

Application Note



Using the IFR 2935 GSM Tester with GPRS Option 01



The GPRS Option 01 for the 2935 provides new features that allow efficient and flexible testing of GPRS capable mobiles.

Introduction

Circulation of GPRS capable phones is now widespread and growing. All major phone manufacturers have introduced GPRS capability to their latest designs. Tools in support of GPRS phone testing have emerged to satisfy the needs of design, manufacturing and service. This application note provides an overview of IFR 2935 GPRS Test option 01 which has been designed to meet the essential testing needs of engineers and technicians alike.

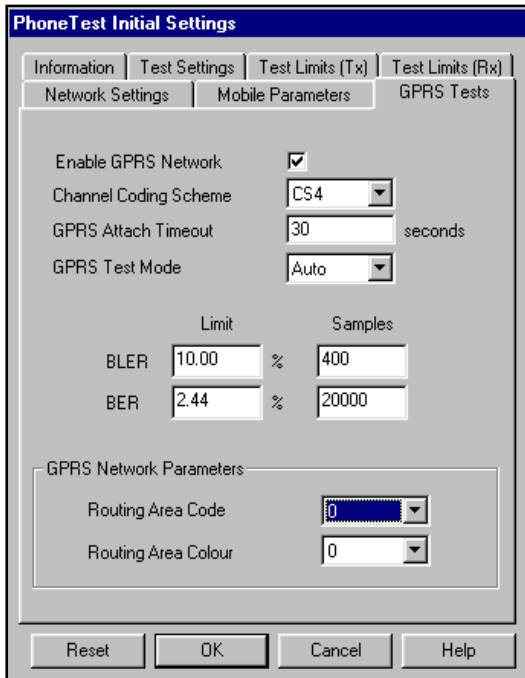
Testing a GPRS capable terminal

2935 GPRS Test option 01 can be requested either as an upgrade to existing installed 2935's or as a factory fitted option with new equipment. The option makes it possible to test the functional capabilities of GPRS phones in both voice call mode using circuit switched connection or in data call using packet mode connection. Measurement of transmitter and receiver performance can be performed in either mode, especially important as some

measurement parameters such as Tx power profile, power control, Tx Timing and Rx sensitivity are defined or determined differently for GPRS. In test environments where time is an important consideration, utilising the GPRS capabilities of phones as an alternative to normal voice call testing can offer savings. Using the GPRS mode of operation can also help to simplify testing.

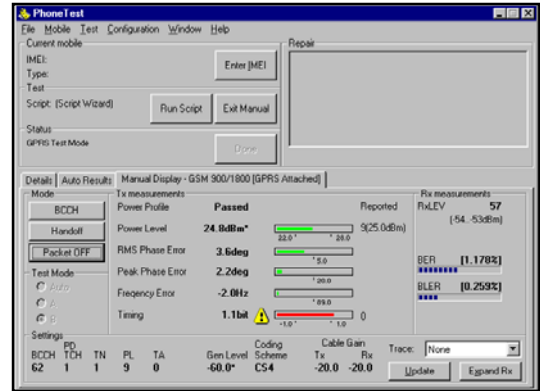
The text that follows describes the implementation for GPRS testing offered in the IFR 2935 with option 01.

Screen 1 shows the revised PhoneTest set-up screen including GPRS configuration controls. All control parameters are contained in a single screen to simplify set-up.



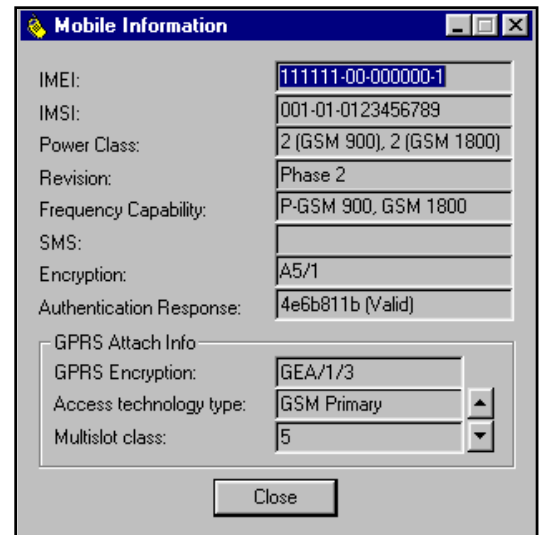
Screen 1 GPRS test setting screen

Screen 2 shows PhoneTest operated in manual mode and illustrates the addition of GPRS test mode and call processing features together with GPRS specific receiver BER / BLER test parameters. Those familiar with 2935 PhoneTest will recognize that little has apparently changed to the general presentation of measurement information thus making the transition to GPRS testing painless for the technician. Test progress bars associated with receiver BER & BLER tests inform the user when the measurement is complete. The measurement time is determined by the number of samples specified in the GPRS test setting screen 1, e.g. using a sample length of 400 results in a BLER measurement time of 8 seconds. Test time can be further reduced by lowering the sample length but at the expense of degrading measurement uncertainty.



Screen 2 Manual Mode Operation showing additional GPRS features

In manual test mode GPRS testing is initiated by first selecting the GPRS mode key. Before a GPRS attach can be performed the terminal must first be registered. When the GPRS attach is completed, GPRS class mark information is updated in the terminal information window as shown in screen 3 and the manual mode display title bar is updated to indicate GPRS Attached. Once attached, the terminal remains so until switched off or until registration is repeated. Under normal circumstances registration and attach both occur automatically simply by turning the phone on. Test parameters associated with the GPRS attach access burst are frozen and displayed until Test Mode is activated.

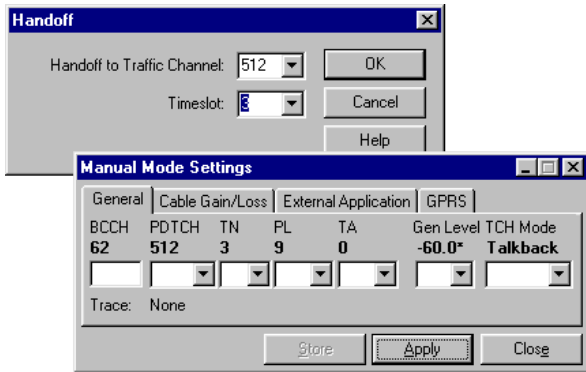


Screen 3 The terminal information screen with GPRS information

The terminal is now ready to receive or send packet data. The operator commands the terminal into a Test Mode operation (GPRS Option 01 supports both Test Modes A and B). In either Test Mode, the terminal receives and sends data from which the tester measures the transmitter and receiver performance. Unlike GSM voice mode testing, it is not necessary to dial a number or receive a call using the terminal keypad, connection is completed automatically. As well as being simpler, this also helps to make testing faster. Further speed improvements are provided through the specific use of the more efficient BER Test Mode B. To establish with confidence the receiver's sensitivity performance, GPRS

terminals that are able to operate in Test Mode B require fewer frames than would be the case in a corresponding GSM voice call.

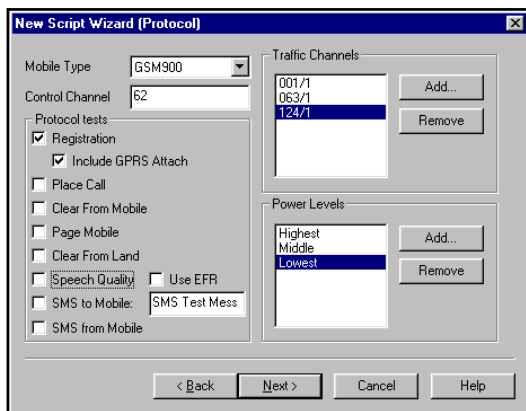
From the manual mode screen, the user can easily initiate hand-off commands that tell the terminal to switch to a different PDTCH (Packet Data Traffic Channel) and different TN, (time slot number). Alternatively the same action can be achieved by selecting the Update key in which case the user can also control PL (Power Level) and TA (Timing Advance) parameters too. Screen 4 shows the both the handoff and the Update windows.



Screen 4 Initiating a Handoff

Using The 2935 Script Wizard to Build GPRS Test Cases

2935 with GPRS Option 01 supports expanded script wizard functions that provide the user the added flexibility to easily define a range of simple or comprehensive test sequences that will exercise a phone in GSM or GPRS or both modes of operation. Aeroflex supplies a variety of standard test scripts incorporating GPRS test cases that make it possible to commence testing immediately. Screen 5 shows the initial setup for defining a GSM or GPRS test script. Selecting Registration with GPRS attach causes the presentation of additional GPRS pages as the wizard progresses.

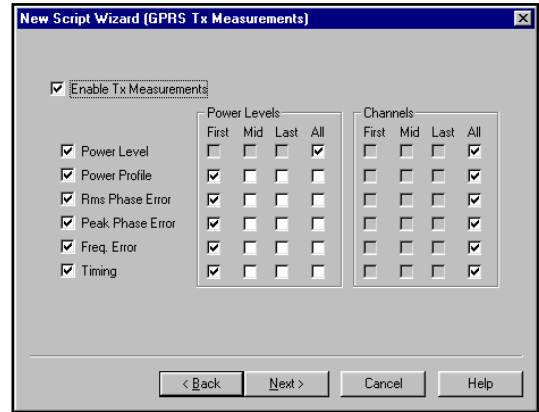


Screen 5 GPRS PhoneTest script wizard

As the user progresses through the script wizard, they can set up the test parameter and test limits independently for each of GSM and GPRS modes. Any voice call mode tests specified are performed first, followed by any defined GPRS tests. The power levels and traffic channel numbers are common to both modes although in later screens the user can further refine the selection making it possible to test GPRS on different power level and chan-

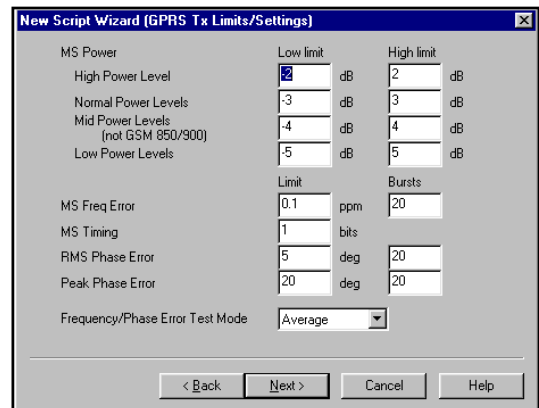
nel combinations to those used for voice call mode. In this way very efficient test sequences can be designed that avoid repeating tests unnecessarily.

Screen 6 shows the Tx testing setup screen. The transmit parameters are common to those measured in voice call mode however, there are some subtle differences in the way GPRS power control and timing are defined and therefore they can merit measurement in both modes.

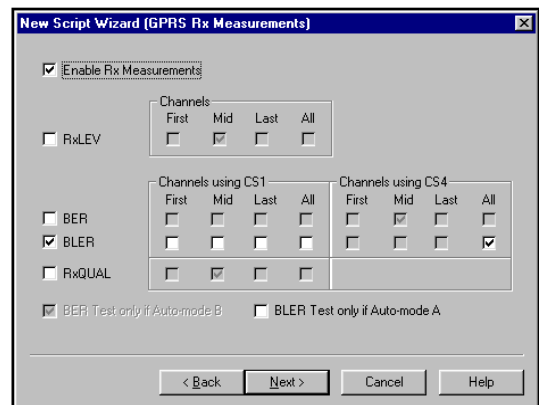


Screen 6 GPRS Tx test setup

Screen 7 shows the Tx test limit setup screen. Different limits can be set for different power level test cases as well as the number of measurement averages that are used.



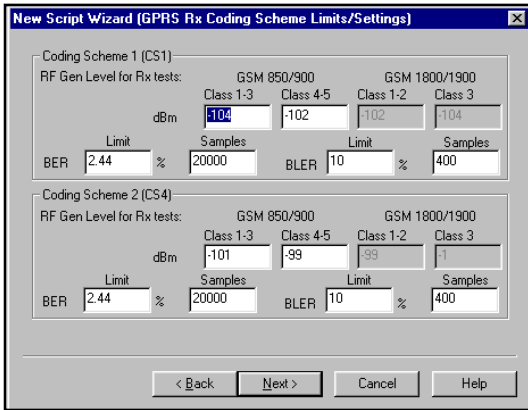
Screen 7 GPRS Tx test limit setup



Screen 8 GPRS Rx test setup

Screen 8 shows the Rx testing setup for BER or BLER. Tx and Rx test parameter control is provided independently to permit greater flexibility in designing scripts. BER measurement requires the mobile to support Test Mode B, whereas BLER measurement is common to Test Modes A and B. Either measurement can be specified for coding schemes CS1 or CS4 independently. However, RxQual measurements are only relevant when using coding scheme CS1.

Full flexibility in configuring the Rx test pass/fail limits allows the user to define as comprehensive or as quick a test as required. Screen 9 shows the Rx Limits setup through the script wizard.



Screen 9 Rx Limits setup screen

Conclusion

Currently phone manufacturers offer a limited range of GPRS capability. In time, the range of specified GPRS classes available will lead to a ever wider variety of different phone types and levels of capability. This evolution will increasingly mean that flexible GPRS modes of testing will take precedence over standard voice call testing. This application note has introduced GPRS option 01 for IFR 2935 and considered the various benefits of using the GPRS mode of operation. Aeroflex will continue to enhance product performance in line with the advances in phone capability to ensure affordable and competent test capability exists. Visit the Aeroflex website at

<http://www.aeroflex.com/products/commtest/cellparametric/2935.cfm> to keep up to date on Aeroflex GPRS test capabilities.

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