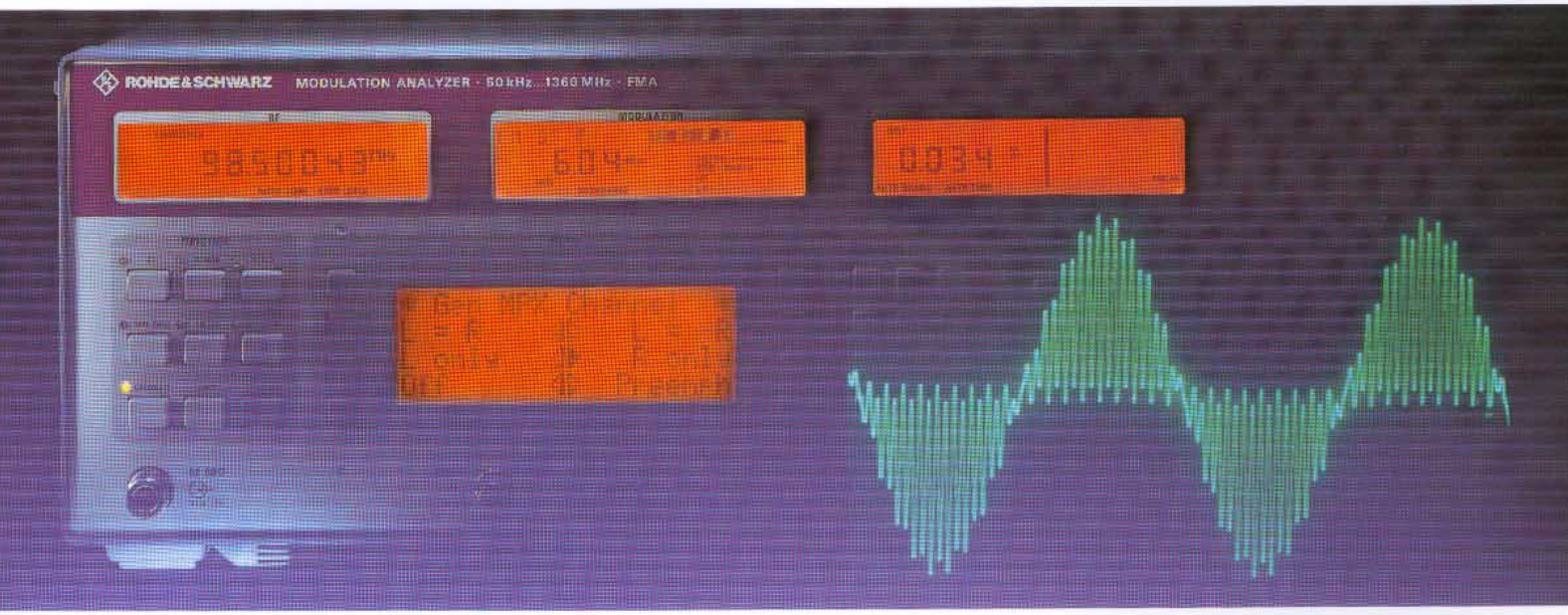

AM/FM, level – AF, stereo MPX, VOR/ILS/TACAN: the high-precision source for every application

AM/FM Calibrator/AF Generator FMA-B4

The AM/FM Calibrator/AF Generator FMA-B4 from Rohde & Schwarz is an option for use with the FMA family. It provides a high-precision AM or FM signal for internal and external calibration as well as an unmodulated 10-MHz signal for level calibration. The AF generator supplies signals in the range from 10 Hz to 100 kHz which can be modulated upon the 10-MHz carrier for a performance test of the FMA.

The AF signals are generated by a signal processor and a 16-bit D/A converter. Signal generation includes single-tone and two-tone AF signals, stereo multiplex signals and especially VOR/ILS/TACAN baseband signals. Modulation Analyzer FMA can thus be enhanced to form a complete transmitter test set for various applications from sound broadcasting through radiocommunication to air navigation.

Dual-channel unbalanced or single-channel balanced baseband signals are available at two rear-panel BNC outputs. The output impedance can be selected in three steps.

With the aid of Connector Unit FMA-Z2 the rear-panel baseband outputs as well as all other rear-panel inputs and outputs of the basic unit become accessible from the front.

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Specifications

The data are tested at 23 °C (73.4 °F) and guaranteed by design in the range 23 ± 5 °C (73.4 ± 9 °F).

Baseband signals

AF (Single-tone and two-tone signals)

Frequency range	10 Hz to 100 kHz
Frequency resolution	1 mHz
Frequency error	1 mHz + error of reference frequency
Level	1 mV to 7 V
Error of output level at 1 kHz	≤0.1% ±10 µV
Level resolution	0.02% (min. 10 µV)
Frequency response[1])	
10 Hz to 50 kHz	≤±0.1%
10 Hz to 100 kHz	≤±0.2%
THD + N (level ≤6 V)	
10 Hz to 20 kHz	≤0.02% + 10 µV (100 kHz bandwidth)
20 to 100 kHz	≤0.1% + 20 µV (300 kHz bandwidth)
Intermodulation distortion (two-tone signals, PK voltage ≤8 V)	
10 Hz to 20 kHz	≥74 dB down
20 to 100 kHz	≥60 dB down

Stereo MPX

The data are not tested individually but given by design.

Generation of stereo multiplex signals, L, R, R = L, R = –L incl. 19-kHz pilot tone (disconnectible) or 19-kHz pilot tone + 57-kHz subcarrier (without multiplex signal)	
Linear distortion	
Selectable preemphasis	50/75 µs
Frequency response 10 Hz to 53 kHz	≤0.1%
Crosstalk attenuation 30 Hz to 15 kHz, M ↔ S, L ↔ R	≥65 dB
Nonlinear distortion and intermodulation distortion	≥70 dB down
Unweighted and weighted S/N ratio to CCIR 468-4	≥80 dB
Pilot tone	
Nominal frequency	19 kHz ± 1 mHz + error of reference frequency
Phase versus carrier	≤0.1°
Setting range	±10°
57-kHz subcarrier (only possible with multiplex signal switched off)	
Nominal frequency	57 kHz ± 1 mHz + error of reference frequency
Phase versus pilot tone	≤0.1°
Setting range	±30°

VOR-ILS-TACAN (FMAV only)

The data are not tested individually but given by design.

VOR	
Deviation error at 9.96-kHz subcarrier	≤±0.1% ± 1 Hz
Setting range	0 to 700 Hz
Phase error 30 Hz	≤±0.005°
ILS	
Frequency response 90 Hz/150 Hz	≤0.02%
Additional gain difference error	≤0.1% x gain difference
Phase error 90 Hz/150 Hz	≤±0.05°
TACAN	
Phase error 15 Hz/135 Hz	≤±0.1°

Outputs	2 BNC female connectors on rear panel, 2 x unbalanced, same signal at both outputs, can be individually switched off or 1 x balanced
Output impedance	20 Ω, 200 Ω, 600 Ω selectable, tolerance: ±1% ± 2 Ω, can be internally switched to AF measuring circuit

[1]) For Z_{out} = 20 Ω, C_L ≤200 pF.

AM/FM/level

(modulated signal; carrier frequency 10 MHz)

AM

Carrier frequency	10 MHz
Level	–10 dBm
Modulation depth	adjustable from 0 to 99%
Error at f_{mod} = 1 kHz, 80% AM	≤0.1% of reading
Additional linearity error at m = 10 to 95%	≤0.1%
Modulation frequency response	
15 Hz to 10 kHz	≤0.1%
10 Hz to 100 kHz	≤0.5%
Modulation distortion (THD + N)	
10 Hz to 20 kHz, m = 80%	≤0.1%
Incidental φM, m ≤ 80%	≤0.01 rad
Residual AM (20 Hz to 23 kHz, RMS)	typ. ≤0.02%

AM-VOR/ILS (FMAV only)

ILS	
DDM accuracy	
m = 18 to 22%	≤±0.00005 DDM ± 0.001 x (DDM)
m = 32 to 48%	≤±0.0001 DDM ± 0.001 x (DDM)
Phase error 90 Hz/150 Hz	≤0.1°
VOR	
Deviation error at 9.96-kHz subcarrier	≤±0.1% ± 1 Hz
Deviation setting range	0 to 700 Hz
Phase error 30 Hz	≤0.01°
TACAN	
Phase error 15 Hz/135 Hz	≤±0.25°

FM

Carrier frequency	10 MHz
Level	–10 dBm
Deviation (f_{mod} = 1 kHz, squarewave-shaped)	100 kHz
Deviation error	≤0.1%
Additional sinewave modulation	f_{mod} = 10 Hz to 100 kHz, deviation = 1 to 100 kHz
Residual FM (BW = 23 kHz, RMS)	≤10 Hz
Deviation error for 100 kHz deviation, f_{mod} = 1 kHz	≤0.2% + residual FM
Additional linearity error for f_{mod} = 1 kHz, deviation 10 to 100 kHz	≤0.1%
Modulation frequency response 10 Hz to 100 kHz	≤0.5%
Modulation distortion for deviation = 100 kHz, f_{mod} = 10 Hz to 20 kHz	≤0.1%
Incidental AM (Δf = 50 kHz, f_{mod} = 1 kHz, BW = 3 kHz)	typ. ≤0.05%

Level

Carrier frequency	10 MHz
Frequency error	error of reference frequency
Level range	–50 to –4 dBm
Level error	
Output level –10 dBm	≤0.1 dB
–40 to –4 dBm	≤0.2 dB ± 6 nW
Output	BNC female on front panel (CAL), can be internally switched to RF input
VSWR at 10 MHz	≤1.05

Ordering information

Order designation	AM/FM Calibrator/AF Generator FMA-B4 855.6008.52
Recommended extra	Connector Unit FMA-Z2 1048.8495.52

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