Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as spectrum analysers, signal generators, oscilloscopes, power meters, logic analysers etc from all the major suppliers such as Agilent, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. As such, we fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 2 year warranty. Our staff have extensive backgrounds in T&M, totalling over 150 years of combined experience, which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, covering the cost of warranty returns BOTH ways (plus supplying a loan unit, if available) and supplying a free business tool with every order.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based near Heathrow Airport in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:

- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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Email: info@TestEquipmentHQ.com
Web: www.TestEquipmentHQ.com
• Frequency resolution 1 Hz
• Level range $-140$ to $+19$ dBm, overrange up to $25$ dBm (option)
• Level accuracy better than 1 dB
• SSB phase noise $<-114$ dBc at $1$ GHz, $\Delta f = 20$ kHz
• AM, FM, pulse modulation
• Modulation generator 1 Hz to $500$ kHz
• Sweep capabilities
• Nonvolatile memory for 100 complete front-panel setups
• RF overload protection 30 W (SMY01) or 50 W (SMY02)
• Low RF leakage ($<0.1 \, \mu V$)
• Calibration at 3-year interval
SMY – the ideal generator for receiver measurements...

Signal generators of the SMY family from Rohde & Schwarz are cost-effective instruments for testing AM, FM and FM receivers as well as for component measurements. Two models are available:

- SMY01 with a frequency range from 9 kHz to 1040 MHz
- SMY02 from 9 kHz to 2080 MHz.

Designed exclusively for the main applications of signal generators by cutting out the unnecessaries, SMY features an outstanding price/performance ratio. Thanks to its comprehensive basic features and excellent signal characteristics, it is an economical solution for universal use in lab, production and servicing environments.

- Level range −140 dBm to +13 dBm (19 dBm over-range) *, sufficient even for receivers of highest sensitivity
- High level accuracy and low RF leakage allowing accurate and undegraded sensitivity measurements
- FM-DC with high accuracy of carrier frequency for testing pagers and receivers fitted with digital squelches
- Low SSB phase noise and high spurious rejection for all in-channel and blocking measurements
- Low residual FM affording ample of margin for S/N measurements
- Modulation generator 1 Hz to 500 kHz for modulation frequency response measurements
- Stereo channel separation of 50 dB and low harmonic distortion for testing FM stereo receivers

... and for general-purpose applications

*) With option SMY-B40 −134 dBm to +19 dBm (25 dBm over-range)
Non-interrupting level setting over a range of 20 dB for reproducible measurement of squelch hysteresis

- Frequency resolution 1 Hz, suitable also for narrowband test items
- FM-DC, deviation up to 20 MHz for VCO simulation
- FM bandwidth 2 MHz for fast FSK and telemetry applications
- High output level up to 19 dBm (25 dBm with option SMY-B40) for component and overdrive testing
- AF synthesizer 1 Hz to 500 kHz, separate use as AF signal source for external applications possible, eg recording of AF frequency response
- Remote-control interface IEC625/IEEE488 for use in automatic test systems
- RF sweep
- Sequence function and SEQ input for semi-automatic use

With option SMY-B40:
The overrange feature for the output level allows measurements on high-level mixers. To the right: output level obtained with settings of 19 dBm, 21 dBm, 23 dBm and 25 dBm

Accuracy of carrier frequency with FM-DC, long-term stability.
Settings: carrier frequency = 1 GHz, FM deviation = 50 kHz, external FM-DC

- FM frequency response of SMY
  Frequency modulation is possible even at full deviation up to high modulation frequencies

Level/frequency response at 0 dBm output level. The software supported level correction reduces the frequency response to typically 0.1 dB

Phase-continuous frequency change of modulation generator.
To the right: frequency change from 10 Hz to 40 Hz.
Cost-saving synthesis concept

Single-loop synthesis is a concept that makes for simple and cost-effective circuit design and does not entail giving up high frequency resolution and short setting time. The fractional-N technique uses a fractional frequency division ratio, i.e. a frequency resolution of 1 Hz is obtained in spite of the high reference frequency. High reliability and light weight thanks to VLSI components are further advantages of this technique.

Operation

The panel controls are ergonomically arranged so that there is no time wasted for familiarization. Operation is from the left to the right: parameters, data, units; each control is at its right place.

The patented, magnetically locking spinwheel is just as practical. Although easy to turn, each setting step is felt exactly by the user. Thus for instance it is not really necessary to observe the SMY display in the case of stepwise tuning. This means that the annoying procedure of looking back and forth between a measuring instrument and the signal generator can be dispensed with. Naturally fast tuning and programming of the step width are also possible.

Frequently used settings can be stored and recalled any time. The memory saves up to 100 complete front-panel setups.

Low cost of ownership thanks to high reliability and easy maintenance

Like with all Rohde & Schwarz signal generators, the well-proven self-test facility is integrated in SMY monitoring continuously the signal generator status. If there are any malfunctions, these are immediately detected and reported in the form of error messages. The user thus has an effective protection against invalid measurements, should the generator ever fail.

Thanks to its advanced circuit design, SMY requires particularly little maintenance. Aging and drift are compensated for by control loops. Due to the few reference components, which are designed for maximum stability, calibration is required at intervals of 3 years only.

If the accuracy is required to be higher than the specified data, user-specific calibration values for frequency and level may be entered and stored at any time without opening the instrument.

Further development of proven technology

Signal Generators SMY from Rohde & Schwarz stands for the economy class of generators. Well-proven features have been improved and unnecessary details omitted. It is the sum of its characteristics which makes SMY so attractive. Tangible for the user are the variety of facilities and versatility at an excellent price/performance ratio. SMY is the economical solution for universal use in lab, production and servicing environments.
### Specifications

#### Frequency
- **Range**: 9 kHz to 1.04 GHz (SMY01) 9 kHz to 2.08 GHz (SMY02)
- **Resolution**: 1 Hz
- **Setting time (to within 1 Hz)**: <60 ms

#### Temperature effect
- **(0 to 55 °C)**
- **Total error for levels > 0.1 dB**: without guarantee of specs up to 19 dBm, up to 25 dBm, overranging
- **Non-interrupting level setting**: Setting time (IEC/IEEE bus) <25 ms (<10 ms with electronic)

#### Aging
- **(after 30 days of operation)** 1 x 10⁻⁸/year

#### Reference frequency
- **Output for internal reference**: Frequency 10 MHz
- **Level [EMF, sinewave]**: 1 V (rms)
- **Source impedance**: 50 Ω
- **Input for external reference**: Frequency 5 or 10 MHz
- **Input level**: 0.2 to 2 V (rms)
- **Input impedance**: 200 Ω

#### Spectral purity
- **Spurious**: Harmonics
  - Subharmonics: f ≤ 0.04 GHz
  - Nonharmonics: at > 5 kHz from carrier f ≤ 0.04 GHz
- **Broadband noise with CW**: carrier offset > 1 MHz, 1 Hz bandwidth
  - f ≤ 10 MHz: <3 x 10⁻⁶
  - f > 10 MHz: < 1 Hz
- **SSB phase noise at 1 GHz (CW)**
  - f = 1 MHz to 65 MHz: < 64 dBc
  - f > 65 MHz: < 70 dBc

#### Simultaneous modulation
- **Modes**: internal, external AC/DC
- **Modulation depth**: any combination of AM, FM (µM) and pulse modulation
- **Resolution**: 0 to 100%<sup>11</sup>
- **Setting error at 1 kHz**:<sup>11</sup> ||<sup>1</sup> |<sup>2</sup>
  - Setting error at 1 kHz (m < 80%):<sup>1</sup>
    - m = 30%: |<sup>1</sup> |<sup>2</sup>
    - m = 80%: <<sup>1</sup> |<sup>2</sup>
- **Modulation frequency response**: flatness (m = 60%:<sup>13</sup>)
  - SSB phase noise at 1 GHz: <20 Hz, typ. 7 Hz
- **Spurious**: SSB phase noise at 1 GHz (CW)
  - f = 1 kHz: < 0.1° reading
  - f > 10 MHz: < 1° reading

#### Setting time
- **IEC/IEEE bus**: <25 ms (<10 ms with electronic)
- **Output for internal reference**: Frequency 10 MHz
- **Level [EMF, sinewave]**: 1 V (rms)
- **Source impedance**: 50 Ω
- **Input for external reference**: Frequency 5 or 10 MHz
- **Input level**: 0.2 to 2 V (rms)
- **Input impedance**: 200 Ω

#### Overload protection
- **Max. RF power**: SMY01 30 W, SMY02 50 W
- **Max. DC voltage**: 35 V
- **Max. pulse loading capacity**: (pulse width < 10 μs)
  - 1 mWs or 150 V (V<sub>p</sub>)

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<sup>1</sup> Any combination of AM, FM (µM) and pulse modulation

<sup>2</sup> Possible changes to be applied to the instrument during normal operation, for example signal distortion, phase distortion, etc.</sup>
**Memory**

- Non-volatile, for 100 instrument setups

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Resolution</th>
<th>Setting error at AF = 1 kHz</th>
<th>THD (20 Hz to 100 kHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>&lt;1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>0.1</td>
<td>&lt;0.4%</td>
<td>0.2%</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>&lt;0.2%</td>
<td>0.1%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>&lt;0.1%</td>
<td>0.05%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>&lt;0.05%</td>
<td>0.02%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>&lt;0.02%</td>
<td>0.01%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>&lt;0.01%</td>
<td>0.005%</td>
<td></td>
</tr>
</tbody>
</table>

**Remote control**

- System: IEC 625 (IEEE 882)
- Connector: Amphenol, 24-contact
- IEC/IEEE-bus address: 0 to 30
- Interface functions: SH1/SH2/L1/L2/SR1/RL1/PP0/DC1/DTO/CO

**General data**

<table>
<thead>
<tr>
<th>Temperature range</th>
<th>Guaranteed specs</th>
<th>Storage temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 55 °C</td>
<td>IEC68-2-1 and IEC68-2-2</td>
<td>−40 to +70 °C</td>
</tr>
</tbody>
</table>

**Mechanical resistance**

- Sinewave vibration: 5 to 150 Hz, max. 2 g at 55 Hz, max. 0.5 g in range 55 to 1.3 kHz, complying with IEC68-2-6, IEC1011-1 and MIL-T-28800D, class 5

**Electromagnetic compatibility**

- complying with EN50081-1 and EN50082-1 (EMC Directives of EU)
- RF leakage: <0.1 µV (measured with a two-turn coil of 2.5 cm in diameter at a distance of 2.5 cm from any point of enclosure)
- Radiated susceptibility: 10 V/m
- Power supply: 100 V/230 V (AC) −10 to +15%, 120/220 V (AC) −12.5 to +10%, 47 to 440 Hz, max. 120 VA

**Safety**

- complying with EN61010-1

**Dimensions**

- Weight: 12 kg (SMY01), 13 kg (SMY02)
- Modules: SMY01 435 mm x 147 mm x 460 mm, SMY02 435 mm x 147 mm x 350 mm

**Ordering information**

- Signal Generator: SMY01 1062.5502.11, SMY02 1062.5502.12
- Accessories supplied: power cord, operating manual

**Options**

- Reference Oscillator OCXO: SMY-B1 1062.7505.02
- Rear-Panel Connectors for RF and NF: SMY-B10 1062.8001.02
- Pulse Modulator and High Output Power: SMY-B40 1062.9008.02
- Recommended extras: ZZA93 0396.4892.00
- Service Kit: SMY-Z2 1062.7805.02
- Service Manual: 1062.5502.11
- 19" Rack Adapter: PD 757.3805.21

**Remote control**

- System: IEC 625 (IEEE 881)
- Connector: Amphenol, 24-contact
- IEC/IEEE-bus address: 0 to 30
- Interface functions: SH1/SH2/L1/L2/SR1/RL1/PP0/DC1/DTO/CO

**General data**

- Temperature range: 0 to 55 °C, complying with IEC68-2-1 and IEC68-2-2
- Storage temperature: −40 to +70 °C

**Mechanical resistance**

- Sinewave vibration: 5 to 150 Hz, max. 2 g at 55 Hz, max. 0.5 g in range 55 to 1.3 kHz, complying with IEC68-2-6, IEC1011-1 and MIL-T-28800D, class 5

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