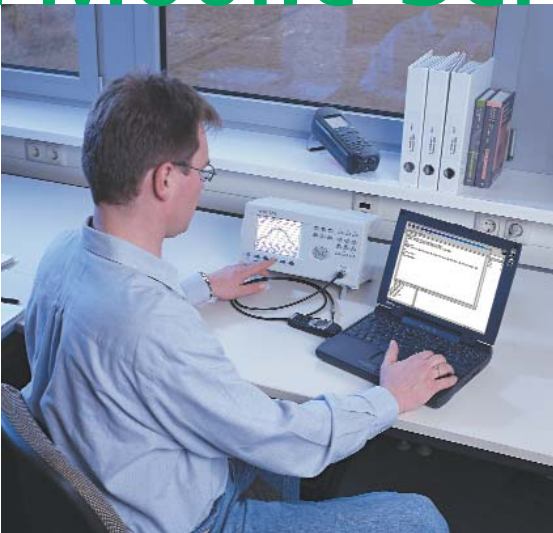


will'tek

# Willtek 4200

## Mobile Service Tester



Application Note for  
4200 Data Testing



## Introduction

The 4200 S Series supports data testing. This Application Note addresses some issues related to data testing.

People have often run into problems trying to test the data mode of a phone. They found it was not easy to test the data channels. The test setup not only requires hardware such as a PC and a connection to the phone, but also the implementation into the phone of how the different data channels are supported. This is in spite of the common standard these phones are following. This Application Note should provide some guidance and assistance in solving these problems.

The Data Testing mode is intended to verify the RF behavior of a phone when transmitting a data channel. This mode is ideal for data-only phones which are not equipped to set up a voice call.

## Functionality supported by the 4200S

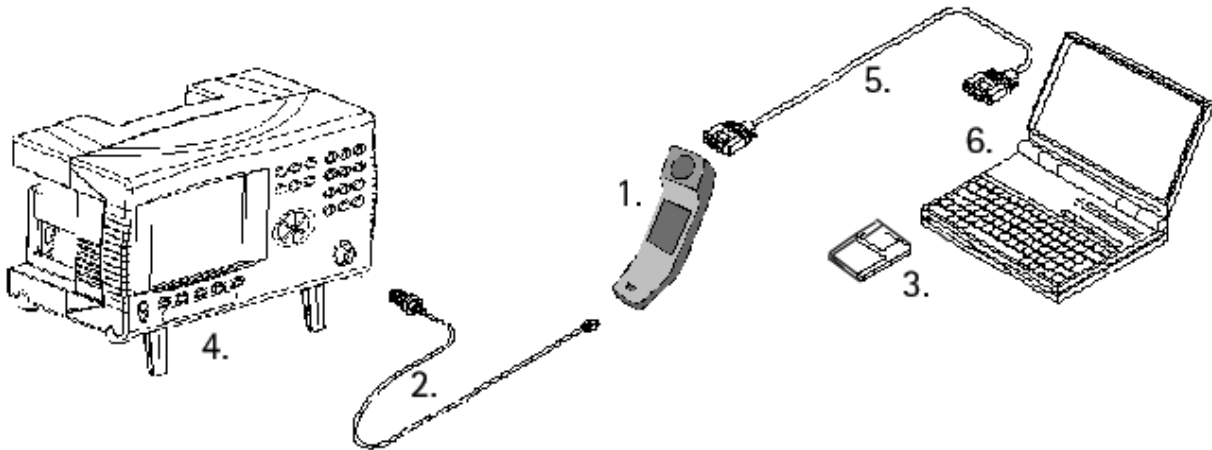
The 4200S supports the channel coding for a 9600 bps data channel in transparent mode. Since the 4200S only tests the RF characteristics no further protocol running on top of the data channel is supported, e.g. Radio Link Protocol for nontransparent data, error protection protocols (e.g. V.42) or Fax.

Since many phones on the market support non-transparent data (sometimes exclusively) it is necessary to set some parameters as indicated below.

## Preparation

First of all connect the phone to the serial interface of a PC, either via a dedicated cable or, if available, through an IrDA connection. Modern phones usually have the modem already built in, so this can be accessed directly. If not you will need to install a specific software driver, as supplied with the phone on the PC. Start a terminal program on the PC, e.g. Hyperterminal, which is delivered together with Windows.

Within this program make sure that you have the right COM port configured and that it is not used by any other third party software, e.g. PALM HotSync program.



1. Mobile Phone
2. RF Cable
3. Mobile Phone Modem SW
4. 4200 RF Test Set
5. Serial Cable
6. PC

Figure 1: Test Setup.

## Configuration of your phone

Having done this, you need to configure and control your phone via so-called AT commands (AT stands for ATtention).

After entering a command the phone will respond with OK or an error if a certain feature is not supported:

1. If your phone supports transparent data then type the following string into the terminal program:

`at+cbst=7,0,0`. If your phone supports non-transparent data then type:  
`at+cbst=7,0,1`. (`cbst` stands for **cellular bearer service type** and is a dedicated cellular AT command which sets the bearer service of your phone).

If you do not know what type of bearer service your phone supports, type in `at+cbst=?`. The phone will then respond and show which bearer services are supported. The last digit indicates whether it supports transparent (0) or non-transparent data (1).

Figure 2 shows the "trace" of this command and a possible response. This phone supports autobauding, 2400 bps (V.22bis), 4800 bps (V.32), 9600 bps (V.32), 2400 bps (V.110), 4800 bps (V.110) and 9600 bps (V.110), all indicated within the first brackets. The 0 in the second brackets shows that this phone supports asynchronous modems and eventually the figure in the last brackets shows that this phone supports non-transparent data.

2. If the phone is only supporting non-transparent data then it is very likely that the phone will start an internal timer after which the call is terminated if the RLP is not started. We have found with several phones that this timer can be switched off. Try entering the following two sequences together:  
`at+er=0` and `at+es=1,0,1`.

Please note that these two commands are part of the V.42 protocol and therefore not necessarily supported by your phone.

3. Now you should be able to place a call. But you will not do this from the keyboard of your phone. Simply use the following dial command for the number 12345 from your terminal program:  
`atd12345` ("d" stands for dial).
4. Once a call has been established you will see that the way the tests are performed, and the results and measurements are presented, are very much like in normal speech mode.

5. If you want to perform a call from the base station you will need to tell your terminal program to accept the call. This is simply done by setting the modem register S0 to a value of 1, indicating that the modem will accept a phone call after 1 ring. Therefore type `ats0=1` into your terminal program.

6. Press the button **BS Call** on the 4200S, which will initiate a call from the tester. Your phone should start ringing and the modem should accept the call after one ring. Again the test results will be shown on the screen, similar to the speech mode.

At Willtek we are aware that data testing is not as simple as plain speech testing, simply because the whole test setup is different and because of different implementation of the GSM standard into the phones. Once you have successfully mastered one test, it is very easy.

There are dedicated commands for certain phones, so if you have trouble performing tests, please let us know the type of phone, so that we can support you properly.

Figure 2: Trace of bearer service inquiry.

```
at+cbst=?
+CBST: (0,4,6,7,68,70,71),(0),(1)
```

# Appendix

## Coding of bearer service type +CBST

Table 1: +CBST parameter command syntax.

Command	Possible response(s)
+CBST=[5speed4[,5name4[,5ce4]]]	
+CBST?	+CBST:5speed4[,5name4,5ce4]
+CBST=?	+CBST: (list of supported 5speed4s),(list of supported 5name4s),(list of supported 5ce4s)

### Description

This command selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated (refer to GSM 02.02 [1]). Test command returns values supported by the TA as compound values.

### Defined values

<speed>:

- 0 autobauding (automatic selection of the speed)
- 1 300 bps (V.21)
- 2 1200 bps (V.22)
- 3 1200/75 bps (V.23)
- 4 2400 bps (V.22bis)
- 5 2400 bps (V.26ter)
- 6 4800 bps (V.32)

### 7 9600 bps (V.32)

- 8 unknown or network specific (no speed specification needed)
- 9 7200 bps (V.32bis)
- 10 12000 bps (V.32bis)
- 11 14400 bps (V.32bis)
- 12 9600 bps (V.34)
- 13 12000 bps (V.34)
- 14 14400 bps (V.34)
- 15 19200 bps (V.34)
- 16 28800 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)
- 74 12000 bps (V.110)

75 14400 bps (V.110)

79 19200 bps (V.110)

81 38400 bps (V.110)

also all other values below 128 are reserved <name>:

### 0 asynchronous modem

- 1 synchronous modem
  - 2 PAD Access (asynchronous)
  - 3 Packet Access (synchronous)
- also all other values below 128 are reserved

<ce4:>

### 0 transparent

- 1 non-transparent

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Willtek Communications GmbH  
85737 Ismaning  
Germany  
Tel: +49 (0) 89 996 41 - 0  
Fax: +49 (0) 89 996 41 - 440  
info@willtek.com

Willtek Communications Inc.  
Indianapolis  
USA  
Tel: +1 317 595 2021  
Tel: +1 866 willtek  
Fax: +1 317 595 2023  
willtek.us@willtek.com

Willtek Communications Ltd.  
Chessington  
United Kingdom  
Tel: +44 20 8408 5720  
Fax: +44 20 8397 6286  
willtek.uk@willtek.com