

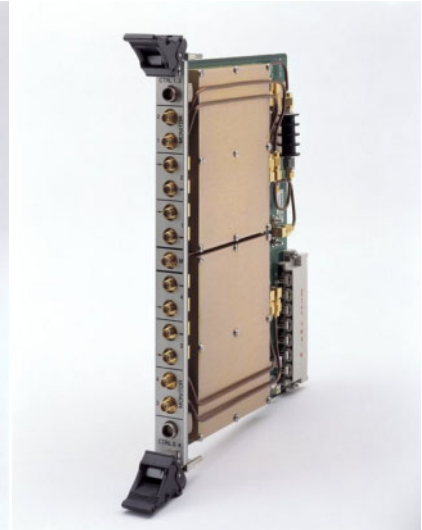


Multi-band GSM Test Set

Plextek has developed a low phase noise, multi-band test set that can be used for testing GSM/EDGE mobile handsets. The design is based around the requirements of 3GPP TS51.010-1 Annex 5, but could also be customised to meet other requirements.



Transceiver module



Combiner module

A block diagram of the GSM test set is shown in overleaf. It comprises a pair of identical two-channel transceiver modules and a front-end combiner module. Photographs of a transceiver module and a combiner module are shown above. The test set has four parallel channels, which allows the testing of a mobile as it hands over from one base station to another. The test set is able to simultaneously monitor the current channel, the alternative (next) channel and two interfering channels.

The test-set covers all five of the currently allocated GSM frequency bands by separating the input signal into three bands:

- 450MHz – 496MHz (For GSM450)
- 824MHz – 960MHz (covering GSM850 and GSM900(R))
- 1710MHz – 1990MHz (covering GSM1800 and GSM1900)

Each transceiver module uses a three stage conversion architecture to perform frequency conversion between the selected RF channel and a 16.2MHz IF. Direct baseband processing of each IF takes place in parallel.

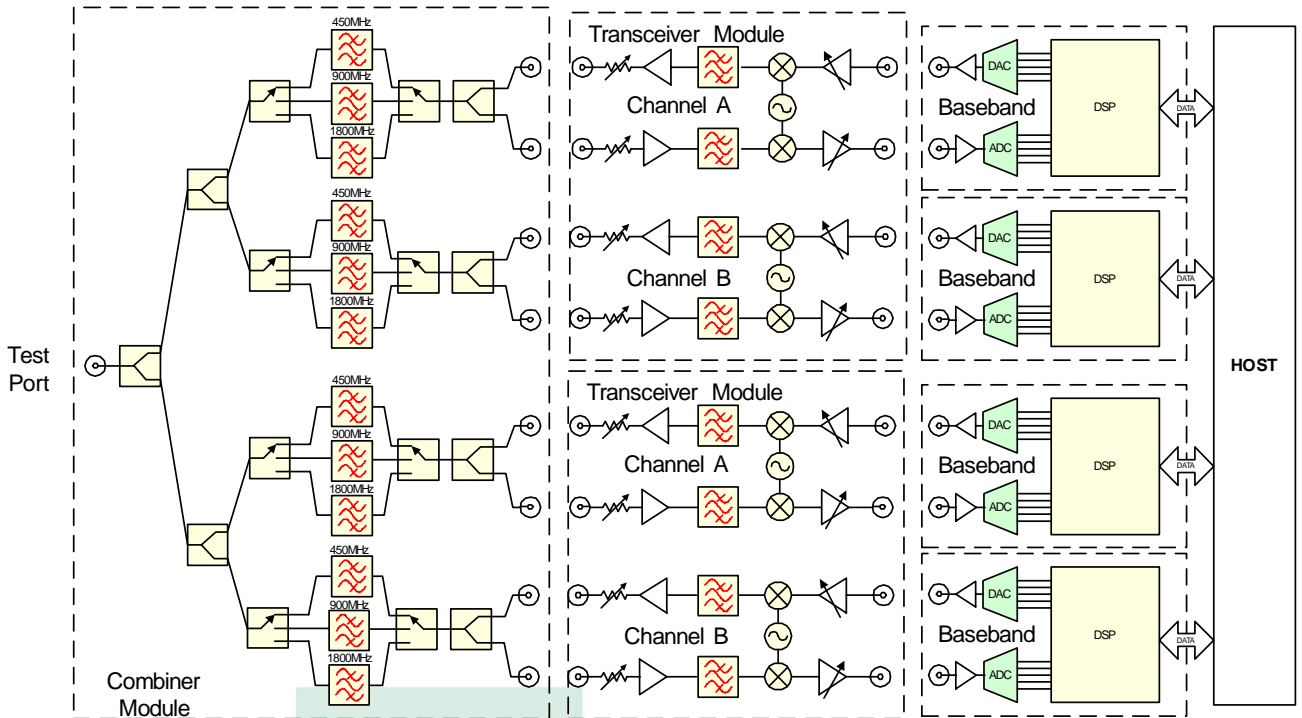
Very accurate Local Oscillator (LO) frequency stability is achieved by the use of an oven controlled crystal source. The module can also be locked to an external 10MHz reference, such as an off-air standard or a rubidium source. Additional clock outputs are provided, which can be used for the baseband data conversion process.

All of the required LO signals are generated within the transceiver module. The module is designed to support EDGE modulation and very low phase noise was a fundamental design goal. The total phase error caused by the integrated effect of the phase noise of all three LO signals is less than 1° RMS with an added EVM of less than 4% RMS.

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Block diagram of GSM test set

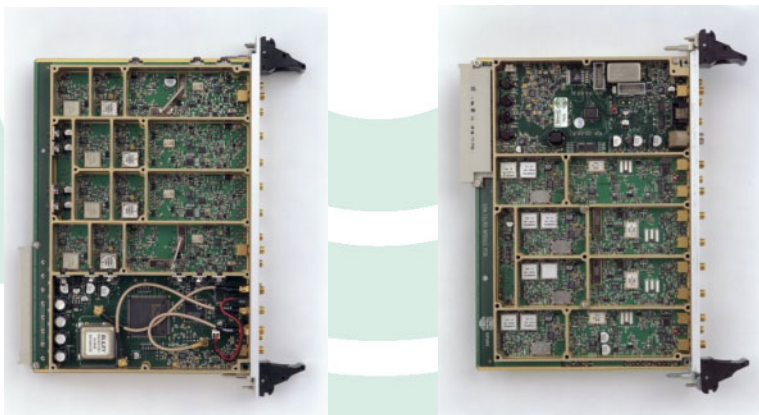
The calibrated transmitted power level from the test set can be adjusted in 2dB steps from -20dBm to -110dBm with an accuracy of ± 1 dB, for a baseband input of -4dBm. The receiver input is also calibrated to maintain an accuracy of ± 1 dB, over an input power level range of +46dBm (at the input of the

combiner module) down to -20dBm, the IF output level being maintained at +10dBm.

Each two channel transceiver module is mounted on a 2 slot double eurocard. The combiner module, which interfaces to two transceiver modules, is mounted on a single slot double eurocard.

The test set is controlled by a simple RS232 serial interface, which is used to set the frequency and gain of the transceiver, and also for module diagnostics. Calibration data is stored in on-board flash memory.

The test set is available as a finished product or on a license to manufacture basis. In both cases the test set can be customised to meet specific client requirements.



Internal photographs of the transceiver module

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