

Using the IFR 2935 GSM Tester with GPRS Test Option 01

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

Introduction

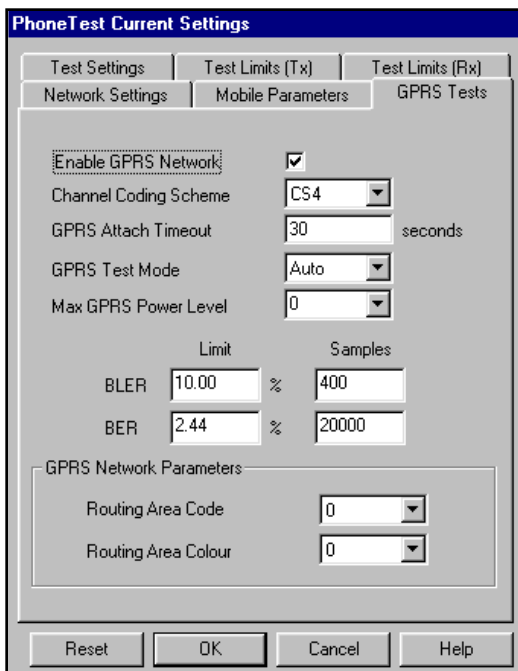
Circulation of GPRS capable phones is now widespread and growing. All major phone manufacturers have introduced GPRS capability to their latest designs. Tools in support of GPRS phone testing are required to satisfy the needs of design, manufacturing and service. This application note provides an overview of IFR's 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, utilizing 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.

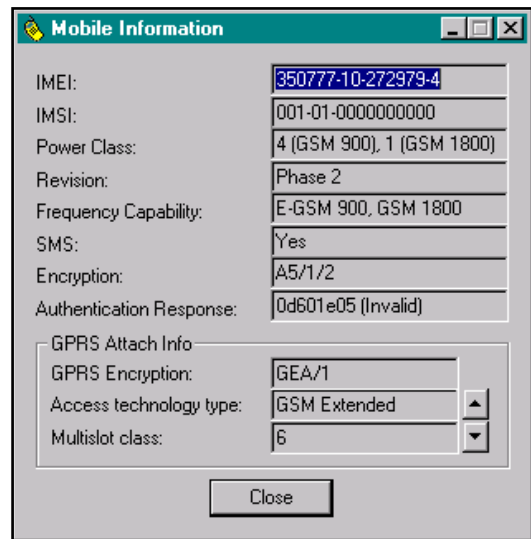
The text that follows describes the implementation for GPRS testing offered in the IFR 2935 with option 01.

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

With 'Enable GPRS Network' selected in the PhoneTest Current Settings and providing that the mobile has been set up for packet data services, then following registration, the mobile will automatically perform a GPRS Attach. The method to enable packet data services on the phone itself will vary between phone types. On completion of the GPRS Attach, GPRS class mark information including Encryption, Access Technology Type(s) supported and their associated Multislot Class will be displayed in the Mobile Information window. Once attached, the terminal should remain so until switched off. Should a mobile detach itself for any reason, then it is possible to force a re-attachment by re-registering the mobile again.



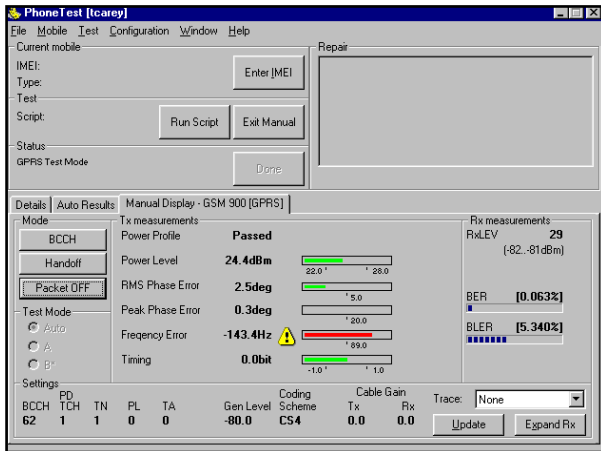
Screen 2 The terminal information screen with GPRS information displayed

In GPRS manual mode testing is initiated by first selecting the appropriate test mode from mode A, mode B or Auto followed by the 'Packet On' key. This forces the mobile to generate an Access Burst which is captured, measured and briefly displayed. When test mode initiation is completed the Access Burst measurements are replaced with measurements for the selected PDTCH (Packet Data Traffic Channel). The choice of test mode A or B can be determined automatically. 2935 uses an internal database to select the appropriate test mode according to which mobile model is being tested determined from the Type Approval Code in the IMEI. GPRS mobiles are required to support mode A, mode B or both. In test mode B, the terminal receives and then loops back the data to the tester, whereas in mode A the terminal transmits pseudo random data. In either case provision is made within the tester to measure 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. GPRS

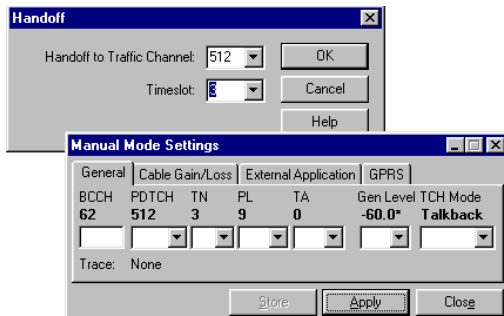
terminals that are able to operate in test mode B require fewer frame samples than would be the case in a corresponding GSM voice call, to establish confidently the receiver's sensitivity performance.

Screen 3 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 approximately 8 seconds. Test time can be further reduced by lowering the sample length but at the expense of degrading measurement uncertainty.



Screen 3 Manual Mode Operation showing additional GPRS features

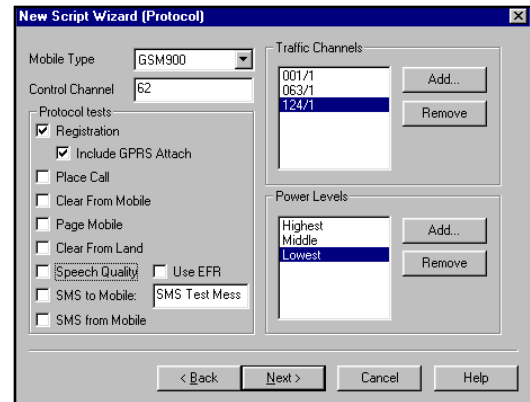
From the manual mode screen, the user can easily initiate handoff commands that tell the terminal to switch to a different PDTCH (Packet Data Traffic Channel) and different TN (time slot number). Alternatively the same action can be achieved by selecting the Update key in which case the user can also control power level and timing advance parameters. Screen 4 shows both the Handoff and the Update windows.



Screen 4 Initiating a Handoff

Using the 2935 Script Wizard to Build GPRS Test Cases

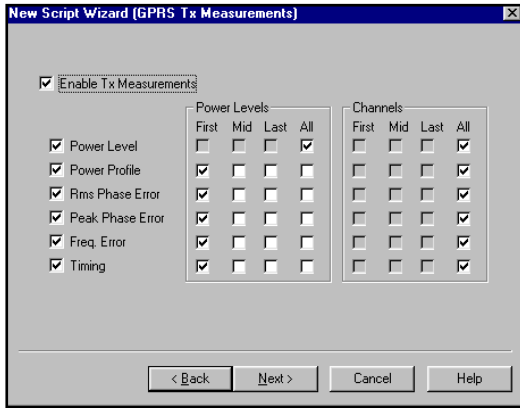
2935 with GPRS option 01 supports expanded script wizard functions that provide the user the added flexibility to easily define a range of simple or comprehensive test sequences that will exercise a phone in either GSM or GPRS mode of operation. IFR supplies a variety of standard test scripts incorporating 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, forces the generation of additional GPRS pages as the wizard progresses.



Screen 5 GPRS PhoneTest script wizard

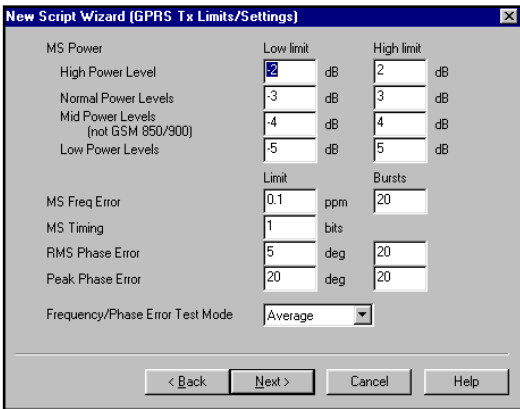
As users progress through the script wizard, they can set up the test parameter and test limits independently for each of GSM and GPRS modes. Any voice call mode tests specified are performed first, followed by any defined GPRS tests. The power levels and traffic channel numbers are common to both modes,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



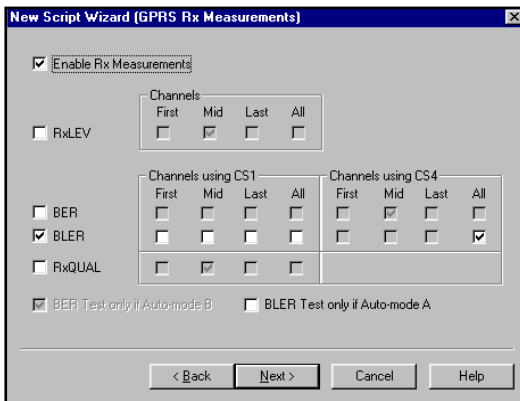
Screen 6 GPRS Tx test setup

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

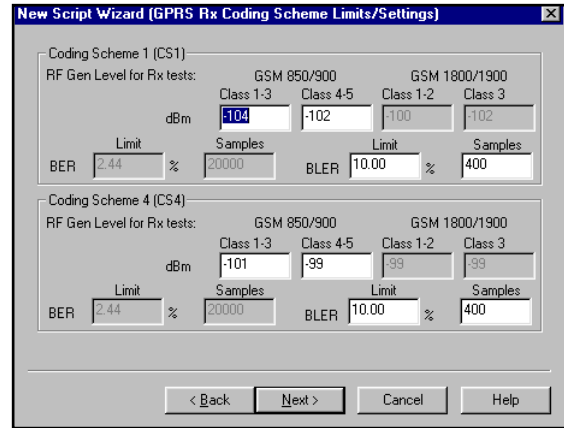
Screen 8 shows the Rx testing setup for BER or BLER. Tx and Rx test parameter control is provided independently to permit greater flexibility in designing scripts.



Screen 8 GPRS Rx test setup

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. It is

worth noting that the performance requirements for GPRS receivers differ depending upon the channel coding scheme used. 2935 supports both CS1 and CS4 to enable a more thorough verification of receiver performance.



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 an 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 the IFR 2935 and considered the various benefits of using the GPRS mode of operation.

Visit the IFR website at:

<http://www.ifrsys.com/products/wireless/2935.htm> to keep up to date on IFR's GPRS test capabilities.