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Willtek 8501

GSM Air Interface Test Module

user's guide

version 3.00

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Ordering information This guide is issued as part of the **8501 GSM Air Interface Test Module**. The ordering number for a published guide is M 290 008. The ordering number for the product is M 100 801.

Table of Contents

About This Guide

Purpose and scope

This user's guide is a comprehensive guide to the Willtek 8501 GSM Air Interface Test Module. It provides information on ordering and connecting the 8501 and the Accessory Kits available. The main focus of the user's guide is the set of commands and the message format of the serial interface of the 8501. The commands offer functions for:

- Controlling the test module
- Forcing the behavior of the test module
- Requesting output of messages in ASCII format in continuous mode

The command reference guide starts with an overview of the trace port commands, mobile control commands and commands forcing special mobile behavior, followed by formats and samples of reports. In the Appendix, command summary and hardware-related information are given.

For the start-up procedure see the getting started manual delivered with the product.

Related information

Use this guide in conjunction with the following information:

Doc. no. M 295 008: Willtek 8501 GSM Air Interface Test Module - getting started manual

Technical assistance

If you need assistance or have questions related to the use of this product, call one of Willtek's technical assistance centers. You can also contact Willtek by e-mail at customer.support@willtek.com.

Table 1 Technical assistance centers

Region	Phone number	Fax number
UK	+44 (0) 20 8408 5720	+44 (0) 20 8397 6286
Europe, Middle East, Asia, Africa	+49 (0) 89 996 41 386 +49 (0) 89 996 41 227	+49 (0) 89 996 41 440
Americas	+1 317 595 2021 +1 866 WILLTEK	+1 317 595 2023

Conventions

This guide uses naming conventions and symbols, as described in the following tables.

Table 2 Typographical conventions

Description	Example
User interface actions appear in this **typeface**.	On the Status bar, click **Start**.
Buttons or switches that you press on a unit appear in this **TYPEFACE**.	Press the **ON** switch.
Code and output messages appear in this `typeface`.	`All results okay`
Text you must type exactly as shown appears in this **`typeface`**.	Type: **`a:\set.exe`** in the dialog box
Variables appear in this **<typeface>**.	Type the new **<hostname>**.
Book references appear in this **typeface**.	Refer to **Newton's Telecom Dictionary**
A vertical bar | means "or": only one option can appear in a single command.	`platform [a|b|e]`
Square brackets [ ] indicate an optional argument.	`login [platform name]`
Slanted brackets < > group required arguments.	`<password>`

Table 3 Keyboard and menu conventions

Description	Example
A plus sign + indicates simultaneous keystrokes.	Press **Ctrl+s**
A comma indicates consecutive keystrokes.	Press **Alt+f,s**
A slanted bracket indicates choosing a submenu from menu.	On the menu bar, click **Start > Program Files**.

Table 4 Symbol conventions

This symbol represents a general hazard.

This symbol represents a risk of electrical shock.

NOTE

This symbol represents a Note indicating related information or tip.

Table 5 Safety definitions

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Safety Information

This chapter provides the safety notes for the 8501 GSM Air Interface Test Module.

Safety notes

The 8501 is built and tested in line with DIN 57411 part 1 (protective measures for electronic test equipment). The instrument complies with safety class I. It left the factory in a perfectly safe condition for operation. Maintenance and repair is only allowed for specially trained service technicians. Opening the instrument without permission causes loss of warranty.

Overview

1

This chapter provides a general description of the 8501 GSM Air Interface Test Module. Topics discussed in this chapter include the following:

About the 8501 GSM Air Interface Test Module

The Willtek 8501 GSM Air Interface Test Module is a test instrument for measuring the link between a base station and a mobile phone. To keep the mobile phone subscribers happy, network operators have to assure that the network always works properly and the quality of service (QoS) can be guaranteed.

To prove that the network coverage is optimal it is no longer sufficient to test the field strength only. With the 8501 it is even possible to measure RX QUAL on the base channel. Additionally, test calls can be established to check the network behavior under specific conditions.

The hardware design and the protocol stack of the 8501 is tried and tested in over 25 different GSM mobile phone types. This assures that the data evaluated by the 8501 represent the network performance as any "normal" user would experience it.

The key applications are:

- Go/NoGo checks of base stations
- Integration in systems for monitoring the network
- Network coverage measurements together with a laptop
- Remote controlled calls
- The main features include:
- Robust housing and easy mounting
- RX QUAL in idle mode
- Trace on voice, data and SMS
- All neighboring cells measured (up to 32)
- Definable channel scan
- Full remote control
- Precise measurements due to individual calibration

Compared with commercial mobile phones the 8501 has an additional trace port where information from layers 1 and 3 is visible. The trace port allows also manipulation of the mobile phone behavior, i.e. the band, speech (FR or FR/EFR) and base station can be selected and a handover can be forced. Furthermore, the whole frequency spectrum or parts of it can be scanned with the test instrument.

Ordering Information

Product	Description	Order No.
8501	GSM Air Interface Test Module and Getting Started Guide	M 100 801
MAX-502	Accessory Kit for 8501	M 248 600
MAX-503	Accessory Kit for 8501 incl. GPS receiver	M 248 601

For the contents of the MAX-502 and MAX-503 Accessory Kits see the following tables.

MAX-502 Accessory Kit

Quantity	Description
1	8501 User's Guide
1	RF antenna
1	Right-angle adapter (SMA)
2	9-pin Sub D – 9-pin Sub D cable
1	25-pin Sub D – 36-pin Mini D Ribbon cable
1	PS/2 adapter cable for power supply
1	Adapter box
1	Demo software on a 3.5" floppy disk

MAX-503 Accessory Kit

Quantity	Description
1	8501 User's Guide
1	RF antenna
1	Right-angle adapter (SMA)
3	9-pin Sub D – 9-pin Sub D cable
1	25-pin Sub D – 36-pin Mini D Ribbon cable
1	PS/2 adapter cable for power supply
1	Adapter box (incl. integrated GPS module)
1	Demo software on a 3.5" floppy disk

Accessory Requirements

Device	Requirement
PC or laptop	Windows 95, 98 or NT 4.0 operating system 2 unused RS-232 (COM) ports for MAX-502 3 unused RS-232 (COM) ports for MAX-503
Power supply	5.5 V to 16 V DC or an unused keyboard/mouse PS/2 connector

Operation

2

This chapter describes the functionality of the 8501 GSM Air Interface Test Module. Topics discussed in this chapter are as follows:

Connecting the GSM Air Interface Test Module

For a direct connection of the 8501 to a PC or a laptop computer use the MAX-502 or the MAX-503 Accessory Kit (see figure below).

To connect the test module with the adapter box, proceed as follows:

1 Mount the rectangle SMA connector on the test module antenna socket.

2 Mount the RF antenna on the SMA connector.

3 Connect the control cable to the control connector of the test module.

4 Connect the control cable to the corresponding connector of the adapter box.

5 Connect the data port of the adapter box to the serial connector of your PC (e.g. COM1) by using the serial extension cable.

6 Connect the trace port of the adapter box to the serial connector of your PC (e.g. COM2) by using the serial extension cable.

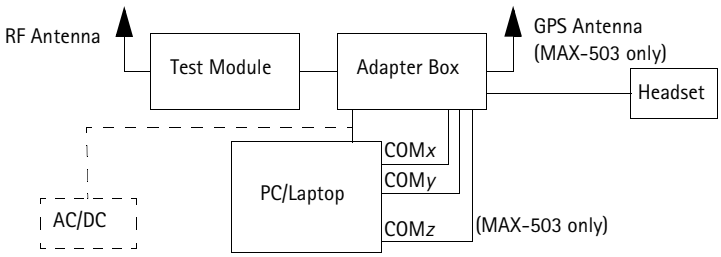
7 Connect your power supply (not part of the accessory kit) to the power supply connector of the adapter box. For portable operation you can use the power supply cable and connect it to your mouse/keyboard PS/2 connector.

8 Connect your headset (not part of the accessory kit, recommended model Plantronics M 120) to the adapter box by plugging its connector into the headset connector of the adapter box.

The following items only apply to the MAX-503 Accessory Kit:

9 Connect the GPS serial port of the adapter box to the serial connector of your PC (e.g. COM3) by using the serial extension cable.

10 Connect a GPS magnetic mount antenna (not part of the accessory kit) to the adapter box. Use preferably Trimble GPS, hard mount or rooftop antenna.



RS-232 Settings (Date & Trace Port)

To perform the set of commands, the test module has to be connected to a PC by two RS-232 cables. These are connected on the COM ports of the PC. There is a 3-wire RS-232 port for trace commands (trace port) and a 5-wire RS-232 port for AT commands (data port).

The parameters of the serial link are:

– Speed 9600 Bauds (trace port) or 19200 Bauds (data port)

- Data bits 8
- Stop bits 1
- Parity None
- No flow control

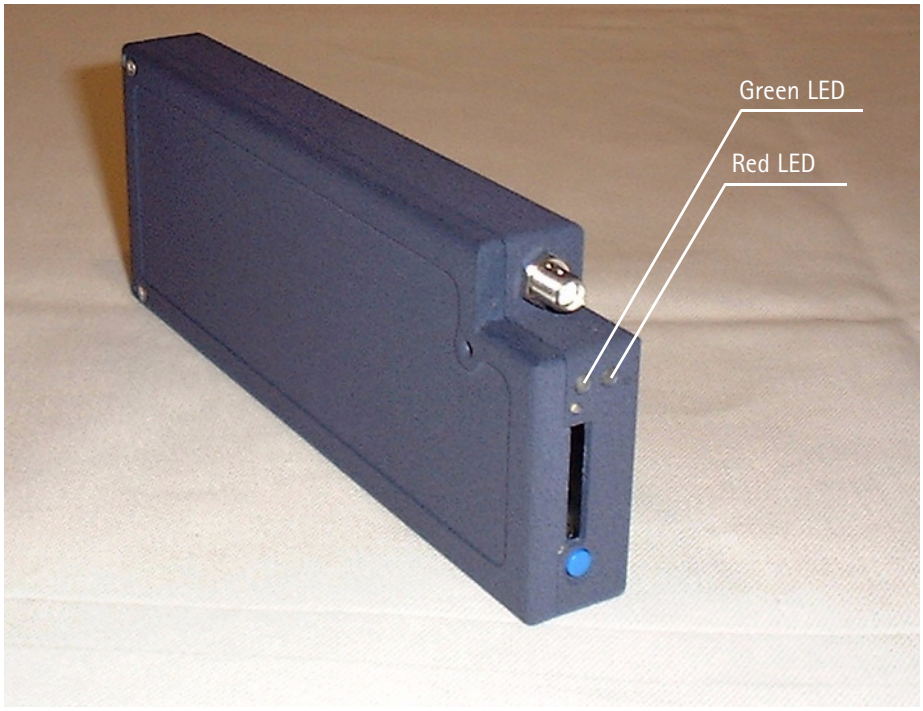
The two RS-232 links (serial links) established between the 8501 and the master PC will therefore be used to:

- Control the mobile part of the test module (data port)
- Retrieve RF measurements and protocol reports; force special mobile behaviour (trace port)

LED Description

The table below shows the LED sequence for the 8501.

		Equipment Status (Red)			
		Off	**On**	**Flash Slow**	**Flash Fast**
Network Status (Green)	**Off**	No power	No coverage	No/Invalid SIM	SMS waiting – no coverage
	On	n/a	In call	n/a	SMS waiting – in call
	Flash Slow	n/a	Idle	n/a	SMS waiting – idle
	Flash Fast	n/a	Incoming call	n/a	SMS waiting – incoming call



Output Wiring Schedule

Pin	Signal	Description
1	Reserved	
2	Reserved	
3	MIC+	Microphone input
4	SPKR+	Speaker output
5	MIC–	Microphone input (inverse)
6	SPKR–	Speaker output (inverse)
7		
8	GND1	Ground for trace port
9	TXD1	Trace port transmit to PC
10	CTS2	Data port CTS from PC
11	ON/OFF	GSM engine power status Open collector output – Low = off
12	RXD2	Data port receive from PC
13	SIM_CLOCK	Clock to external SIM card
14	SIM_RESET	Reset to external SIM card
15	Reserved	
16	Reserved	
17	Reserved	
18	NETWORK_STATUS	Green LED
19	V_DC	$+V_{DC}$ supply should be 5.5 V to 16 V
20	GND	$-V_{DC}$ supply should be 0 V to 0.2 V
21	V_DC	$+V_{DC}$ supply should be 5.5 V to 16 V
22	GND	$-V_{DC}$ supply should be 0 V to 0.2 V
23	Remote_On/Off	On/Off control input like power switch
24		
25		
26	GND2	Data port ground
27	RTS2	Data port RTS to PC
28	TXD2	Data port transmit to PC
29	RXD1	Trace port receive from PC
30	Reserved	
31	SIM_VCC	V_{CC} output (3 V) for external SIM
32	SIM_I/O	Data to/from external SIM
33	Reserved	
34	EQUIPMENT_STATUS	Red LED
35	Reserved	
36	Reserved	

Trace Port Commands

Set Report Flags

To enable this report: ***W**.

This report enables and disables all available reports according to the report bit map on page 33.

Idle Mode Report

To enable this report: **1**.

To disable this report: **6**.

The report includes:

- RX signal level and frequency of the serving cell
- RX signal level and frequency of the six strongest neighboring cells
- BSIC (Base Station Identity Code NCC BCC)

The report is sent when the test module is in idle mode, whenever a paging block is generated (approximately every 2 seconds).

Full Idle Mode Report

To enable this report: ***1**.

To disable this report: ***6**.

The report includes:

- RX signal level and frequency of the serving cell
- RX signal level and frequency of the six strongest neighboring cells
- BSIC (Base Station Identity Code NCC BCC)
- LAC of nonserving cell
- RX QUAL of serving cell
- C1 of serving cell
- C2 of serving cell

Path Loss Report

To enable this report: **\1**.

To disable this report: **\6**.

The report includes:

- Frequency and C1 criterion of the serving cell
- Frequency and C1 criterion of the six strongest neighboring cells
- BSIC of the six strongest neighboring cells

The report is sent when the test module is in idle mode, whenever a paging block is generated (approximately every 2 seconds).

Dedicated Mode Report

To enable this report: **2**

To disable this report: **7**

The report includes:

- RX LEV/RX QUAL readings
- TX power
- Timing advance details of nonserving cells

These messages are sent when the test module enters and exits from idle mode.

Layer 1/Layer 3 Reports

To enable L1 messages: **4**.

To disable L1 messages: **9**.

To enable L3 messages: **3**.

To disable L3 messages: **8**.

When enabled, these reports contain L1 and L3 messages transmitted and received by the test module.

These reports are sent on entry to or exit from idle mode.

Sync Report

To enable this report: **S**.

To disable this report: **T**.

The report includes:

- Frequency
- BSIC
- Timing offset

These messages indicate the synchronization level measurements made on the neighboring cells in idle mode and in dedicated mode.

The report is sent when the test module is in idle or dedicated mode, to indicate synchronization measurements made on neighboring cells.

SACCH Report

To enable this report: **A**.

To disable this report: **B**.

The report includes:

- Details of the L3 headers of Sysinfo 5 or 6
- Reception of SACCH blocks

Complete SACCH Information Report

To enable this report: **\A**.

To disable this report: **\B**.

The report includes:

- Length of messages
- Hexadecimal data bytes of layer 2 messages

BA List Report

To enable this report: ***3**.

To disable this report: ***8**.

The report includes:

- Number of BA channels
- BA channel number

The report is sent whenever a Full Idle Channel Description on Change (***I**) is generated as a result of a change in the idle mode status.

CA List Report

To enable this report: ***4**.

To disable this report: ***9**.

The report includes:

- Number of CA channels
- CA channel number

The report is sent whenever a Full Idle Channel Description on Change (***I**) is generated as a result of a change in the idle mode status, and whenever a Dedicated Channel Description on Change (**+J**) is generated as a result of a change in the dedicated mode status.

Channel Request/ Immediate Assignment Command Report

To enable this report: **C**.

To disable this report: **D**.

The Channel Request Report includes:

- Frame number of the channel request
- Data sent in the message in hexadecimal

The Channel Request Report enables the Immediate Assignment Command Report as well.

The Immediate Assignment Command Report includes:

- Length of layer 3 messages
- Response to immediate assignment
- Hexadecimal data bytes of messages

The Immediate Assignment Command Report enables the Channel Request Report as well.

The Channel Request/Immediate Assignment Command Report is sent when the test module switches to dedicated mode. The **Respond** report is sent when the test module switches to dedicated mode as part of the channel request. The **Ignore** report may be sent at irregular times.

Channel Request/ Immediate Assignment Command Reports + Rest Octets

To enable this report: **+C**.

To disable this report: **+D**.

The report is sent when the test module switches to dedicated mode. The **Respond** report is sent when the test module switches to dedicated mode as part of the channel request. The **Ignore** report may be sent at irregular times.

BCCH Report

To enable this report: **E**.

To disable this report: **F**.

The report includes:

- Length of Layer 3 messages
- BCCH frequency
- Hexadecimal data bytes of messages

The message is sent when the test module is in idle mode and a BCCH is received.

BCCH Report + Rest Octets

To enable this report : **+E**.

To disable this report: **+F**.

The message is sent when the test module is in idle mode and a BCCH is received.

Paging Report

To enable this report: **P**.

To disable this report: **Q**.

The report includes:

- Length of the L3 message
- Maximum value of the downlink signaling counter in decimal
- Current value of the downlink signaling counter in decimal
- Data in hexadecimal

Paging Report + Rest Octets

To enable this report: **+P**.

To disable this report: **+Q**.

Frame Number

To enable this report: **&S**.

To disable this report: **&T**.

Note: The Page reports must be enabled.

Pause Output

To enable this report: ***P**.

Measurement Report

To enable this message: **\V**.

To disable this message: **\W**.

The report includes Layer 3 Measurement Report sent to the network.

Trace Configuration Storage

To store the trace configuration: **&W**.

To cancel the storing: **&F**.

This command is used to store the trace configuration of the messages required. When storing is active, the following message is displayed each time the test module is switched on:

Mobile_start

Note: Forcing is not stored.

Idle Channel Description

To display this report: **I**.

This message represents the current configuration of the control channel and the paging subchannels of the test module.

The report is sent on receipt of the command if the test module is in idle mode.

Idle Channel Description on Change

To enable this message: **+I**.

To disable this message: **–I**.

This message represents the current configuration of the control channel and the paging sub-channels of the test module.

The report is sent on receipt of the command if the test module is in idle mode. The report is also sent when the test module is in idle mode and one of the report parameters changes.

Full Idle Channel Description on Change

To enable this message: ***I**.

The report is sent on receipt of the command if the test module is in idle mode. The report is also sent when the test module is in idle mode and one of the report parameters changes.

Dedicated Channel Description

To display this report: **J**.

The report describes the current dedicated channel (TCH/SDCCH). The data to be transmitted differ slightly depending on whether the test module is in hopping mode.

The report is sent on receipt of the command if the test module is in dedicated mode.

Dedicated Channel Description on Change

To enable this message: **+J**.

To disable this message: **–J**.

The report describes the current dedicated channel (TCH/SDCCH). The data to be transmitted differ slightly depending on whether the test module is in hopping mode.

The report is sent on receipt of the command if the test module is in dedicated mode. The report is also sent when the test module is in dedicated mode and one of the report parameters changes.

Full Dedicated Mode Report

To enable this report: ***2**.

To disable this report: ***7**.

The report is sent when the test module is in dedicated mode while in communication.

Cell ID Description

To enable this report: **\C**.

This message indicates the identity of the cell decoded from SysInfo 3 or 6.

Service State Report

To display this report: **Y**.

This message reports the test module state.

C2 Report

To enable this report: **\3**.

To disable this report: **\8**.

This message reports the ARFCN of the serving cell with its C2 criterion and the ARFCN, C2 criterion and BSIC of the six strongest neighboring cells.

The report is sent when the test module is in idle mode, whenever a paging block is generated (approximately every 2 seconds).

Display Target Frequency for Handover

To enable this report: **\0**.

The report is always sent on receipt of the command.

Display Options

To enable this report: **0**.

This command is used to find out how the test module is programmed.

Display Additional Options

To enable this report: **+0**.

The report is always sent on receipt of the command.

Display EFR State

To enable this report: **W**.

The report is always sent on receipt of the command. The state is set according to whether EFR was active during the last communication.

Test Mode Status

To enable this report: ***0**.

Model Report

To enable this report: ***M**.

The report is always sent on receipt of the command.

Mobile Control Commands

Querying SIM Status

To enable this command: **$Q**.

This command returns the status of the SIM, three different values may be returned:

NOK – not okay (SIM missing, not inserted correctly, blocked, etc).
OK – SIM okay, PIN entry not required.
PIN – QSIM PIN entry required.

Entering SIM PIN

To enable this command: **$P**.

This command prompts for PIN entry - enter PIN, then <CR>.

Setting Up a Call

To enable this command: **\D**.

On reception of this code, a **DIAL?** prompt is displayed. Enter the desired number to be dialed followed by a carriage return.

Terminating a Call

To enable this command: **\E**.

This command terminates the current call.

Last Number RediaL

To enable this command: **\L**.

This command redials the last number called.

Answering a Call

To enable this command: **\S**.

This command answers an incoming call to the test module.

Shutdown the Module

To enable this command: **Z**.

This command forces the test module to disconnect from the current network and prepare for switching off.

Switching On the Module

To enable this command: ****O**.

This command switches the test module on.

Switching Off the Module

To enable this command: ****Z**.

This command switches the test module off.

Service State on Change

To enable this report: ***Y**.

To disable this report: **-Y**.

The report is always sent on receipt of the command. The report is also sent when the service state changes.

Forcing Special Mobile Behavior

These commands are used to modify the behavior of the test module with respect to the network:

- Force a BCCH in idle mode
- Force a handover
- Override a handover
- Ignore the cell barring access bit
- Ignore the negative C1 criteria
- Change the power class of the test module
- Force the Full rate mode
- Force a frequency band

- Require a localization updating
- Scan the GSM 900 and GSM 1800 bands

Forcing a BCCH in Idle Mode

To enable this command: **5**.

Enabling this command causes a **FREQUENCY?** prompt to be displayed. The required channel number is entered, terminated by a carriage return. This forces the test module to the channel specified.

To cancel this command, enter the channel number 0.

Forcing a Handover

To enable this command: **\F**.

On reception of this code, a **TARGET FREQUENCY?** prompt is displayed. The channel number is then entered, terminated by a carriage return. This forces the test module to the channel specified.

To cancel this command, enter the channel number 0.

Note: This command takes precedence over the Suppressing a Handover command.

Suppressing a Handover

To enable this command: **G**.

To disable this command: **H**.

This command stops a handover request by not reporting neighboring cell information to the network.

Cell Bar Suppression

To enable this function: **K**.

To cancel this function: **L**.

When enabled, this command causes the test module ignores the Cell Bar Access bit on the BCCH enabling it to use barred cells.

Path Loss Suppression

To enable this command: **M**.

To disable this command: **N**.

When enabled, this command causes the test module to ignore the cell selection criteria that the path loss for the serving cell should not be negative. The test module will now remain on the selected cell irrespective of the received signal strength, until a downlink signaling failure.

Set Power Class

To enable this function: **O**.

On reception of this code, a prompt will be displayed as follows:

- **Class?** if the test module is in single-band mode
- **Classses?** if the test module is in dual-band mode

The following inputs are valid:

- **y** followed by a carriage return in single-band GSM 900 mode
- **z** followed by a carriage return in single-band GSM 1800 mode
- **y,z** followed by a carriage return in dual-band mode

where
y = 4, 5 or 0 (default)
z = 1, 2 or 0 (default)

RF Scanning Mode

To enable this mode: **+S**.

To disable this mode: **+T**.

When this command is enabled, the test module disconnects from the network and starts scanning the channels.

Enter Configurable Scanning Mode

To enable this report: ***S**.

To disable this report: **+T**.

EFR Suppression

To enable this report: **U**.

To disable this report: **V**.

Force Frequency Band

Send:

- **XG** to force the test module to GSM 900 mode
- **XD** to force the test module to GSM 1800 mode
- **X0** to return the test module to multiband mode

Select Band

To enable this command: ***B**.

Enabling this command causes a **Set Band?** prompt to be displayed. Send:

- **G** to set the test module to GSM 900 band
- **D** to set the test module to GSM 1800 band
- **0** to set the test module to dual band

Force Location Update

To initiate this command: **\O**.

Character Echo

To enable this command: ***E**.

To disable this command: ***F**.

When the Character Echo command is enabled, all characters are echoed.

Command Response

To enable this command: ***U**.

To disable this command: ***V**.

Format and Samples of Reports

Idle Mode Report

Format:

Idle_Mode_Rpt<sp><sp>:<ssf><ssr><nf1><nr1><nb1>...<nf6><nr6><nb6><cr><lf>

where:

<ssf> = <sp><channel number of serving cell, 3 digits, leading = <sp>>

<ssr> = <sp><RX level of serving cell, 3 digits, leading = <sp>>

<nf*x*> = <sp><channel number of nonserving cell *x*, 3 digits, leading = <sp>>

<nr*x*> = <sp><RX level of nonserving cell *x*, 3 digits, leading = <sp>>

<nb*x*> = <sp><BSIC of nonserving cell *x*, 2 digits, ledaing = <sp>>

If BSIC is not decoded then <nb*x*> = 99.

If less than six neighboring cells then:

unused <nf*x*> = <sp><sp>0

unused <nr*x*> = <sp><sp>0

unused <nb*x*> = 00

Example:

```
Idle_Mode_Rpt: 77 27, 81 33 51, 79 24 73, 91 23 63,
97 22 51, 75 17 99, 89 17 99
```

Full Idle Mode Report

Format:

Full<sp>Idle<sp>Report:<ssf><ssr><qual><sc1><sc2><nmax><cr><lf>
<sp x 8>Ncell<sp><x><sp>:<nr*x*><nf*x*><nc1*x*><nc2*x*><nb*x*>

<nlac*x*><cr><lf>

where:

<ssf> = <sp><channel number of serving cell, 3 digits leading= <sp>>
<ssr> = <sp><RX level of serving cell, 3 digits, leading = <sp>>
<qual> = <sp><RX quality of serving cell, 1 digit>
<sc1> = <sp><C1 of serving cell, 3 digits, leading = <sp>>
<sc2> = <sp><C2 of serving cell, 3 digits, leading = <sp>>
<nmax> = <sp><number of non serving cells in report, 1 digit>
<x> = <non-serving cell number, 1 to nmax, 1 digit>
<nf*x*> = <sp><channel number of non serving cell *x*, 3 digits, leading = <sp>>
<nr*x*> = <sp><RX level of nonserving cell *x*, 3 digits, leading = <sp>>
<nc1*x*> = <sp><C1 of nonserving cell *x*, 3 digits, leading = <sp>>
<nc2*x*> = <sp><C2 of nonserving cell *x*, 3 digits, leading = <sp>>
<nb*x*> = <sp><BSIC of nonserving cell *x*, 2 digits, leading = <sp>>
<nlac*x*> = <sp><LAC of nonserving cell *x*, 4 hexadecimal digits>

The second line of output (Ncell *x*) is repeated for each non-serving cell in the report (nmax times).

If C1 is not decoded then <sc1> OR <nc1*x*> = 999.

If C2 is not decoded then <sc2> OR <nc2*x*> = 999.

If BSIC is not decoded then <nb*x*> = 99.

The report is sent when the test module is in idle mode, whenever a paging block is generated (approximately every 2 seconds).

Example:

```
Full Idle Report:  47  32 0  24   0 5
         NCell   1 :  90  32 999 999 99 0000
         NCell   2 :  26  15 999 999 99 0000
         NCell   3 :  16  12 999 999 99 0000
         NCell   4 :  98   8 999 999 99 0000
         NCell   5 :  21   7 999 999 99 0000
```

Path Loss Report

Format:

Path_Loss_Rpt<sp><sp>:<ssf ><ssl><nf1><nl1>...<nf6><nl6><nb6>
<cr><lf>

where:

<ssf> = <sp><channel number of serving cell, 3 digits, leading = <sp>>
<ssr> = <sp><RX level of serving cell, 3 digits, leading = <sp>>
<nf*x*> = ,<sp><channel number of non-serving cell *x*, 3 digits, leading = <sp>>
<nl*x*> = <sp><C1 of non-serving cell *x*, 3 digits, leading = <sp>>
<nb*x*> = <sp><BSIC of non-serving cell *x*, 2 digits, leading = <sp>>

If C1 is not decoded then <nl*x*> = <sp>--.

If BSIC is not decoded then <nb*x*> = 99.

If less than six neighboring cells then:
unused <nf*x*> = <sp><sp>0
unused <nl*x*> = <sp><sp>0
unused <nb*x*> = 00

Example**:**

```
Path_Loss_Rpt: 77 25, 81 30 51, 79 22 73, 91 17 63,
97 16 51, 89--99, 95--99
```

Dedicated Mode Report

Format:

Dedicated_Rpt<sp><sp>:<ta><pwr><rlf><rqf><rls><rqs><nf1><nr1><nb1>
...<nf6><nr6><nb6><cr><lf>

where:

<ta> = <sp><timing advance of serving cell, 2 digits, leading = <sp>>
<pwr> = <sp><TX power of serving cell, 2 digits, leading = <sp>>
<rlf> = <sp><RX-LEV-FULL of serving cell, 2 digits, leading = <sp>>
<rqf> = <sp><RX-QUAL-FULL of serving cell, 1 digit>
<rls> = <sp><RX-LEV-SUB of serving cell, 2 digits, leading = <sp>>
<rqs> = <sp><RX-QUAL-SUB of serving cell, 1 digit>
<nf*x*> = ,<sp><channel number of non-serving cell *x*, 3 digits, leading = <sp>>
<nr*x*> = <sp><RX level of nonserving cell *x*, 3 digits, leading = <sp>>
<nb*x*> = <sp><BSIC of nonserving cell *x*, 2 digits, leading = <sp>>

If BSIC is not decoded then <nb*x*> = 99.

If less than six neighboring cells then:
unused <nf*x*> = <sp><sp>0
unused <nr*x*> = <sp><sp>0
unused <nb*x*> = 00

Example:

```
Dedicated_Rpt: 0 5 42 0 42 0, 113 34 46, 77 8 99,
91 8 99, 85 8 99, 83 7 99, 118 7 99
```

Full Dedicated Mode Report

Format:

Full<sp>Ded<sp>Report<sp>:<ta><pwr><rlf><rqf><rls><rqs><dtx><cr><lf>

<sp x 8>Ncell<sp><x><sp>:<nr*x*><nf*x*><nb*x*><cr><lf>

where:

<ta> = <sp><timing advance of serving cell, 2 digits, leading = <sp>>
<pwr> = <sp><TX power of serving cell, 2 digits, leading = <sp>>
<rlf> = <sp><RX-LEV-FULL of serving cell, 2 digits, leading = <sp>>
<rqf> = <sp><RX-QUAL-FULL of serving cell, 1 digit>
<rls> = <sp><RX-LEV-SUB of serving cell, 2 digits, leading = <sp>>
<rqs> = <sp><RX-QUAL-SUB of serving cell, 1 digit>
<x> = <DTX used, 0 or 1, 1 digit>
<nf*x*> = <sp><channel number of nonserving cell *x*, 3 digits, leading = <sp>>
<nr*x*> = <sp><RX level of non serving cell *x*, 3 digits, leading = <sp>>
<nb*x*> = <sp><BSIC of non serving cell *x*, 2 digits, leading = <sp>>

The second line of output (Ncell *x*) is repeated for each nonserving cell in the report (nmax times).

If BSIC is not decoded then <nb*x*> = 99.

Example:

```
Full Ded Report 3 0 31 0 34 0 0
NCell 0 : 677 39 22
NCell 1 : 587 24 22
```

C2 Report

Format:

C2_Rpt<sp><sp><sp><sp><sp><sp><sp><sp><sp>:<ssf><ssl><nf1><nl1><nb1>...<nf6><nl6><nb6><cr><lf)

where:

<ssf> = <sp><channel number of serving cell, 3 digits, leading = <sp>>
<ssr> = <sp><RX level of serving cell, 3 digits, leading = <sp>>
<nf*x*> = ,<sp><channel number of nonserving cell *x*, 3 digits, leading = <sp>>
<nl*x*> = <sp><C2 of nonserving cell *x*, 3 digits, leading = <sp>>
<nb*x*> = <sp><BSIC of nonserving cell *x*, 2 digits, leading = <sp>>

If C2 is not decoded then <nl*x*> = <sp>--.

If BSIC is not decoded then <nb*x*> = 99.

If less than six neighboring cells then:

unused <nf*x*> = <sp><sp>0
unused <nl*x*> = <sp><sp>0
unused <nb*x*> = 00

Example:

```
C2_Rpt: 81 31, 77 24 54, 85 17 52, 79 21 73, 97 17
51, 91--99, 75--99
```

Layer 1/Layer 3 Reports

Format:

For Layer 3 messages:

L3_Downlink<sp><len>:<sp><d1>...<dn><cr><lf>
L3_Uplink<sp><sp><sp><len>:<sp><d1>...<dn><cr><lf>

For Layer 1 messages:

L1_Downlink<sp><len>:<sp><d1>...<dn><cr><lf>
L1_Uplink<sp><sp><sp><len>:<sp><d1>...<dn><cr><lf>

where:

<len> = <number of data bytes, 3 digits, leading = <sp>>
<dn> = <data byte, 2 hexadecimal digits><sp>

Example:

```
L1_Uplink          9: 01 20 19 05 54 f8 17 f8 52
L3_Uplink          6: 05 54 f8 17 f8 52
```

Display Target Frequency for Handover

Format:

Target_Freq<sp><sp><sp><sp><sp>:<freq><cr><lf>

where:

<freq> = <sp><target channel number, up to 3 digits, no leading zeroes>
OR <freq> = <sp><sp> if handover forcing is inactive

Sync Report

Format:

Sync<sp>Report<sp><sp><sp><sp>:<fff><bs><off><cr><lf>

where:

<fff> = <sp><channel number of serving cell, 3 digits, leading = <sp>>
<bs> = <sp><BSIC of serving cell, 2 digits, leading = <sp>>
<off> = <sp><timing offset relative to serving cell, 8 digits, leading = <sp>>

If BSIC is not decoded then <bs> = 99.

SACCH Report

Format:

Sacch_Report<sp><sp><sp>:<mrlt><crlt><pd><mt><cr><lf>

where:

<mrlt> = <sp><maximum radio link time-out counter, 2 digits, leading = <sp>>
<crlt> = <sp><current radio link time-out counter, 2 digits, leading = <sp>>
<pd> = <sp><L3 message PD/TI, 2 hexadecimal digits, leading = <sp>>
<mt> = <sp><L3 message type, 2 hexadecimal digits>

If SACCH block is not decoded then:

<pd> = <sp>ff
<mt> = <sp>ff

Example:

```
Sacch_Report   :16 16 06 1e
```

Complete SACCH Information Report

Format:

Sacch_Data <sp><sp><len>:<mrlt><crlt><sp><d1>...<dn><cr><lf>

where:

<len> = <number of data bytes, 3 digits, leading = <sp>>
<mrlt> = <sp><maximum radio link time-out counter, 2 digits, leading = <sp>>
<crlt> = <sp><current radio link time-out counter, 2 digits, leading = <sp>>
<dn> = <data byte, 2 hexadecimal digits><sp>

If SACCH block is not decoded then <len> = <sp><sp>0 and no data fields.

Example:

```
Sacch_Data  21: 24 24 03 03 49 06 1d 10 00 00 20 00 1c
00 00 00 00 88 00 88 04 80 00
```

BA List Report

Format:

BCCH<sp>Alloc=<len>,<ch1>...<ch16><cr><lf>

<sp x 14><ch17>...<ch32><cr><lf>

where:

<len> = <number of BA channels, 2 digits, leading = <sp>>
<chx> = <BA channel number, 3 digits, leading = <sp>>

The number of BA channels in the report equals the value of <len>. The second line of output is only present if there are more than 16 BA channels.

CA List Report

Format:

Cell<sp>Alloc=<len>,<ch1>...<ch16><cr><lf>

<sp x 14><ch17>...<ch32><cr><lf>

<sp x 14><ch33>...<ch48><cr><lf>

<sp x 14><ch49>...<ch64><cr><lf>

where:
<len> = <number of CA channels, 2 digits, leading = <sp>>
<chx> = <CA channel number, 3 digits, leading = <sp>>

The number of CA channels in the report equals the value of <len>. The second, third and fourth lines of output are only present if there are more than 16, 32 or 48 CA channels respectively.

Channel Request/ Immediate Assignment Command Report

This report has two possible formats depending on the trigger.

Format 1:

Channel_Req_Report:<data><frame><cr><lf>

where:
<data> = <sp><data sent in request, 2 hexadecimal digits>
<frame> = <sp><sp><sp><frame number, up to 7 digits, no leading zeroes>

Example:

Chan_Req_Report: e2 477140

Format 2:

Agch_Report<sp><len>:<ri><d1>...<dn><cr><lf>

where:
<len> = <number of data bytes, 3 digits, leading = <sp>>
<ri> = Respond<sp><sp> OR Ignore<sp>
<dn> = <data byte, 2 hexadecimal digits><sp>

Example:

```
Agch_Report ll: Respond 06 3f 03 61 60 55 eb da 36 03
00
```

Channel Request/ Immediate Assignment Command Reports + Rest Octets

This report has two possible formats depending on the trigger.

Format 1:

Channel_Req_Report:<data><frame><cr><lf>

where:
<data> = <sp><data sent in request, 2 hexadecimal digits>
<frame> = <sp><sp><sp><frame number, up to 7 digits, no leading zeroes>

Example:

Chan_Req_Report: e2 477140

Format 2:

Agch_Report<sp><sp>22:<ri><d1>...<d22><cr><lf>

where:
<ri> = Respond<sp><sp> OR Ignore<sp>
<dn> = <data byte, 2 hexadecimal digits><sp>

There are 22 data bytes; those not used for the L3 message are set to 2b.

Example:

```
Agch_Report 22: Respond 06 3f 03 61 60 55 eb da 36 03
00 2b 2b 2b 2b 2b 2b 2b 2b 2b 2b
```

BCCH Report

Format:

Bcch_Report<sp><len>:<fff><sp><sp><sp><d1>...<dn><cr><lf>

where:
<len> = <number of data bytes, 3 digits, leading = <sp>>
<fff> = <sp><sp><sp><BCCH frequency, 3 digits, leading = <sp>>
<dn> = <data byte, 2 hexadecimal digits><sp>

Example:

```
Bcch_Report 19:    89   06 1b 71 34 62 f2 10 83 03 48
04 3c 65 65 08 9d 00 00 2c
```

BCCH Report + Rest Octets

Format:

Bcch_Report<sp><sp>22:<fff><sp><sp><sp><d1>...<d22><cr><lf>

where:
<fff> = <sp><sp><sp><BCCH frequency, 3 digits, leading = <sp>>
<dn> = <data byte, 2 hexadecimal digits><sp>

There are 22 data bytes; those not used for the L3 message are set to 2b.

Example:

```
Bcch_Report 22:    89   06 1b 71 34 62 f2 10 83 03 48
04 3c 65 65 08 9d 00 00 2c 2b 2b 2b
```

Paging Report

Format:

Page_Report<sp><len>:<mdsc><cdsc><sp><sp><sp><d1>...<dn><cr><lf>

where:

<len> = <number of data bytes, 3 digits, leading = <sp>>
<mdsc> = <sp><maximum value of downlink sig counter, 2 digits, leading = <sp>>
<cdsc> = <sp><current value of downlink sig counter, 2 digits, leading = <sp>>
<dn> = <data byte, 2 hexadecimal digits><sp>

If the paging block cannot be decoded, then the <len> field is set to 0 and there are no data bytes.

Example:

```
Page_Report 22: 15 15   06 21 00 01 00
```

Paging Report + Rest Octets

Format:

Page_Report<sp><len>:<mdsc><cdsc><sp><sp><sp><d1>...<dn><cr><lf>

where:

<len> = <sp>22 OR <sp><sp>0 if the paging block cannot be decoded
<mdsc> = <sp><maximum value of downlink sig counter, 2 digits, leading = <sp>>
<cdsc> = <sp><current value of downlink sig counter, 2 digits, leading = <sp>>
<dn> = <data byte, 2 hexadecimal digits><sp>

If the paging block cannot be decoded, then the <len> field is set to 0 and there are no data bytes.

Example:

```
Page_Report  22: 11 11   06 21 00 01 f0 2b 2b 2b 2b
2b 2b 2b 2b 2b 2b 2b 2b 2b 2b 2b 2b 2b
```

Frame Number

Format:

Frame<sp>Number<sp>:<num>

Example:

```
Frame Number: 649572
```

Measurement Report

Format:

Meas_Rpt<sp><sp><sp><sp><sp><sp><sp>: <sp><d1>...<d18><cr><lf>

where:

<dn> = <data byte, 2 hexadecimal digits><sp>

Example:

```
Meas_Rpt: 06 15 1d 1d 01 25 3b 4e 25 94 42 d1 ea 74 00 00
00 00
```

Idle Channel Description

Format:

Idle_Channel<sp><sp><sp>:<fff><bs><type><cchc><mfrm><agres><cchg><pmfrm><pbi><cr><lf>

where:

<fff> = <sp><channel number of serving cell, 3 digits, leading = <sp>>
<bs> = <sp><BSIC of serving cell, 2 digits, leading = <sp>>
<type> = <sp>Comb OR <sp>Nonc
<cchc> = <sp>CchC=<cchc channel count, 1 digit>
<mfrm> = <sp>Mfrm=<multiframes between paging, 1 digit>
<agres> = <sp>AGRes=<access grant reserved blocks, 1 digit>
<cchg> = <sp>CchG=<mobile paging subgroup – cch group, 1 digit>
<pmfrm> = <sp>PMfrm=<mobile paging subgroup – multiframes paging, 1 digit>
<pbi> = <sp>PBI=<mobile paging subgroup – block index paging, 1 digit>

If BSIC is not decoded then *<nbx>* = 99.

Example:

```
Idle_Channel: 115 55, NonC CchC=1 Mfrm=5 AGRes=2,
CchG=0 PMfrm=0 PBI=0
```

Idle Channel Description on Change

Format:

Idle_Channel<sp><sp><sp>:<fff><bs><type><cchc><mfrm><agres><cchg><pmfrm><pbi><cr><lf>

where:

<fff> = <sp><channel number of serving cell, 3 digits, leading = <sp>>
<bs> = <sp><BSIC of serving cell, 2 digits, leading = <sp>>
<type> = <sp>Comb OR <sp>Nonc
<cchc> = <sp>CchC=<cchc channel count, 1 digit>
<mfrm> = <sp>Mfrm=<multiframes between paging, 1 digit>
<agres> = <sp>AGRes=<access grant reserved blocks, 1 digit>
<cchg> = <sp>CchG=<mobile paging subgroup – cch group, 1 digit>
<pmfrm> = <sp>PMfrm=<mobile paging subgroup – multiframes paging, 1 digit>
<pbi> = <sp>PBI=<mobile paging subgroup – block index paging, 1 digit>

If BSIC is not decoded then *<nbx>* = 99.

Full Idle Channel Description on Change

Format:

Full<sp>Idle<sp>Desc<sp>:<fff><bs><ci><lac><mnc><mcc><cr><lf>

<sp17><type><cchc><mfrm><agres><cchg><pmfrm><pbi><cr><lf>

<sp x 17><mret><acc><mpwr><cr><lf>

<sp x 17><macc><pen><tsc><t3212><cr><lf>

Flags<sp x 10>:<cba><rna><pwrc><dtx><c2inc><cbq><ecs><cr><lf>

CBCH<sp>Supported<sp>:<cht><ts><sub><tsc><sp>Non-Hopping<freq>
<cr><lf>
OR
CBCH<sp>Supported<sp>:<cht><ts><sub><tsc><sp>Hopping<maio><hsn>
<cr><lf>

where:

<fff> = <sp>Chan=<channel number of serving cell, 3 digits, no leading zeroes>
<bs> = <sp>BSIC=<BSIC of serving cell, 2 digits, no leading zeroes>
<ci> = <sp>CI=<cell id, 4 hexadecimal digits>
<lac> = <sp>LAC=<location area code, 4 hexadecimal digits>
<mnc> = <sp>MNC=<mobile network code, 2 digits>
<mcc> = < sp>MCC=<mobile country code, 3 digits>
<type> = <sp>Comb OR <sp>Nonc
<cchc> = <sp>CchC=<cchc channel count, 1 digit>
<mfrm> = <sp>Mfrm=<multiframes between paging, 1 digit>
<agres> = <sp>AGRes=<access grant reserved blocks, 1 digit>
<cchg> = <sp>CchG=<mobile paging subgroup – cch group, 1 digit>
<pmfrm> = <sp>PMfrm<mobile paging subgroup – multiframes paging, 1 digit>
<pbi> = <sp>PBI=<mobile paging subgroup – block index paging, 1 digit>
<mret> = <sp>Max<sp>Retrans=<maximum retransmissions>
<acc> = <sp>Access<sp>Class=<access class, 4 digits, no leading zeroes>
<mpwr> = <sp>Max<sp>Tx<sp>Pwr=<maximum TX power, 2 digits, no leading zeroes>
<macc> = <sp>Min<sp>Access=<access class>
<pen> = <sp>Penalty<sp>Time=<penalty time, 5 digits, no leading zeroes>
<tsc> = <sp>Tsc=<training sequence code, 1 digit>
<t3212> = <sp>T3212=<t3212 timer value, 3 digits, no leading zeroes>
<cba> = <sp>CBA=<cell bar access flag, 0 or 1>
<rna> = <sp>RNA=<reestablishment not allowed flag, 0 or 1>
<pwrc> = <sp>PWRC=<pwrc flag, 0 or 1>
<dtx> = <sp>UseDtx=<use dtx flag, 0 or 1>
<c2inc> = <sp>C2Inc=<C2 parameter present flag, 0 or 1>
<cbq> = <sp>CBQ=<cell bar qualify flag, 0 or 1>
<ecs> = <sp>ECS=<ecs control flag, 0 or 1>
<cht> = <sp>Sdcch4
OR <cht> = <sp>Sdcch8
OR <cht> = <sp>TchF<sp><sp>
OR <cht> = <sp>TchH<sp><sp>
<ts> = <sp>TS=<timeslot, 1 digit>
<sub> = <sp>Sub=<subchannel number, 1 digit>
<tsc> = <sp>Tsc=<training sequence code, 1 digit>

<freq> = <sp>Freq=<dedicated channel number, 3 digits, no leading zeroes>
<maio> = <sp>MAIO=<mobile allocation index offset, 2 digits, no ledaing zeroes>
<hsn> = <sp>HSN=<hopping sequence number, 2 digits, no leading zeroes>

If BSIC is not decoded then <bs> = 99.

Dedicated Channel Description

If frequency hopping is in operation, Output 2 is displayed, otherwise Output 1 is displayed.

Output 1:

Dedicated_Chan<sp>:<fff><bs><cht><ts><sub><tsc><hop><ba><freq><cr><lf>

Output 2:

Dedicated_Chan<sp>:<fff><bs><cht><ts><sub><tsc><hop><maio><hsn><ba><cr><lf>

where:
<fff> = <sp><channel number of serving cell, 3 digits, leading = <sp>>
<bs> = <sp><BSIC of serving cell, 2 digits, leading = <sp>>
<cht> = ,<sp>Sdcch4
OR <cht> = ,<sp>Sdcch8
OR <cht> = ,<sp>TchF<sp><sp>
OR <cht> = ,<sp>TchH<sp><sp>
<ts> = <sp>TS=<timeslot, 1 digit>
<sub> = <sp>Sub=<subchannel number, 1 digit>
<tsc> = <sp>Tsc=<training sequence code, 1 digit>
<hop> = <sp>Non-Hopping for Output 1
OR <hop> = <sp>Hopping for Output 2
<ba> = <sp>BA=<band number, 1 digit>

If BSIC is not decoded then <bs> = 99.

Output 1 only:
<freq> = <sp>Freq=<dedicated channel number, 3 digits, leading = <sp>>

Output 2only:
<maio> = <sp>MAIO=<mobile allocation index offset, 2 digits, leading = <sp>>
<hsn> = <sp>HSN=<hopping sequence number, 2 digits, leading = <sp>>
<chan> = <number of channels in list, 2 digits, leading = <sp>>
<fn> = <sp><channel number, 3 digits, leading = <sp>>

If the number of hopping frequencies is greater than 32, only the first 32 hopping frequencies are provided.

Example:

```
Dedicated_Chan :  89 37, Sdcch8 TS=0 Sub=2 Tsc=7
Non-Hopping BA=0 Freq=100
```

Dedicated Channel Description on Change

If frequency hopping is in operation, Output 2 is displayed, otherwise Output 1 is displayed.

Output 1:

Dedicated_Chan<sp>:<fff><bs><cht><ts><sub><tsc><hop><ba><freq><cr><lf>

Output 2:

Dedicated_Chan<sp>:<fff><bs><cht><ts><sub><tsc><hop><maio><hsn><ba><cr><lf>

where:

<fff> = <sp><channel number of serving cell, 3 digits, leading = <sp>>
<bs> = <sp><BSIC of serving cell, 2 digits, leading = <sp>>
<cht> = ,<sp>Sdcch4
OR <cht> = ,<sp>Sdcch8
OR <cht> = ,<sp>TchF<sp><sp>
OR <cht> = ,<sp>TchH<sp><sp>
<ts> = <sp>TS=<timeslot, 1 digit>
<sub> = <sp>Sub=<subchannel number, 1 digit>
<tsc> = <sp>Tsc=<training sequence code, 1 digit>
<hop> = <sp>Non-Hopping for Output 1
OR <hop> = <sp>Hopping for Output 2
<ba> = <sp>BA=<band number, 1 digit>

If BSIC is not decoded then <bs> = 99.

Output 1 only:
<freq> = <sp>Freq=<dedicated channel number, 3 digits, leading = <sp>>

Output 2only:
<maio> = <sp>MAIO=<mobile allocation index offset, 2 digits, leading = <sp>>
<hsn> = <sp>HSN=<hopping sequence number, 2 digits, leading = <sp>>
<chan> = <number of channels in list, 2 digits, leading = <sp>>
<fn> = <sp><channel number, 3 digits, leading = <sp>>

If the number of hopping frequencies is greater than 32, only the first 32 hopping frequencies are provided.

Example:

```
Dedicated_Chan :  89 37, Sdcch8 TS=0 Sub=2 Tsc=7
Non-Hopping BA=0 Freq=100
```

Cell ID Description

Format:

Cell<sp>ID<sp><sp><sp><sp><sp>:<ci><lac><mnc><mcc><cr><lf>

where:

<ci> = <sp>CI=<cell id, 4 hexadecimal digits>
<lac> = <sp>LAC=<location area code, 4 hexadecimal digits>
<mnc> = <sp>MNC=<mobile network code, 2 digits>
<mcc> = <sp>MCC=<mobile country code, 3 digits>

Example:

```
Cell ID      : Cl=086c LAC=002e MNC=15 MCC=234
```

Service State Report

Format:

Service_state<sp><sp>:<state><cr><lf>

where:
<state> = 0 (no service)
OR <state> = 1 (emergency service)
OR <state> = 2 (normal service)
OR <state> = 3 (intermediate or undetermined state)

Set Report Flags

Format:

Set<sp>Flags?<sp>

Report flag bitmap, up to 8 hexadecimal digits, followed by <cr> or <cr><lf> or the ninth digit.

Bit Number	Report	Enabled	Disabled
31 – 26	Ignored	–	–
25	Frame Number	&S	&T
24	Paging Report + Rest Octets	+P	+Q
23	BCCH Report + Rest Octets	+E	+F
22	Channel Request/Immediate Assignment Command Reports + Rest Octets	+C	+D
21	Service State Report	*Y	–Y
20	CA List Report	*4	*9
19	BA List Report	*3	*8
18	Dedicated Mode Report	*2	*7
17	Full Idle Mode Report	*1	*6
16	Full Idle Channel Description on Change	*I	
15	Dedicated Channel Description on Change	+J	–J
14	Idle Channel Description on Change	+I	–I
13	Channel Request/Immediate Assignment Command Report	C	D
12	Sync Report	S	T

Bit Number	Report	Enabled	Disabled
11	Paging Report	**P**	**Q**
10	Measurement Report	**\V**	**\W**
9	Complete SACCH Information Report	**\A**	**\B**
8	SACCH Report	**A**	**B**
7	BCCH Report	**E**	**F**
6	Layer 3 Report	**4**	**9**
5	Layer 1 Report	**3**	**8**
4	C2 Report	**\3**	**\8**
3	Path Loss Suppression	**\1**	**\6**
2	Not implemented	**–**	**–**
1	Dedicated Mode Report	**2**	**7**
0	Idle Mode Report	**1**	**6**

If this value is added to the flag bitmap value then the report is enabled, otherwise it is disabled.

Example:

For example, a value of `0000 0001` (bit 0 set to 1) enables the Idle Mode Report and a value of `0000 0801` (bits 0 and 11 set to 1) enables both the Idle Mode Report and the Paging Report. A value of `0000 0000` disables all reports.

If less than 8 digits are entered, leading zeroes are assumed, e.g. if `f348a`<cr> is entered, it is interpreted as `000f348a`.

Service State on Change

Format:

Service_state<sp><sp>:<state><cr><lf>

where:
<state> = 0 (no service
OR <state> = 1 (emergency service)
OR <state> = 2 (normal service)
OR <state> = 3 (intermediate or undetermined state)

Enter Configurable Scanning Mode

Format:

Scan<sp>Cycles?<sp>

<cycles>

Scan<sp>Period?<sp>

<period>

Scan<sp>Channels?<sp>

<chans>

where:
<cycles> = <number of scans to carry out, 1 to 255, terminated by <cr> if 1 or 2 digits>
OR <cycles> = <cr> if no scan count required
<period> = <time between scans in seconds, 30 to 255, terminated by <cr> if 2 digits>
OR <period> = <cr> if no delay between scans required
<chans> = any combination of <number> and <range> separated by ",", up to a maximum of 116 characters terminated by <cr> if less than 116 characters
OR <chans> = <cr> if all channels to be scanned
<number> = <channel number, maximum 3 digits>
<range> = <number>-<number>

If all channels are selected to be scanned, the output is identical to the standard scan report (see RF Scanning Mode on page 19).

RF<sp>Scan<sp>(selected<sp>channels)<sp>:<cr><lf>

<gsm><cr><lf>

<dcf><cr><lf>

where:
<gsm> = up to 8 times <gn> separated by ",<sp>" and terminated by <cr><lf>
<dcs> = up to 8 times <dn> separated by ",<sp>" and terminated by <cr><lf>
<gn> = <sp><GSM 900 channel number, 3 digits, leading = <sp>>>
<sp><RX level of channel, 2 digits, leading = <sp>>
<dn> = <sp><GSM 1800 channel number, 3 digits, leading = <sp>>
<sp><RX level of channel, 2 digits, leading = <sp>>

There is a <gn> field for each selected GSM 900 channel in the range 1...124. The <gsm> field is repeated as required to display all selected GSM 900 channels. The <gsm> field is omitted if no GSM 900 channels are selected.

There is a <dn> field for each selected GSM 1800 channel in the range 512...885. The <dcs> field is repeated as required to display all selected GSM 1800 channels. The <dcs> field is omitted if no GSM 1800 channels are selected.

Channels are listed in the channel number order.

Command Response

Format:

<command><sp>-<sp><result><cr><lf>

<command> = command entered (1 or 2 characters)

<result> = OK
OR UNRECOGNISED<sp>COMMAND
OR INVALID<sp>DATA
OR INVALID<sp>NUMBER
OR WRONG<sp>LINE<sp>STATE
OR WRONG<sp>SERVICE<sp>STATE
OR COMMAND<SP>FAILED

Display Additional Options

Format:

Test_Mode<sp>+<sp>:<cr><lf>

Full_Rate_forced<sp>:<status><cr><lf>

Band_forced<sp>:<mode><cr><lf>

Internal_Microphone<sp>:<sp>DISABLED<cr><lf>

where:
<status> = <sp>ENABLED
OR <status> = <sp>DISABLED
<mode> = <sp>900
OR <mode> = <sp>1800
OR <mode> = <sp>DISABLED

Display EFR State

Format:

EFR state<sp>:<state><cr><lf>

where:
<state> = 0 (nonactive EFR)
OR <state> = 1 (active EFR)

RF Scanning Mode

Format:

RF<sp>Scan<sp>:<cr><lf>

<gsm>

<dcs>

where:
<gsm> = <g1>...<g20><cr><lf>
<g21>...<g40><cr><lf>
<g41>...<g60><cr><lf>
<g61>...<g80><cr><lf>
<g81>...<g100><cr><lf>

<g101>...<g120><cr><lf>
<g121>...<g124><cr><lf>
<dcs> = <d1>...<d20><cr><lf>
<d21>...<d40><cr><lf>
<d41>...<d60><cr><lf>
<d61>...<d80><cr><lf>
<d81>...<d100><cr><lf>
<d101>...<d120><cr><lf>
<d121>...<d140><cr><lf>
<d141>...<d160><cr><lf>
<d161>...<d180><cr><lf>
<d181>...<d200><cr><lf>
<d201>...<d220><cr><lf>
<d221>...<d240><cr><lf>
<d241>...<d260><cr><lf>
<d261>...<d280><cr><lf>
<d281>...<d300><cr><lf>
<d301>...<d320><cr><lf>
<d321>...<d340><cr><lf>
<d341>...<d360><cr><lf>
<d361>...<d374><cr><lf>
<g*n*> = <sp><RX level od GSM 900 channel *n*, 3 digits, leading = <sp>>
<d*n*> = <sp><RX level od GSM 1800 channel *n* + 511, 3 digits, leading = <sp>>

Note: No <sp> precedes the first entry in each line (for *n* = 1, 21, 41, ...).

The <gsm> field is omitted if the test module is in GSM 1800 mode. The <dcs> field is omitted if the test module is in GSM 900 mode. To convert RX level to dBm, subtract 110 from the reported value.

Test Mode Status

Format:

TTP<sp>Test<sp>Mode<sp>:<cr><lf>

Configurable<sp>scanning<sp>:<status><cr><lf>

<config>

Command<sp>responses<sp>:<status><cr><lf>

Messages<sp>Displayed<sp>:<cr><lf>

<report>

where:
<status> = <sp>ENABLED
OR <status> = <sp>DISABLED
<config> = <sp x 15>Cycles<sp>:<cycles><cr><lf>
<sp x 15>Period<sp>:<period><cr><lf>
<sp x 13>Channels<sp>:<chans><cr><lf>
OR not present if configurable scanning mode = DISABLED
<cycles> = <sp><number of scan cycles left to run, 3 digits, no leading zeroes>

<period> = <sp><period between scans in seconds, 3 digits, no leading zeroes>
<chans> = <sp><list of channels scanned as entered when configured>
If the cycles, period or channel parameters were not entered when the scanning mode was configured, then the <cycles>, <period> or <chans> field is blank, and the default values of no scan limit, scan continuously and scan all channels respectively are assumed.
<report> = Full<sp>idle<sp>mode<sp>reports<cr><lf>
Full<sp>dedicated<sp>mode<sp>reports <cr><lf>
BA<sp>reports<cr><lf>
CA<sp>reports<cr><lf>
Full<sp>idle<sp>description<sp>on<sp>change<cr><lf>
Service<sp>state<sp>reports<cr><lf>
Each element of the <report> field is only displayed if the relevant report is enabled. The elements are always displayed in the order shown above.

Model Report

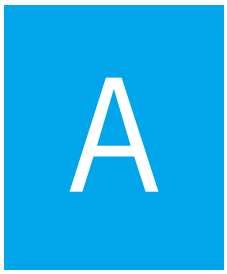
Format:

Model<sp>ID<sp><sp><sp><sp><sp><sp><sp><sp>:<sp><name><sp><version><cr><lf>

where:

<name> = <product name, maximum 10 characters>
<version> = <version number, maximum 10 characters>

Commands



This appendix summarizes and describes the commands 8501 GSM Air Interface Test Module. Furthermore this appendix also includes a diagram describing the mounting holes position. The topics discussed in this appendix are as follows:

Command summary

Table 1 Trace port commands

Command	Enable	Disable	Page
Idle Mode Report	1	6	9
Full Idle Mode Report	*1	*6	9
Path Loss Report	\1	\6	9
Dedicated Mode Report	2	7	10
Layer 3 Report	3	8	10
C2 Report	\3	\8	15
Layer 1 Report	4	9	10
SACCH Report	A	B	10
Complete SACCH Information Report	\A	\B	11
Channel Request/Immediate Assignment Command Report	C	D	12
Channel Request/Immediate Assignment Command Reports + Rest Octets	+C	+D	12
BCCH Report	E	F	12
BCCH Report + Rest Octets	+E	+F	13
Paging Report	P	Q	13
Paging Report + Rest Octets	+P	+Q	13
Frame Number	&S	&T	13
Sync Report	S	T	10
Measurement Report	\V	\W	13
Full Dedicated Mode Report	*2	*7	15
BA List Report	*3	*8	11
CA List Report	*4	*9	11
Full Idle Channel Description on Change	*I	(-I)	14
Set Report Flags	*W		9
Service State on Change	*Y	-Y	34
Display Options	0		15
Display Additional Options	+0		36
Display Target Frequency for Handover	\0		15
Cell ID Description	\C		15

Table 1 Trace port commands (Continued)

Command	Enable	Disable	Page
Idle Channel Description	I		14
Idle Channel Description on Change	+I	–I	14
Dedicated Channel Description	J		14
Dedicated Channel Description on Change	+J	–J	14
Service State Report	Y		15
Display EFR State	W		16
Test Mode Status	*0		16
Model Report	*M		16

Table 2 Altering mobile mode

Command	Enable	Disable	Page
Forcing a BCCH in Idle Mode	5		18
Forcing a Handover	\F		18
Suppressing a Handover	G	H	18
Cell Bar Suppression	K	L	18
Path Loss Suppression	M	N	18
Set Power Class	O		19
Force Location Update	\O		20
RF Scanning Mode	+S	+T	19
EFR Suppression	U	V	19
Force Frequency Band	X0,XD,XG		19
Select Band	*B		19
Enter Configurable Scanning Mode	*S	+T	19
Character Echo	*E	*F	20
Command Response	*U	*V	20

Table 3 Keypad emulation

Command	Enable	Disable	Page
Setting Up a Call	\D		16
Terminating a Call	\E		16
Last Number Redial	\L		17

Table 3 Keypad emulation (Continued)

Command	Enable	Disable	Page
Answering a Call	\S		17
Shutdown the Module	Z		17
Switching On the Module	**O		17
Switching Off the Module	**Z		17

Table 4 Miscellaneous

Command	Enable	Disable	Page
Trace Configuration Storage	&W	&F	13
Pause Output	*P		13

AT commands in compliance with V.25ter

Table 5 Command summary

Command	Function
A/	Repeat the previous command
+++	Change from data mode to command mode (Hayes escape sequence)
+++AT	Change from data mode to command mode (TIES escape sequence)
ATA	Answer a call
ATD<dial-string>	Dial the number <dial-string>
ATD><mem><n>	Dial the number stored in memory type <mem> phone book, entry <n>
ATD><n>	Dial entry <n> of the current phone book
ATD><string>	Dial entry <string> of the current phone book
ATDI<n>	Dial ISDN number <n>
ATDL	Redial the last number
ATE	Enable echo of commands sent to the TA
ATH	Hang up (terminate) the current call
ATI	Interrogate the Engine to show product information
ATL	No function – for V.25ter compatibility only

Table 5 Command summary (Continued)

ATM	No function – for V.25ter compatibility only
ATO	Change from command mode to data mode
ATP	No function – for V.25ter compatibility only
ATQ<n>	Enable/Disable result code
ATS0=<n>	Set the number of rings before a call is answered
ATS3=<n>	Set the command termination character
ATS4=<n>	Set the response formatting character
ATS5=<n>	Set the command line editing character
ATS6	No function – for V.25ter compatibility only
ATS7=<n>	Set time-out in seconds for call to connect
ATS8	No function – for V.25ter compatibility only
ATS10=<n>	Set disconnect delay after detected loss of carrier
ATT	No function – for V.25ter compatibility only
ATV<n>	Set result code format: 0 = short, 1 = long
ATX<n>	Set CONNECT result code format: n = 0 to 4
ATZ	Reset all parameters to user-defined profile
AT&C<n>	No function – for V.25ter compatibility only
AT&D<n>	No function – for V.25ter compatibility only
AT&F	Reset all parameters to manufacturer defaults
AT&V	Display current settings
AT&W	Write current settings to the user-defined profile
AT+DR	V.42bis data compression reporting control
AT+DS	V.42bis data compression control
AT+GCAP	Show complete TA capabilities list
AT+GMI	Show manufacturer identification
AT+GMM	Show TA model identification
AT+GMR	Show TA revision identification
AT+GOI	Show global object identification
AT+GSN	Show TA serial number identification
AT+ICF	Set TE-TA control character framing

Table 5 Command summary (Continued)

AT+IFC	Set TE-TA local data flow control
AT+ILRR	Set TE-TA local rate reporting mode
AT+IPR	Set fixed local rate

AT commands in compliance with GSM 07.07

Table 6 Command summary

Command	**Function**
AT+CBST	Select bearer service type
AT+CCWA	Call waiting control
AT+CEER	Extended error report
AT+CGMI	Request manufacture identification
AT+CGMM	Request model identification
AT+CGMR	Request revision identification
AT+CGSN	Request product serial number identification (identical to +GSN)
AT+CHLD	Call hold and multiparty
AT+CKPD	Keypad control
AT+CLCC	List current calls of ME
AT+CLCK	Facility lock
AT+CLIP	Calling line identification presentation
AT+CMEE	Report mobile equipment error
AT+COLP	Connected line identification presentation
AT+COPS	Operator selection
AT+CPAS	Mobile equipment activity status
AT+CPBF	Find phone book entries
AT+CPBR	Read current phone book entry
AT+CPBS	Select phone book memory storage
AT+CPBW	Write phone book entry
AT+CPIN	Enter PIN
AT+CPWD	Change password
AT+CR	Service reporting control

Table 6 Command summary (Continued)

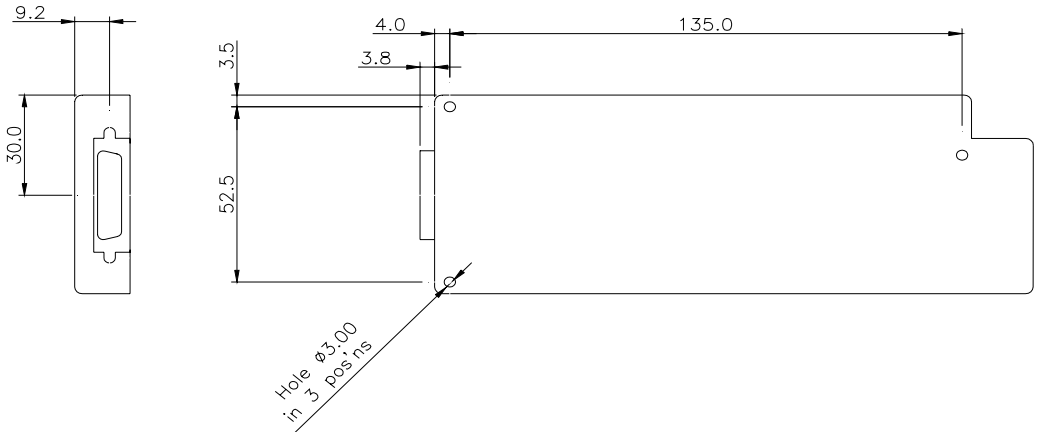
AT+CRC	Set cellular result codes for incoming call indication
AT+CREG	Network registration
AT+CRLP	Select radio link protocol parameter for originating nontransparent data call
AT+CSCS	Select TE character set
AT+CSTA	Select type of address
AT+CSQ	Signal quality report
AT+FCLASS	FAX: select, read or test service CLASS
AT+FMI	FAX: report manufactured ID
AT+FMM	FAX: report model ID
AT+FMR	FAX: report revision ID
AT+VTD=<n>	Tone duration

AT commands in compliance with GSM 07.05

Table 7 Command Summary

Command	Function
AT+CMGD	Delete SMS message
AT+CMGF	Select SMS message format
AT+CMGL	List SMS message from preferred store
AT+CMGR	Read SMS message
AT+CMGS	Send SMS message
AT+CMGW	Write SMS message to memory
AT+CMSS	Send SMS message from storage
AT+CNMI	New SMS message indication to TE
AT+CPMS	Preferred SMS message storage
AT+CRES	Restore SMS settings
AT+CSAS	Save SMS settings
AT+CSCA	SMS service center address
AT+CSCB	Select cell broadcast SMS messages
AT+CSDH	Show SMS text mode parameters
AT+CSMP	Set SMS text mode parameters
AT+CSMS	Select message service

Mounting holes position



Publication History

Revision	Comment
0010-100-A	First edition.
0103-100-B	New accessory kits.
0104-100-A	Accessory requirements added.
0112-100-A	Manual Ident No. changed, order of some pages changed, WWG changed to Acterna, some commands added.
0210-100-A	New company name (Willtek).
0410-300-A	Software changes from Version 1.2 to 3.0. For further details please refer to the Online Help delivered with the Software. Formatting and structure adjusted.

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