

TECHNICAL SPECIFICATION (PROVISIONAL DATA)

TEST CAPABILITY

| | |
|----------------------|---|
| Transmitter Tests: | Cell Control Channel Generation Bit Error Ratio Phase/Frequency Error Power Level/Steps Power Profile Modulation Spectrum |
| Receiver Tests: | Traffic Channel Bit Error Ratio Traffic Channel Absolute Sensitivity RACH Frame Erasure Rate RX Level RX Quality Link Test |
| A-bis Function Test: | |

SIGNAL SOURCE

Frequency

| | |
|-------------|---|
| Range: | 890 to 915 MHz (GSM900) 1710 to 1785 MHz (GSM1800) 1850 to 1910 MHz (GSM1900) |
| Resolution: | 1 Hz |

Level

| | |
|--------------------|--|
| Range: | -40 dBm to -120 dBm into 50 Ω (Simplex mode) -47dBm to -120 dBm into 50 Ω (Duplex mode) |
| Resolution: | 0.1 dB |
| Accuracy: | ± 1.5 dB GSM900 (>-110 dBm) ± 1.8 dB GSM1800 (>-110 dBm) ± 1.8 dB GSM1900 (>-110 dBm) |
| Accuracy (Simplex) | ± 1.5 dB GSM900 (>-110 dBm) ± 1.8 dB GSM1800 (>-110 dBm) ± 1.8 dB GSM1900 (>-110 dBm) ¹ |
| Accuracy (Duplex) | ± 1.5 dB GSM900 (>-110 dBm) ± 1.8 dB GSM1800 (>-110 dBm) ¹ ± 1.8 dB GSM1900 (<-110 dBm) |

RF OUT Connector

| | |
|------------|---------------------|
| Impedance: | 50 Ω Nominal |
| VSWR: | $\leq 1.2:1$ |
| Connector: | TNC female |

RF IN/Duplex Connector

| | |
|------------|---------------------|
| Impedance: | 50 Ω Nominal |
| VSWR: | $\leq 1.2:1$ |
| Connector: | N Type female |

MEASURING RECEIVER

| | |
|------------------|---|
| Frequency Range: | 935 to 960 MHz (GSM900) 1805 to 1880 MHz (GSM1800) ² 1930 to 1990 MHz (GSM 1900) |
| Level Range: | +46 dBm to -1 dBm |
| Max Power: | 50W (+47 dBm) continuous |

A-bis INTERFACE

| | |
|-------------|---|
| Format: | 2.048 Mbit/s or 1.544 Mbit/s supporting 32 or 24 x 64 kbit/s time slots |
| Connectors: | Switchable BNC unbalanced and 4 mm Banana balanced |
| Traffic: | Single 16 kbit/s bi-directional Channel |
| Signaling: | Two 16 or 64 kbit/s bi-directional Links |
| Impedance: | E1 (option 52) either 75 Ω BNC or 120 Ω 4 mm banana T1 (option 51) 100 Ω BNC or 4 mm banana |

MEASUREMENTS

Phase Error

| | |
|----------------|---------------------------------|
| Range: | 10° RMS, $\pm 30^\circ$ peak |
| Accuracy RMS: | $< 0.3^\circ$ at 5° phase error |
| Accuracy Peak: | $\pm 7.2^\circ$ |

Frequency Error

| | |
|-----------|-----------------------------------|
| Range: | ± 2.5 kHz |
| Accuracy: | 4.5 Hz + freq. std ³ . |

Power Level

| | |
|--------------------|---|
| Range: | ± 46 dBm to -1 dBm |
| Absolute Accuracy: | ± 1.0 dB (GSM900) ± 1.0 dB (GSM1800, ≤ 20 W) ± 1.2 dB (GSM1900, ≤ 20 W) |
| Relative Accuracy: | $\leq \pm 0.4$ dB |

Power Profile

| | |
|---------------|------------------------|
| Dynamic Range | > 48 dB ³ |
|---------------|------------------------|

Modulation Spectrum

| | |
|-----------------|------------------------|
| Dynamic Range | > 52 dB ³ |
| Frequency Span: | 1 MHz |

Notes

1. Input power ≤ 5 W (± 37 dBm)
2. For 1 dB overshoot
3. 10 Bursts averaged, non-hopping
4. After 20 days continuous operation

Frequency Standard

| | |
|--------------------------------|--|
| Internal | $\pm 1.2 \times 10^{-7}$ (standard) ⁴ |
| (1 Year, all sources of error) | $\pm 3.5 \times 10^{-8}$ (Option 04F) ⁴ |
| External frequencies: | 10 MHz or 13 MHz ± 2.5 ppm |
| | -2 dBm to +19 dBm into 50 Ω |

| | |
|-------------------|---|
| Reference Output: | 10 MHz or 13 MHz $+9$ dBm nominal into 50 Ω |
|-------------------|---|

INTERFACES

| | |
|-------------------------|--|
| Memory Card: | 2 Sockets, PCMCIA V2.0 |
| Card Size | Type1, 2 or 3 |
| Card Types supported | SRAM, ATA Flash EEPROM And hard discs |
| Synchronization Output: | For synchronizing external equipment such as a spectrum analyzer |
| | ANSI/IEEE 488.2 - 1987 |
| Compatibility Subset: | SH1, AH1, T5, L4, SR1, RL1 PP0, DC1, DT0, C0, E1 |
| RS232 Interfaces: | 2 configurable ports for printing and control 9 way male D-Type 25 way female D-Type |
| Parallel Printer: | 25 way female D-Type |

BTS MANUFACTURERS SUPPORTED

Alcatel
Encsson
Interwave
Italtel
Motorola
Nokia
Nortel
PKI
Siemens

GENERAL

| | |
|-------------------|------------------------------|
| Voltage ranges | 85 to 13V and 180 to 264V AC |
| Frequency range: | 45 to 66Hz |
| Power consumption | 170 VA maximum |

Dimensions and Environment

| | |
|-----------------------|--|
| Height | 210 mm |
| Width | 350 mm |
| Depth | 420 mm |
| Weight | 14 kg approx |
| Operating Temperature | 0 to 50°C |
| Calibration Period: | 1 year |
| EMC: | Complies with BS EN50081-1 (emissions) BS EN50082-1 (immunity) |
| Safety | Complies with BS EN61010-1 |

UPDATE PROGRAMS

Racal Instruments offers a comprehensive software maintenance and enhancement program. This means that as new BTS software versions are released the test capability of the 6113 can be updated in line with any changes. Adding new BTS software versions or updating existing software features of the 6113 can be performed quickly and easily in the field via memory card, IEEE488 or RS232 interface.

Racal Instruments has a policy of continuous improvements which means that specifications will change. For full details of 6113 capabilities and BTS support options, contact your local Racal Instruments office.

ADDITIONAL FACILITIES

Instrument Control

The instrument is capable of being controlled either from the front panel keyboard or remotely via IEEE488 GPIB interface. This allows the test set to be included as part of a larger automatic test system. Whichever control method is used, particular attention has been paid to ease and speed of use.

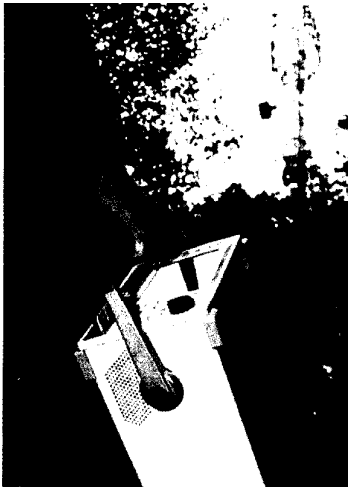
Memory Cards

The PC memory cards and hard disks provide the user with the ability to store and recall a number of instrument set-ups, test sequences and configuration files for carrying out various tests on differing BTS types. New test sequences can be generated from the front panel using a special learning facility and then stored on the memory card. In this way tests can be selected, limits and parameters changed, and printing controlled, guaranteeing total control and repeatability of testing.

The PCMCIA version 2 industry standard card and DOS formatting allows direct transfer of files to a suitable PC. Two sockets are provided so that files are easily duplicated and test sequence files can be conveniently separated from results and parameter files.

Synchronization Output

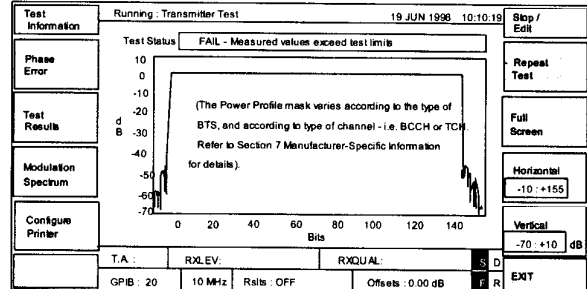
A programmable synchronization output allows external equipment such as a spectrum analyzer or a logic analyzer to be triggered at any point in the GSM frame. Using this trigger signal, spurious signals can be monitored either out-of-band or during the unused slots.



6113 Digital Radio Test Set can easily be carried to remote sites

OPTIONS

The 6113 in its basic form is a complete integrated test set capable of performing the full range of measurements on a GSM Base Station. To complement this, Racal Instruments can supply a range of options and accessories, which significantly enhance the applications of the 6113. A full list is provided on the back page along with ordering information.



A zoom mode allows more detailed examination

Frequency Standards

Under normal circumstances the supplied frequency standard is more than adequate, however, in a laboratory or production situation, a higher performance may be required. The optional internal standard can achieve a stability of 0.03ppm per year.

| | Supplied | Option 04F |
|---------------|------------------------------|------------------------------|
| Frequency | 10 MHz | 10 MHz |
| Stability*: | $\pm 1 \times 10^{-7}$ /year | $\pm 3 \times 10^{-8}$ /year |
| 0° to 50°C: | $< \pm 1.7 \times 10^{-8}$ | $< \pm 1 \times 10^{-8}$ |
| Warm up time: | 30 minutes | 30 minutes |

*Ageing after 30 days of continuous operation

ORDERING INFORMATION

| | |
|---|--|
| Model 6113 | BTS Test Set |
| Model 6113E | BTS Test Set with encryption, option 10R |
| Option 01 | GSM900 operation* |
| Option 02 | GSM1800 operation* |
| Option 03 | GSM1900 operation* |
| Option 04F | Very High Stability Frequency Standard |
| Option 08 | GSM 850 Operation |
| Option 10R | Encryption retrofit kit <i>Negative?</i> |
| Option 51 | T1 A-bis Interface† |
| Option 52 | E1 A-bis Interface† |
| Option 61 | Padded Carrying Bag |
| Option 62 | Rigid Transit Case |
| Option 64 | Front Panel Protection Cover |
| Option 76 | Memory Card, 256 kbyte |
| Option 77 | Memory Card, 2 Mbyte |
| Option 78 | Flash Memory Card, 10M byte |
| Option 79 | Removable Hard Disk Drive 170M byte |
| Option 90 | Test Set/PC RS232 download cable, (9 way D-type) |
| Option 91 | Test Set/Printer RS232 cable (25 way D-type) |
| Option 92 | Test Set/Printer parallel cable |
| *A least one of the option 01,02,03 must be ordered with the basic model and options 02 and 03 cannot be installed together. †At least one of option 51 or 52 must be ordered with the basic model | |

4E
Oscillator

MANUFACTURER SPECIFIC SOFTWARE

| | |
|------------|---|
| Option 220 | Ericsson Software |
| Option 230 | Italtel Software |
| Option 235 | Siemens Software |
| Option 250 | Nortel Software |
| Option 255 | Motorola Software |
| Option 270 | Nokia Software |
| Option 275 | Alcatel Software |
| Option 280 | Lucent Software |
| Option 285 | Interwave Software |
| Option 300 | AIME Software – Air Interface Monitor and Emulator Software |
| Option 310 | LIVE Testing |
| Option 311 | Cell Integrity Testing Software |

SUPPORT OPTIONS

| | |
|-----------|--|
| Option S1 | One year Software Support |
| Option S2 | Two year Software Support |
| Option S3 | Three year Software Support |
| Option C1 | One annual calibration |
| Option C2 | Two annual calibrations |
| Option E2 | One year extended warranty |
| Option E3 | Two year extended warranty |
| Option W2 | One year extended warranty with calibration |
| Option W3 | Two year extended warranty with calibrations |

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 The Racal policy is one of continuous improvement and consequently the equipment may vary in detail from the description and specification in this publication

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