:17 NSLA.003 filter/7 sample = 129 -> DEACTIVE
11/30/07 11:15:17 NSLA.002 filter/7 act cond removed
11/30/07 11:15:17 NSLA.002 filter/7 deact cond detected
11/30/07 11:15:22 NSLA.003 filter/7 sample = 126 -> DEACTIVE
11/30/07 11:15:27 NSLA.003 filter/7 sample = 124 -> DEACTIVE
11/30/07 11:15:32 NSLA.003 filter/7 sample = 122 -> DEACTIVE
11/30/07 11:15:37 NSLA.003 filter/7 sample = 120 -> DEACTIVE
11/30/07 11:15:42 NSLA.006 filter/7 output FALSE
11/30/07 11:15:42 NSLA.002 filter/7 client notification bypassed
11/30/07 11:15:42 NSLA.003 filter/7 sample = 138 -> DEACTIVE
11/30/07 11:15:47 NSLA.003 filter/7 sample = 145 -> DEACTIVE
11/30/07 11:15:52 NSLA.003 filter/7 sample = 133 -> DEACTIVE
11/30/07 11:15:57 NSLA.003 filter/7 sample = 141 -> DEACTIVE
11/30/07 11:16:02 NSLA.003 filter/7 sample = 129 -> DEACTIVE
11/30/07 11:16:07 NSLA.003 filter/7 sample = 137 -> DEACTIVE

```

After being used for four minutes, return to the main SIM is carried out. The changes and the cause are reported through events. The PPP2 interface drops and the PPP1 activates (UP).

```

11/30/07 11:18:57 NSLA.003 filter/7 sample = 130 -> DEACTIVE
11/30/07 11:19:01 WWAN.015 Return crtia TIME AT/AFTER met, switch to main SIM (internal/socket 2) intf gprs0/0
11/30/07 11:19:01 NSLA.002 filter/7 ioctl DEACTIVE
11/30/07 11:19:01 NSLA.004 alarm/7 ioctl DEACTIVE
11/30/07 11:19:01 WWAN.009 CHNGD SIM to internal/socket 2 sckt intf gprs0/0
11/30/07 11:19:01 WWAN.012 Main SIM (internal/socket 2) is active intf gprs0/0
11/30/07 11:19:12 PPP.002 Interface ppp2 down
11/30/07 11:19:26 NSLA.005 advisor/5 ioctl ACTIVE
11/30/07 11:19:26 NSLA.002 filter/5 ioctl ACTIVE
11/30/07 11:19:26 NSLA.004 alarm/5 ioctl ACTIVE
11/30/07 11:19:29 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:19:29 NSLA.002 filter/5 act cond detected
11/30/07 11:19:31 PPP.001 Interface ppp1 ready
11/30/07 11:19:31 PPP.001 Interface ppp1 ready
11/30/07 11:19:34 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:19:39 NSLA.003 filter/5 sample = timeout -> ACTIVE
11/30/07 11:19:43 NSLA.003 filter/5 sample = 123 -> DEACTIVE

```

Chapter 3 Monitoring

3.1 Interface Monitoring Commands

The commands added to the generic **AT** commands interface to control the GPRS connection and numerated and described in this section. The result of these commands depends on the module installed in the device.

Command	Function
<i>?(HELP)</i>	Permits you to view the available commands or the options for each of these commands.
<i>AT-MODE</i>	Sends AT commands directly to the module.
<i>BITRATE</i>	Real time monitoring of the connection data speed.
<i>COMMAND</i>	Sends AT commands to the module.
<i>DISCONNECT</i>	Sends the disconnect command.
<i>GPRS</i>	Sends predefined AT commands to the module for information.
<i>LIST</i>	Lists the current parameters for the interface.
<i>RESET</i>	Reset command to the module.
<i>SIM-MANAGEMENT</i>	Commands related to double SIM management monitoring.
<i>EXIT</i>	Returns to the previous menu.

3.1.1 ? (HELP)

You can use the **?** (HELP) command to list all the commands that are valid at the level where the router is being monitored. This command can also be used after a specific command to list the available options for it.

Syntax:

```
gprs0/0 AT+?
```

Example:

```
gprs0/0 AT+ ?
at-mode      Send AT commands directly to the module
bitrate      Bit rate monitor
buffer       Display saved commands and answers
command      Send AT command to the module
disconnect   Send disconnect command
gprs         GPRS/UMTS commands
list         List interface and module parameters
reset        Send reset command
sim-management Double SIM management statistics
exit
```

3.1.2 AT-MODE

Sends the **AT** commands directly over the connected device.

Example:

```
gprs0/0 AT+at
You are now entering AT command mode on interface gprs0/0
Please type CTRL-C to exit AT command mode
ati
SIEMENS
MC35i
REVISION 01.02
OK
AT command mode finished
*
```

3.1.3 BITRATE

Permits you to monitor the data transmission speed in the interface.

Example:

```
gprs0/0 AT+bit
-----
                        Interface gprs0/0
-----
Current trx rate (bps) =      2000   Current rcv rate (bps) =      36000
Current trx rate (bps) =     12000   Current rcv rate (bps) =           0
Current trx rate (bps) =     24000   Current rcv rate (bps) =      34000
gprs0/0 AT+
```

3.1.4 COMMAND

Sends AT commands to the module. Sending of **AT** commands to the module will be available when this is not connected.

Sending of any command or waiting for the result can be aborted by pressing any key.

Syntax:

```
gprs0/0 AT+command
```

Example:

```
gprs0/0 AT+command
<2..509 chars>   AT command
gprs0/0 AT+command ati
ati
SIEMENS
MC35
REVISION 04.00
OK
```

3.1.5 DISCONNECT

Forces disconnection of an active context.

Example:

```
gprs0/0 AT+disconnect
gprs0/0 AT+
```

3.1.6 GPRS

Sends predefined **AT-GPRS** commands to the module. This is available when this is not connected. The results of the informative commands depend on the module being used.

Syntax:

```
gprs0/0 AT+gprs ?
attach      Perform manually network attach
cellinfo    Show cell base station information
detach      Perform manually network detach
imei        Display IMEI module number
imsi        Display SIM IMSI module number
list        List GPRS/UMTS connection status
neighbour   Show neighbour cells information
operator     Operator information menu
quality     Display signal quality
sim-id      Display SIM ID module number
sms         SMS menu
```

3.1.6.1 GPRS ATTACH

Manually carries out an **ATTACH** (register) to the GPRS network.



Note

The device, before each call, will always try and carry out an ATTACH to the network to verify it is still registered.

Syntax:

```
gprs0/0 AT+gprs attach
```

Example:

```
gprs0/0 AT+gprs attach
AT+CGATT=1
OK
```

3.1.6.2 GPRS CELLINFO

Dumps the information stored in the module regarding the base station it is serving.

Syntax:

```
gprs0/0 AT+gprs cellinfo
```

Example:

```
gprs0/0 AT+gprs cellinfo
AT^MONI
Serving Cell                               I Dedicated channel
chann rs dBm PLMN LAC cell NCC BCC PWR RXLev C1 I chann TS timAdv PWR dBm Q
ChMod
 52 31 -51 21407 0B05 082C 5 2 33 -103 50 I No connection
OK
```

3.1.6.3 GPRS DETACH

Manually carries out a **DETACH** (deregister) to the GPRS network.

Syntax:

```
gprs0/0 AT+gprs detach
```

Example:

```
gprs0/0 AT+gprs detach
AT+CGATT=0
OK
+CGREG: 0
```

3.1.6.4 GPRS IMEI

Provides the module IMEI (**International Mobile station Equipment Identity**).

Syntax:

```
gprs0/0 AT+gprs imei
```

Example:

```
gprs0/0 AT+gprs imei
AT+CGSN
500161111199050
OK
```

3.1.6.5 GPRS IMSI

Provides the SIM IMSI (**International Mobile Subscriber Identity**).

Syntax:

```
gprs0/0 AT+gprs imsi
```

Example:

```
gprs0/0 AT+gprs imsi
AT+CIMI
214031303057905

OK
```

3.1.6.6 GPRS LIST

Provides information on the GPRS connection status, indicating the parameters for the serving cell (**SCELL**) and for the first neighbor (**1NGHB**).

Syntax:

```
gprs0/0 AT+gprs list
```

Example:

```
gprs0/0 AT+gprs list
Last Measure: 11 sec
Parameter                : SCELL  1NGHB
-----
PLMN Public Land Mobile Network code : 21407  21407
LAC Location area code   : 0B05   0000
Cell ID                  : 082C   0000
BSIC Base station identity code      : 0     0
PLMN colour code        : 5     *****
Base station colour code : 2     0
ARFCN Absolute Frequency Channel Number : 52   523
RSSI Received signal level of the BCCH : 27   24
Minimal receiving level to allow regist : -103 ***** dBm
Receiving level of the BCCH carrier    : -60  -66 dBm
Maximal power level used on RACH channel: 33   ***** dBm
C1 Cell selection criterion            : 44   37
C2 Cell reselection criterion          : 0    37
```

Parameter	Description
<i>PLMN</i>	This code indicates the cell owner mobile telephony carrier.
<i>LAC</i>	Location Area Code in hexadecimal. A Local Area (or LA) contains various cells. The LAC occupies two bytes.
<i>Cell ID</i>	Active cell identification in hexadecimal. The Cell ID is unique in the LA. A truly unique description of a cell is obtained with the CGI (Cell Global Identity), which is made up of the Cell ID, PLMN and LAC.
<i>BSIC ID</i>	Base station identifier code.
<i>PLMN Code</i>	PLMN Colour Code.
<i>BCC</i>	BTS Colour Code.
<i>ARFCN</i>	BCCH carrier ARFCN. Indicates the serving cell GSM channel or GSM frequency. GSM-900 has 124 channels (1 – 124) and GSM-1800 has 374 (512 – 885). The channels are shared among the various carriers (PLMN). Therefore if this value is between 1 and 124, we are operating in GSM 900 MHz band and if it is between 512 and 885, we are operating over the GSM-1800 band. In fixed locations, this value and the equivalent for the neighboring cells, these are very useful when deciding what type of external antenna to use.
<i>RSSI</i>	RSSI value. Valid values: 0 – 63.
<i>Minimal Rx</i>	Minimum reception level in the base station allowed permitting the register.
<i>RxLev</i>	Reception level for the BCCH carrier in dBm. The higher this is (lower number in absolute value) the greater the reception power.
<i>PWR</i>	Maximum power level used in the RACH channel in dBm. Under some conditions this value cannot be displayed, as the GPRS module does not calculate it. In this case “-“ will appear.
<i>RXLev</i>	Minimum reception level, in dBm, so registration is permitted. Minimum sensibility for the GSM/ GPRS module. Under some conditions this value cannot be displayed, as the GPRS module does not calculate it. In this case “-“ will appear.

C1	<p>Cell selection criteria. This is much better when the value is higher. This is also known as path loss criterion parameter. This is defined as $C1=(RxLev-RxLevAm-MAX((MSTxPwr-MSMaxTxPwr),0))$. This is used to select and reselect the cell. The MS calculates this value and uses it to decide which cell to attach this to. C1 is more useful than just the reception power as this also considers the transmission power and the maximum transmission power (normally 33 dBm).</p> <p>Under some conditions this value cannot be displayed, as the GPRS module does not calculate it. In this case “-“ will appear.</p>
C2	<p>Cell reselection criteria. This is better when the value is higher. C2 is identical to C1 when the module is in a 900 MHz cell. Dual modules prefer the 1800 band. C1 can be much bigger than C2 without this implicating that the module changes to 900 MHz. C2 is included to manage small cells, where an MS can select a cell, but does not have enough time to do anything in it before it is lost. C2 varies over time therefore it can increase after a certain period. If the MS can still see this cell, it changes.</p>

3.1.6.7 GPRS NEIGHBOUR

Provides information on the neighbor cells that can serve the module.

Syntax:

```
gprs0/0 AT+gprs neighbour
```

Example:

```
gprs0/0 AT+gprs neighbour
AT^MONP
chann rs dBm PLMN BCC C1 C2
 49 23 -68 21407 2 35 35
 523 20 -74 21407 0 29 29
 36 15 -83 21407 2 20 20
 46 15 -83 21407 2 20 20
 27 14 -85 21407 2 18 18
 512 12 -89 21407 0 14 14
OK
```

3.1.6.8 GPRS OPERATOR

Provides information on the available operators.

Syntax:

```
gprs0/0 AT+gprs operator
```

Example:

```
gprs0/0 AT+gprs operator ?
available List operators available
registered List operator registered
```

Example:

```
gprs0/0 AT+gprs operator available
AT+COPS=?
+COPS: (2,"Movistar",,"21407"),(3,"E AMENA",,"21403"),(3,"E VODAFONE",,"21401"),
,(0-4),(0,2)
OK
```

Example:

```
gprs0/0 AT+gprs operator registered
+COPS: 0,2,"Movistar"
OK
```

3.1.6.9 GPRS QUALITY

Information on the quality of the signal received by the module.

Syntax:

```
gprs0/0 AT+gprs quality
```


Example:

```
gprs0/0 AT+gprs quality
+CSQ: 31,0
OK
```

The module returns the detected signal level with the following format +CSQ:<rssI>,<ber>

<rssI> Receive level:

- 0 #-113 dBm or less.
- 1 #-111 dBm.
- 2...30 # -109... -53 dBm.
- 31 # -51 dBm or higher.
- 99 not detectable.

<ber> Bit error rate:

- 0...7 according to the values described in the GSM 05.08 section 8.2.4 specification.
- 99 unknown (cannot be measured or has not carried out a call).

3.1.6.10 GPRS SIM-ID

Displays the SIM card identification number.

Syntax:

```
gprs0/0 AT+gprs sim-id
```

Example:

```
gprs0/0 AT+gprs sim-id
AT^SCID
^SCID: 8934011370248184547
OK
```

3.1.7 LIST

Permits you to monitor information on the interface status.

Example:

```
gprs0/0 AT+list
GPRS Daughter Board      = SIEMENS MC35i Rev 1
GPRS Manufacturer        = SIEMENS
GPRS Module Model        = MC35i
GPRS Module Firmware     = REVISION 01.02
GPRS Module IMEI         = 351246000118756
GPRS Module IMSI         = 214070000586094
GPRS Module SIM Card ID  = 8934074100095600103
GPRS Coverage Status     = 0x00000800 (TRUE)
Dialers registered       = GPRS
Current dialer registered = none
State                    = (1) DISCONNECT
Call request             = 0
Telephone number         =
Total connection time    = 0 seconds
Current connection time  = 0 seconds
Time to establish connection = 0 sec
gprs0/0 AT+
```

3.1.8 RESET

Sends the **RESET** command to the module.

Example:

```

gprs0/0 AT+reset
gprs0/0 AT+04/08/09 21:50:43 AT.020 Module restarted intf gprs0/0
04/08/09 21:50:43 AT.020 RI change OFF --> ON intf gprs0/0
04/08/09 21:50:49 PPP.002 Interface ppp1 down
04/08/09 21:50:49 AT.020 RI change ON --> OFF intf gprs0/0
04/08/09 21:50:51 AT.020 CTS change OFF --> ON intf gprs0/0
04/08/09 21:50:52 AT.020 ATCMD-->AT+CMEE=1 intf gprs0/0
04/08/09 21:50:53 AT.020 ATCMD-->AT+CPIN? intf gprs0/0
04/08/09 21:50:54 AT.020 PIN is required intf gprs0/0
04/08/09 21:50:56 AT.020 PIN successful intf gprs0/0
04/08/09 21:50:57 AT.020 Setup SIEMENS MC35i on intf gprs0/0
04/08/09 21:50:57 AT.020 ATCMD-->AT+F intf gprs0/0
04/08/09 21:50:57 AT.020 ATCMD-->AT+F intf gprs0/0
04/08/09 21:50:57 AT.020 ATCMD-->AT+C1&S0&D2\Q3 intf gprs0/0
04/08/09 21:50:57 AT.020 ATCMD-->AT^SSYNC=1 intf gprs0/0
04/08/09 21:50:57 AT.020 ATCMD-->AT^SGAUTH=1 intf gprs0/0
04/08/09 21:50:59 AT.001 Modem initialized successfully intf gprs0/0
04/08/09 21:51:04 PPP.001 Interface ppp1 ready

```

3.1.9 SIM-MANAGEMENT

Monitors the different double SIM management elements that the hardware has. If this isn't supported, the command is not available.

Syntax:

```

gprs0/0 AT+sim-management ?
list      Show SIM management status
switch    Switch to unused SIM socket

```

3.1.9.1 SIM-MANAGEMENT LIST

Displays information on the double SIM management. This indicates which one is the main SIM, which SIM is being used and if the double SIM management/supervision is enabled.

Syntax:

```

gprs0/0 AT+ sim-management list

```

Example:

```

gprs0/0 AT+ SIM-MANAGEMENT LIST
Current SIM Socket: internal/socket 2
Main SIM Socket:   internal/socket 2
SIM supervision :  enabled
gprs0/0 AT+

```

3.1.9.2 SIM-MANAGEMENT SWITCH

Permits manual switching between the SIM being used and the other one, without taking into account which one is the main SIM and which one the backup. This process requires confirmation as switching means resetting the module and consequently dropping all the established connections and calls.

Syntax:

```

gprs0/0 AT+ sim-management switch
Are you sure (Yes/No)?

```

Example:

```

gprs0/0 AT+sim-management switch
Are you sure (Yes/No)? y
OK
gprs0/0 AT+

```

Switching cannot take place if the double SIM management/supervision is not enabled, if the hardware is currently enabling the cellular interface or if switching is in progress. All of these will produce an error message.

When switching is carried out, the WWAN.014 event is displayed indicating that the cause was the console and the

SIM being switched to.

Example:

```
11/27/07 18:58:23 WWAN.014 Criteria CONSOLE met, switch to backup SIM (external/socket 1) intf gprs0/0
11/27/07 18:58:23 WWAN.009 CHNGD SIM to external/socket 1 sckt intf gprs0/0
11/27/07 18:58:23 WWAN.013 Backup SIM (external/socket 1) is active intf gprs0/0
```

3.1.10 EXIT

Returns to the previous menu.

Example:

```
gprs0/0 AT+exit
*
```

Chapter 4 GSM/GPRS Coverage

4.1 Monitoring

Signal coverage monitoring and parameters relative to the GSM/GPRS connection is accessed in the Commands Line Interface **Process 3** or **P 3** menu in the device console (Please see manual *Dm704-I Configuration and Monitoring*). Once in this menu, enter the GPRS interface menu you wish to monitor, e.g. **net gprs0/1**.

This menu contains a direct connection mode with the module through an **AT** commands interface. To enter this mode, type **AT** command.

Please note that on entering the **AT** commands mode when there is an established data communication, either through a GSM call or a GPRS context, the data communication is interrupted until you exit the **AT** commands mode.

Example:

```
*p 3
+net g0
-- AT Console --
gprs0/0 AT+at
You are now entering AT command mode on interface gprs0/0
Please type CTRL-C to exit AT command mode
```

4.1.1 Considerations

Routers with the Siemens MC35/MC35i module only have a GPRS net ("net gprs0/0") available, i.e. it only permits you to have a single defined GPRS context at any given moment. Therefore, with this type of module, when entering the commands mode the data connection is interrupted making it impossible to remotely enter the commands mode from the GPRS network.

Routers with the Siemens MC45 module have two GPRS networks (**net gprs0/0** and **net gprs0/1**) i.e. permit two GPRS contexts to be defined and established simultaneously. Therefore, with this module, it is possible to have an established data connection and without interrupting it, enter monitoring in **AT** commands mode from the other network (the GSM/GPRS coverage and other parameters are common, as the router only has one GSM/GPRS interface, although you can define two GPRS contexts and share the traffic between them, you can only execute one GSM call simultaneously). Logically, if the two contexts are established, one of these must be interrupted in order to enter the commands mode. Lastly, as the module is class B, you cannot have a GSM call and a GPRS context simultaneously running traffic. This is due to the fact that when the call is established, the GPRS traffic is interrupted although the GPRS context and attach in principal remain active during the GSM call, and reestablish when the GSM call ends, commencing data traffic once more.

4.1.2 Coverage monitoring commands

Useful coverage monitoring commands exist for both the Siemens MC35/MC35i modules as well as for the MC45 modules and are described below.

4.1.2.1 at^moni

Offers information on the cell that the router is currently connected to and on its coverage parameters. You can directly execute the **AT^MONI** command in order to view the current parameters or use the **AT^MONI =N** command so the output updates every n seconds, n being between 1 and 254.

Example:

```
gprs0/0 AT+at
You are now entering AT command mode on interface gprs0/0
Please type CTRL-C to exit AT command mode
at^moni
Serving Cell                               I Dedicated channel
chann rs  dBm MCC MNC  LAC cell NCC BCC PWR RXLev  Cl I chann TS timAdv PWR  dBm Q ChMod
  801  26  -84 214  03 03ED 0B43  3  6  30  -111 27 I   No connection
OK
```

Parameters offering this command are described in the following table:

Serving Cell Parameters

Parameter	Description
<i>chann</i>	BCCH carrier ARFCN. Indicates the serving cell GSM channel or GSM frequency. GSM-900 has 124 channels (1 – 124) and GSM-1800 has 374 (512 – 885). The channels are shared among the various carriers (PLMN). Therefore if this value is between 1 and 124, we are operating in GSM 900 MHz band and if it is between 512 and 885, we are operating over the GSM-1800 band. In fixed locations, this value and the equivalent for the neighboring cells, these are very useful when deciding what type of external antenna to use.
<i>rs</i>	RSSI Value. Valid values: 0 – 63.
<i>dBm</i>	Reception level for the BCCH carrier in dBm. The higher this is (lower number in absolute value) the greater the reception power.
<i>MCC</i>	Mobile Country Code. This is the first part of the PLMN code. This PLMN code indicates the mobile telephony carrier, who is the owner of the serving cell.
<i>MNC</i>	Mobile Network Code. This is the second part of the PLMN code.
<i>LAC</i>	Local Area Code in hexadecimal. An LA (or Local Area) contains various cells. The LAC occupies two bytes. Together with the MCC and the MNC, these form the LAI.
<i>cell</i>	Active cell identifier (Cell ID), in hexadecimal. The Cell ID is unique in the LA. A truly unique description is obtained with the CGI (Cell Global Identity), which is made up of the Cell ID, MCC, MNC and LAC.
<i>NCC</i>	PLMN Colour Code.
<i>BCC</i>	BTS Colour Code.
<i>PWR</i>	Maximum power level used in the RACH channel in dBm. Under some conditions this value cannot be displayed, as the GPRS module does not calculate it. In this case “-“ will appear.
<i>RXLev</i>	Minimum reception level, in dBm, so registration is permitted. Minimum sensibility for the GSM/GPRS module. Under some conditions this value cannot be displayed, as the GPRS module does not calculate it. In this case “-“ will appear.
<i>C1</i>	Cell selection criteria. This is much better when the value is higher. This is also known as path loss criterion parameter . This is defined as $C1 = (RxLev - RxLevAm - MAX((MSTxPwr - MSMaxTxPwr), 0))$. This is used to select and reselect the cell. The MS calculates this value and uses it to decide which cell to attach this to. C1 is more useful than just the reception power as this also considers the transmission power and the maximum transmission power (normally 33 dBm). Under some conditions this value cannot be displayed, as the GPRS module does not calculate it. In this case “-“ will appear.

Dedicated Channel Parameters

Parameter	Description
<i>chann</i>	TCH carrier ARFCN. Note <chann> = h indicates frequency hop.
<i>TS</i>	Timeslot number
<i>TimAdv</i>	Timing advance , in bits.
<i>PWR</i>	Current power level.
<i>dBm</i>	TCH carrier reception level, in dBm.
<i>Q</i>	Reception quality (0 – 7).
<i>ChMod</i>	Channel Mode. Possible values are: S_HR: Half rate, S_FR: Full rate, S_EFR: Enhanced Full Rate.

Additional text depending on the status of the service.

Text	Status of the service
<i>No connection</i>	The MS is in a cell and registered in the network. The service status is idle i.e. there is no established connection or a dedicated channel in use. The GPRS connection can be perfectly active in this state.
<i>Limited Service</i>	The MS is in a cell, but not registered in the network. Only emergency calls are permitted in this state.
<i>Cell Reselection</i>	The MS is in a cell, but searching for a better cell (cell re-selection).
<i>Searching</i>	The MS is searching, but has not found an adequate cell as yet.

4.1.2.2 at^monp

Offers information on the current neighboring cells and their coverage parameters. You can directly execute the **AT^MONI** command in order to view the current parameters or use the **AT^MONI=N** command so the output updates every *n* seconds, *n* being between 1 and 254.

Example:

```
gprs0/0 AT+at
You are now entering AT command mode on interface gprs0/0
Please type CTRL-C to exit AT command mode
at^monp
chann rs dBm MCC MNC BCC C1 C2
785 13 -97 214 03 6 14 14
783 10 -100 214 03 7 11 11
762 3 -107 214 03 6 4 4
OK
```

Parameters offering this command are described in the following table:

Parameter	Description
<i>chann</i>	BCCH carrier ARFCN. Indicates the serving cell GSM channel or GSM frequency. GSM-900 has 124 channels (1 – 124) and GSM-1800 has 374 (512 – 885). The channels are shared among the various carriers (PLMN). Therefore if this value is between 1 and 124, we are operating in GSM 900 MHz band and if it is between 512 and 885, we are operating in the GSM-1800 band. In fixed locations, this value and the equivalent for the neighboring cells, these are very useful when deciding what type of external antenna to use.
<i>rs</i>	RSSI Value. Valid values: 0 – 63.
<i>dBm</i>	Reception level for the BCCH carrier in dBm. The higher this is (lower number in absolute value) the greater the reception power.
<i>MCC</i>	Mobile Country Code. This is the first part of the PLMN code. This PLMN code indicates the mobile telephony carrier, the owner of the serving cell.
<i>MNC</i>	Mobile Network Code. This is the second part of the PLMN code.
<i>BCC</i>	BTS Color Code.
<i>C1</i>	Cell selection criteria. This is much better when the value is higher. This is also known as path loss criterion parameter . This is defined as $C1 = (RxLev - RxLevAm - MAX((MSTxPwr - MSMaxTxPwr), 0))$. This is used to select and reselect the cell. The MS calculates this value and uses it to decide which cell to attach this to. C1 is more useful than just the reception power as this also considers the transmission power and the maximum transmission power (normally 33 dBm). Under some conditions this value cannot be displayed, as the GPRS module does not calculate it. In this case “-“ will appear.
<i>C2</i>	Cell reselection criteria. This is better when the value is higher. C2 is identical to C1 when the module is in a 900 MHz cell. Dual modules prefer the 1800 band. C1 can be much bigger than C2 without this implicating that the module changes to 900 MHz. C2 is included to manage small cells, where an MS can select a cell, but does not have enough time to do anything in it before it is lost. C2 varies over time therefore it can increase after a certain period. If the MS can still see this cell, it changes.

Acronyms used

ARFCN	Absolute Frequency Channel Number
BCCH	Broadcast Control CHannel
BTS	Base Transceiver Station
CGI	Cell Global Identity
LA	Local Area
LAC	Local Area Code
LAI	Local Area Information
MCC	Mobile Country Code
MNC	Mobile Network Code
MS	Mobile Station
PLMN	Public Land Mobile Network
RACH	Random Access CHannel

RSSI	Received signal strength indication
TCH	Traffic CHannel

4.1.3 Criteria for Quality of Coverage

When measuring the quality of coverage in a specific place, you need to bear in mind that not only does this affect the level of the received power in the serving cell, but it also affects the difference of power received between the serving cell and the neighbors. Not receiving enough power from any cell is almost as bad as receiving similar power from various cells. This is due to the fact that if a similar power is received from various cells, there is a high possibility that more cell hops will occur (**handovers**) which prejudice the communication quality. This is especially sensitive in the case of GPRS, where behavior with large and different transmission delays including intermittent losses has been observed, in cases where there is insufficient coverage.

The least theoretic reception power must coincide with the sensitivity (**RXLev** parameter), generally between -103 dBm and -111 dBm, depending on the carrier. It is worth giving this power a margin of at least 10 dB to protect it against signal fading caused by various reasons, which leaves the minimum power criteria required in the region of -93 dBm. For GPRS and with a stricter criterion, this minimum power should be considered in the region of -80 dBm, although with power between -80 and -93 dBm, functionality can also be viable. To avoid cell changes, it is also convenient that the reception power in the first neighbor cell is at least 6 dB less than the serving cell.

4.1.4 Positioning the antenna

In general, the calculation of the coverage parameters described above, has small oscillations for a given location, which should be considered as normal. Therefore, in order to obtain the reference values, we recommend taking various samples from each parameter (e.g. executing the **AT^MONI=3** command for half a minute) and estimating the average.

Given the above explanation, the installation guide or the selection criteria for the best position for the antenna can be summarized in the following way:

- (1) Look for an initial antenna location, where you consider reception should be adequate (high enough, away from vertical metal surfaces etc).
- (2) In compliance with the **chann** parameter, identify the frequencies band for the serving cell and the neighbors in order to use the appropriate antenna in cases where there are various options. Unidirectional antennas can usually only be adjusted to a determined band whereas omni directional antennas are more likely to be dual.
- (3) If the reception power **dBm** parameter is better than -80 dBm, go to point 5.
- (4) If the reception power is between -80 and -93 dBm, try and find a better location (and return to point one).
- (5) Check that the first neighbor cell reception level is at least 6 dB less than the serving cell. If this is the case then you can consider the antenna location to be appropriate. If not, then return to point 1 should you require a more reliable coverage at all times, in order to find a better location.

Chapter 5 Upgrading Firmware

5.1 Introduction

Given the rapid progress of cellular technology, it's essential that the devices used in the access solutions can be upgraded with the latest features available.

Some Teldat devices that incorporate GPRS cellular technology have a mechanism to update the firmware for the hardware module implementing this technology.

This procedure consists of the following steps:

- Obtaining the upgraded software.
- Transferring the software to the device through FTP.
- Loading it in the card cellular telephony module.

5.2 Procedure

5.2.1 Obtaining the upgrade

In order to execute firmware upgrading, you need to have the appropriate loading file for the module requiring upgrading. In the same way, you also need information on the type and version of the installed module in order to determine which firmware versions are compatible.

The firmware for the various types of modules, as well as the possible versions for each of them, is available for the user from the Teldat Technical Service. To obtain this firmware, please contact the Teldat Technical Service and give them all the information on the module. This information can be found on the device monitoring console.

Example:

```
control gprs0/0 AT+list
  Daughter Board           = SIEMENS MC75 Rev 0
  Module Manufacturer      = SIEMENS
  Module Model             = MC75
  Module Firmware         = REVISION 03.010
  IMEI                     = 355634004733041
  IMSI                     = 214072530000435
  SIM Card ID              = 8934074100102494953
  Drop by ping failed      = 0
  Drop by tracert failed   = 0
  Drop by traffic failed   = 0
  Dialers registered       = GPRS
  Current dialer registered = GPRS
  State                    = (5) CONNECT
  Call request              = 1
  Access Point Name        = xxoperator.com
  Total connection time    = 42 seconds
  Current connection time  = 42 seconds
  Time to establish connection = 7 sec
control gprs0/0 AT+
```

The file containing the new module firmware has a *UPF extension.

5.2.2 Transferring to the device

The Teldat routers have an FTP server to which they can transfer files to upgrade the device software or to load firmware for internal devices. This server is only accessible if the device has started up correctly (application being executed).

The steps to carry out to execute an upgrade are as follows:

- (1) Place the upgrade file in a directory in the machine where you are going to launch the FTP session.
- (2) In order to carry out the upgrading process, the device must have enough space in the memory to store the upgrading file. Likewise, the FTP temporary buffer must have more space in it than the file you wish to load. We

5.2.3 Upgrading the module

- (1) Access the base interface (gprsX/0) monitoring menu for the card you wish to update as indicated in the chapter on monitoring.
- (2) Execute the **MODULE UPGRADE-FRM** command to start loading for the module. If you have not previously loaded the upgrade file in the RAM, you will receive an error message.
- (3) Wait until the process finishes. During this process, some points and messages will appear indicating the upgrading progress and state. These messages and points can be different depending on the type of module you are upgrading.



Note

Do not under any circumstances switch off or restart the device during this process.



Note

This process can take a few minutes.

- (4) Check that this is the correct version through the interface **LIST** command.

Example:

```
control *p 3
Console Operator
+net gprs0/0
gprs0/0 AT+list
    Daughter Board           = SIEMENS MC75 Rev 0
    Module Manufacturer      = SIEMENS
    Module Model             = MC75
    Module Firmware         = REVISION 03.010
    IMEI                    = 355634004733041
    IMSI                    = 214072530000435
    SIM Card ID             = 8934074100102494953
    Drop by ping failed     = 0
    Drop by tracert failed  = 0
    Drop by traffic failed  = 0
    Dialers registered      = GPRS
    Current dialer registered = GPRS
    State                   = (5) CONNECT
    Call request            = 1
    Access Point Name       = xxoparator.com
    Total connection time   = 46 minutes 50 seconds
    Current connection time = 46 minutes 50 seconds
    Time to establish connection = 7 sec
gprs0/0 AT+module upgrade-frm
Reading upgrading file from /MEM, 2719616 bytes
Module SIEMENS MC-75 detected
Are you sure to upgrade the module(Yes/No)? y
Upgrade initializing... OK
Detected Upgrade release 0.3.010
Upgrading(*)...: 37261
Upgrade done
gprs0/0 AT+list
    Daughter Board           = SIEMENS MC75 Rev 0
    Module Manufacturer      = SIEMENS
    Module Model             = MC75
    Module Firmware         = REVISION 03.011
    IMEI                    = 355634004733041
    IMSI                    = 214072530000435
    SIM Card ID             = 8934074100102494953
    Drop by ping failed     = 0
    Drop by tracert failed  = 0
    Drop by traffic failed  = 0
    Dialers registered      = GPRS
    Current dialer registered = none
    State                   = (1) DISCONNECT
    Call request            = 1
```

```
Access Point Name      = xxoparator.com
Total connection time  = 46 minutes 56 seconds
Current connection time = 46 minutes 56 seconds
Time to stablish connection = 7 sec
Module Reset performed = 2
gprs0/0 AT+
```