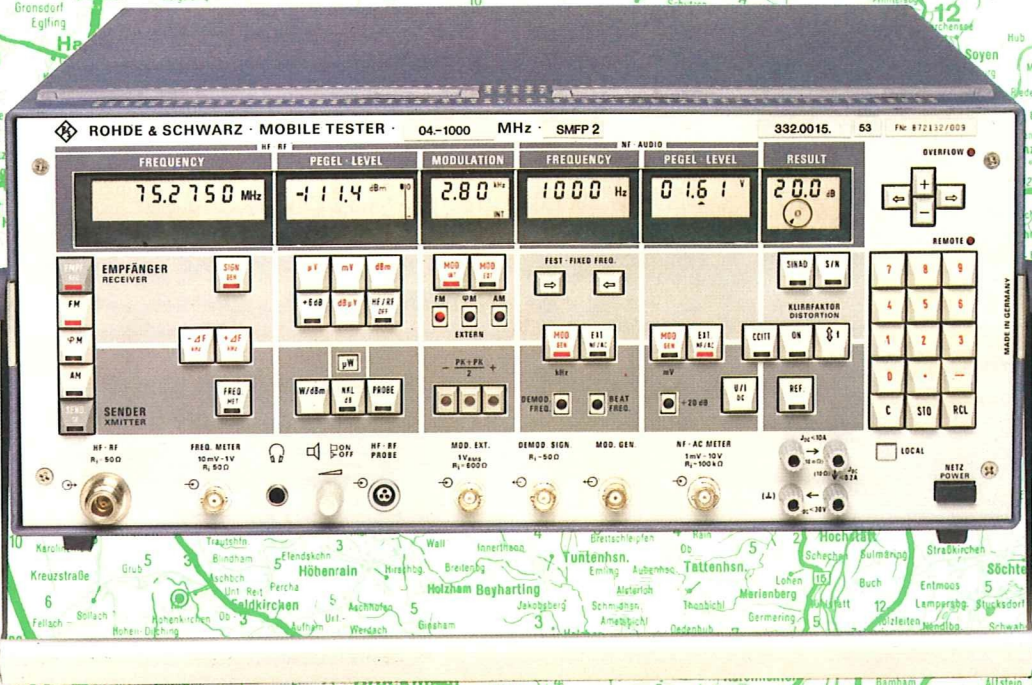


MOBILE TESTERS SMFP 2 and SMFS 2

0.4 to 1000 MHz



The Mobile Testers SMFP 2 and SMFS 2 are the result of further developments on the well-known radiotelephone test sets SMFP and SMFS. The improvements take the form of extended measurement facilities and of new options:

- Selective Call Encoder
- Selective Call Decoder
- RF Millivoltmeter
- 60-W Power Meter

All basic data are given in the 16-page SMFP/SMFS data sheet 332 001

CHARACTERISTICS, MEASUREMENT CAPABILITIES

Characteristics and use

With the Mobile Testers SMFP and SMFS the instrumentation for all transceiver measurements was combined in a single test system for the first time. Manual and automatic operation, mobile and stationary use, universal measuring capabilities and high measuring speed together with high technical performance permitted the versatile application of the test system in developing, production testing, final testing and servicing transceivers.

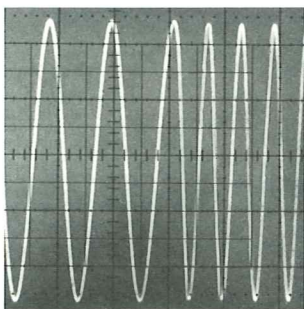
The SMFS was designed for manual and semi-automatic operation featuring numerous firmware test routines. The SMFP, in addition, featured programmed test parameters, operations and special functions for automatic measurements with the aid of a process controller.

This data sheet on the Mobile Testers SMFP 2/SMFS 2 therefore contains only the new measurement capabilities and options as well as the additional technical specifications.

NEW MEASUREMENT CAPABILITIES

Generation of tone sequences (selective call) to ZVEI and CCIR standards. The AF Synthesizer/Selective Call Encoder produces modulation frequencies from 10 Hz to 25 kHz and tone sequences with high resolution and crystal stability. On account of the low source impedance (approximately 1Ω) the voltage at the test item always corresponds to the set EMF, even with low-impedance or complex loads. The very rapid frequency and amplitude switching time as well as phase continuity when changing the frequency meets all the requirements of tone sequence generation.

The AF Synthesizer/Selective Call Encoder comes as standard equipment with the SMFP 2. It is available as Option SMFS 2B7 for the SMFS 2.



Frequency change

The AF Synthesizer/Selective Call Encoder produces tone sequences with one to eight single tones according to ZVEI and CCIR standards. The setting of the test set to the particular standard and the entry of the desired call is keyboard-controlled from the front panel. If the same code number is entered successively the repeat tone is sent automatically. The entered tone sequence can be sent singly or repeatedly.

With the SMFP 2 it is also possible to use simple IEC/IEEE-bus instructions to call up tone sequences or to vary the parameters of the tone sequences. For example, the first tone may be lengthened, pauses may be introduced and the frequency of the single tones may be varied for tolerance investigations. Moreover, completely different tone sequences, such as European radio-paging signals, can be produced.

The Mobile Testers SMFP 2 and SMFS 2 have the same basic characteristics as their predecessors SMFP and SMFS. They feature the same versatile measurement facilities for high-precision measurements on transceivers as well as operational ease and a great number of measurement capabilities. Accordingly, the SMFP/SMFS data sheet (332 001) also applies to SMFP 2 and SMFS 2 without any restrictions.



Quieting measurement. In addition to the two automatic test routines for determining the sensitivity according to the S/N and SINAD ratio method during receiver testing the SMFP 2 and SMFS 2 offer quieting measurements.

Narrower measurement tolerances. The SMFP 2 and SMFS 2 can be switched over to extended averaging time to enhance the accuracy of automatic S/N and SINAD ratio measurements during receiver testing. This considerably narrows down the noise measurement tolerances.

CEPT distortion measurement now at three frequencies (300 Hz, 500 Hz and 1 kHz). The respective notch filters can be temporarily or permanently cut in when measuring interference signals.



Mobile Tester SMFP 2 with Process Controller PUC

The SMFP 2 and SMFS 2 can be retrofitted with a number of new options:

Selective Call Decoder SMFS 2 B6. The SMFS 2 B6 Option permits decoding of tone sequences to ZVEI or CCIR standard (1 to 7 single tones) demodulated in the basic unit or applied to the AF voltmeter input. The decoded code numbers are read out on the display. Repeat tones are automatically decoded. Excessive pauses or tones that deviate from the chosen standard can be readily recognized as can be seen from the examples of displayed decoded tone sequences.

Examples of displayed decoded tone sequences

FREQUENCY	
12345	Tone sequence to standard
12245	Decoded repeat tone
1 2345	Excessive pause after first tone
1 345	Wrong or missing tone

AF Synthesizer/Selective Call Encoder SMFS 2 B7. (only for SMFS 2, comes as standard equipment with the SMFP 2) see left page.

60-W Power Meter SMFP 2 B3. The SMFP 2 B3 Option extends the measurement range of the power meter built into SMFP 2 and SMFS 2 from 30 W to 60 W. The measurement range extension has been achieved by the inclusion of an internal 3-dB power attenuator.

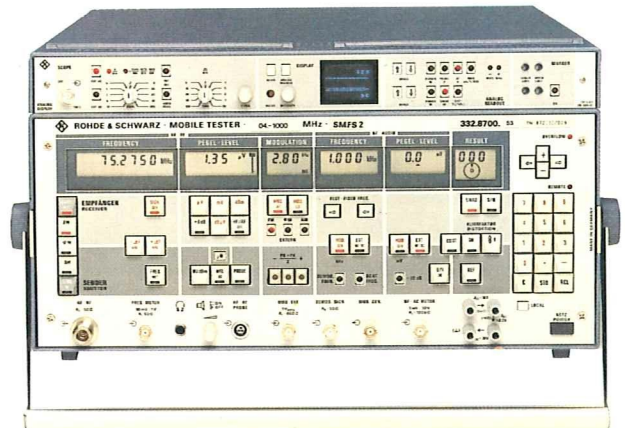
RF Millivoltmeter SMFS 2 B8. In conjunction with suitable probes the SMFS 2 B8 Option permits RF voltage measurements from 1 mV to 100 V over the range 10 kHz to 1 GHz.

Suitable probes are any of the probes and insertion units available for the RF Millivoltmeter URV. Operating controls and display of the measured result are fully integrated into the RF level section of the Mobile Testers, the original operational convenience being preserved. In addition to digital display in mV, V or dBm the RF signal can also be displayed on the Analog Display Option SMFS-B9, if fitted, in four selectable ranges. In the SMFP 2, the RF Millivoltmeter can of course also be used via the IEC/IEEE bus.

New accessories for the Analog Display SMFS-B9

Oscilloscope Probe SMFS-Z1. This probe features switched attenuation (1:1/10:1/Ground) and may be used for displaying external AC and DC signals on the Analog Display SMFS-B9.

Demodulator Probe SMFS-Z2. This probe may be used for displaying frequency response curves in the frequency range 100 kHz to 500 MHz during sweep measurements on duplexers, IF filters, tuned circuits and demodulators. It may be used with the Analog Display SMFS 2-B9 or with any other oscilloscope.



Mobile Tester SMFS 2 with Analog Display SMFS-B9

Options		SMFP 2	SMFS 2	SMFP	SMFS
Reference Oscillator	SMS-B1	×	×	×	×
1-GHz Frequency Extension	SMFP-B2	×	×	×	×
60-Watt Power Meter	SMFP 2 B3	×	×	-	-
Adjacent-channel Power Meter	SMFP-B6 ¹⁾	×	×	×	×
Control Interface	SMFS-B5	●	×	●	×
AF Synthesizer	SMFS-B7	-	-	●	×
AF Synthesizer/Selective Call Encoder	SMFS 2 B7	●	×	-	-
Selective Call Decoder	SMFS 2 B6	×	×	-	-
RF Millivoltmeter	SMFS 2 B8	×	×	-	-
Analog Display	SMFS-B9	×	×	×	×

× Option can be fitted - Option cannot be fitted ● Standard equipment

¹⁾ Because of the necessary frequency accuracy it is recommended to fit SMS-B1 together with SMFP-B6.

²⁾ Only with SMFS 2 B7.

SPECIFICATIONS

The technical data of SMFP 2 and SMFS 2 as well as of the options offered up till now are included in the SMFP/ SMFS data sheet 332.001.

Additional technical data of the new options for SMFP 2 and SMFS 2

60-W Power Meter SMFP 2 B3

Power measurement range 20 mW to 60 W

Additional error

- for $f < 500$ MHz $\pm 3\%$
- $f < 800$ MHz $\pm 5\%$
- $f \geq 800$ MHz typ. 5%

VSWR

- for $f < 500$ MHz ≤ 1.2
- $f \geq 500$ MHz ≤ 1.3

Output level of RF signal generator

- for CW and FM -137 to +10 dBm
- for AM -137 to +4 dBm

Overload protection

- Maximum safe input 60 W
- Other specifications: see data sheet 332.001

AF Synthesizer/Selective Call Encoder SMFS 2 B7

for SMFS 2 (standard equipment in SMFP 2)

Frequency range 10 Hz to 25 kHz

- Resolution $f < 1$ kHz 0.1 Hz
- $f < 10$ kHz 1 Hz
- $f < 25$ kHz 10 Hz
- Selectable fixed frequencies 0.3/0.4/1/1.25/2.7/3/6 kHz
- Frequency error $f < 15$ kHz $< 1 \cdot 10^{-6}$
- $f > 15$ kHz $< 1 \cdot 10^{-5}$

Output voltage range 0.1 mV to 5 V

- Resolution $V < 100$ mV 0.1 mV
- $V < 1$ V 1 mV
- $V < 5$ V 5 mV

Error of output voltage

- $V > 1$ mV $\pm (2\% + 0.1 \text{ mV})$
- $V < 1$ mV typ. 2%
- Source impedance approx. 1 Ω

Minimum load impedance

- $V < 100$ mV $R_L \geq 1 \Omega$
- $V > 100$ mV $R_L \geq 50 \Omega$

Selective Call Encoder

- Standard tone sequences tones 0 to 9 + repeat tone in accordance with ZVEI and CCIR
- Number of single tones 2 to 8

Selective Call Decoder SMFS 2 B6

(can be fitted to SMFS 2 only in conjunction with SMFS 2 B7)

- Standard tone sequences tones 0 to 9 + repeat tone in accordance with ZVEI and CCIR
- Number of single tones 1 to 7

Decoding range

- AF voltmeter 100 mV to 10 V
- FM meter 200 Hz to 20 kHz
- ϕ M meter 0.1 to 10 rad
- AM meter 1 to 100%

Decoding probability P for relative offset from nominal frequency

- $P \geq 0.995$ $\pm 1\%$ (CCIR)
- $\pm 2\%$ (ZVEI)
- $P \leq 0.03$ $\pm 3\%$ (CCIR)
- $\pm 4.5\%$ (ZVEI)

Response time

- Tone recognition typ. 25 ms
- Pause recognition typ. 20 ms
- Wrong-tone recognition typ. 20 ms

RF Millivoltmeter SMFS 2 B8

Frequency range 10 kHz to 1 GHz

Measurement range 1 mV to 10 V/10 mV to 100 V (depends on probe)

Display 3½ digits in mV, V or dBm

- Resolution $V < 100$ mV 0.3 mV
- $V < 300$ mV 1 mV
- $V < 1$ V 3 mV
- $V < 3$ V 10 mV
- $V < 10$ V 30 mV

Error inherent error + frequency response error

Inherent error ($V > 10$ mV, $V < 10$ mV typical values):

	Voltage measurement	Level measurement
+20 to 25 °C	3% + 6 digits	0.2 dB + 1 digit
+15 to 30 °C	4% + 6 digits	0.3 dB + 1 digit
+5 to 40 °C	5% + 8 digits	typ. 0.5 dB

Frequency response error:

depends on probe; see URV 3 data sheet or Measuring Equipment Catalog.

- Probes RF Probe URV-Z7
- 10-V Insertion Unit URV-Z2
- 100-V Insertion Unit URV-Z4

Accessories for Analog Display SMFS-B9

Oscilloscope Probe SMFS-Z1

- Attenuation/bandwidth 10:1/approx. 100 MHz
- 1:1/approx. 10 MHz
- Ground
- Maximum permissible voltage 400 V_p
- C compensation range up to 60 pF
- Connector BNC

Demodulator Probe SMFS-Z2

- Frequency range 100 kHz to 500 MHz
- Input capacitance approx. 4 pF
- Minimum permissible voltage 30 V_{rms} AC, 50 V DC
- Polarity positive
- Connector BNC

Ordering information

- Order designation Mobile Tester
- SMFP 2 332.0015.53
- SMFS 2 332.8700.53

Accessories supplied

50 Ω termination, adapter board, power cable, manual

Options

- Reference Oscillator . SMS-B1 302.8918.02
- 1-GHz Frequency
- Extension SMFP-B2 ... 332.9706.50
- 60-W Power Meter ... SMFS 2 B3 ... 357.8610.02
- Adjacent-channel
- Power Meter SMFP-B6¹⁾ ... 332.8000.02
- Control Interface SMFS-B5²⁾ ... 332.9106.02
- AF Synthesizer/
- Selective Call Encoder SMFS 2 B7³⁾ ... 346.6810.02
- Selective Call Decoder SMFS 2 B6³⁾ ... 346.7000.02
- RF Millivoltmeter SMFS 2 B8⁴⁾ ... 332.9306.02
- Analog Display SMFS-B9 ... 346.5008.02

Recommended extras

- Basic Software SMFP 2 K1 ... 358.2015.02
- Process Controller ... PUC 344.8900.02
- Standard Keyboard ... PUC-Z1 345.2011.04
- IEC-bus Cable (1 m) ... PCK 292.2013.10
- Protective Covers SMFP-Z8⁵⁾ ... 332.7890.02
- 19" Adapter
- for SMFP 2/SMFS 2
- without SMFS-B9 ... SMFP-Z9 ... 332.7978.02
- for SMFP 2/SMFS 2
- with SMFS-B9 SMFS Z10 ... 346.6710.02
- Power attenuators; see data sheet N 3-123

Recommended extras for Analog Display SMFS-B9

- Oscilloscope Probe .. SMFS-Z1 358.0312.02
- Demodulator Probe .. SMFS-Z2 ... 358.0412.02
- Demodulator Probe .. SWOB 3-Z 241.2116.00
- BNC Adapter URV-Z 241.1110.02
- Termination RMF (BNC) .. 100.2927.50 (50 Ω)

Recommended extras for RF Millivoltmeter SMFS 2 B8

- RF Probe URV-Z7 292.5312.02
- 10-V Insertion Unit ... URV-Z2
- 50 Ω /N connector 288.8010.55
- 50 Ω /Dezifix B connector 288.8010.54
- 100-V Insertion Unit ... URV-Z4
- 50 Ω /N connector 283.7716.55

For further accessories see URV 3 data sheet (302.901)
For terminations and attenuators see data sheet 200.001

1) Because of the necessary frequency accuracy it is recommended to fit SMS-B1 together with SMFP-B6.

2) Only for SMFS 2; comes as standard equipment with SMFP 2.

3) For SMFS 2 only together with AF Synthesizer/Selective Call Encoder SMFS 2 B7.

4) Without probe; for probes see recommended extras.

5) For SMFP 2 and SMFS 2 without Analog Display SMFS-B9.