Schlumberger

Technical Data

Signal generator

Carrier frequency

Frequency range	0.4 to 960 MHz
Resolution	10 Hz
Accuracy	as Reference Oscillator

Reference oscillator

Frequency error	$< 1 \times 10^{-7}$ after 15 min, at 20°C
Temperature drift	$< 5 \times 10^{-9}$ / °C
Ageing	$< 1 \times 10^{-6}$ / year
Output	10 MHz, approx. + 5 dBm

Output level (EMF)

Socket RF	0.1 µV to 0.2 V (max. 0.1 V with AM)
Socket RF DIRECT	1 µV to 2 V (max. 1 V with AM)
Resolution	0.1 dB
EMF error Socket RF 20 to 500 MHz	< 1.3 dB ± 1 digit
0.4 to 960 MHz	< 1.8 dB ± 1 digit
EMF error Socket RF DIRECT	as before + 0.7 dB (max.)
Impedance	50 Ω
VSWR Socket RF	< 1.1
Socket RF DIRECT	< 1.5 (P < – 5 dBm)
EMF setting range without interruption	0 to 26 dB
Additional level error	0.1 dB per dB

Spectral purity
(EMF setting range = 0 dB)

Phase noise 25 kHz from carrier	
f ≤ 500 MHz	< – 132 dBc / Hz
f > 500 MHz	< – 126 dBc / Hz
Residual FM in a 30 Hz to 3 kHz bandwidth	
f ≤ 500 MHz	< 2 Hz (rms)
f > 500 MHz	< 3 Hz (rms)
Spurious signals 0.01 to 30 MHz from carrier	
f ≤ 500 MHz	< – 80 dBc
f > 500 MHz	< – 75 dBc
Harmonics	< – 25 dBc
Residual AM	< – 70 dB referred to 30 % AM, CCITT-weighted

FM

Frequency deviation Δf	0 to 20 kHz
Resolution	10 Hz (Δf < 4 kHz) 100 Hz (Δf > 4 kHz)
Modulation frequency internal	30 Hz to 30 kHz
external	2 Hz to 140 kHz (– 3 dB)
Setting error with Δf < 10 kHz	
f_{mod} = 0.3 to 3 kHz	< 4 % ± 2 digit
f_{mod} = 0.03 to 30 kHz	< 8 % ± 2 digit
Distortion	< 2 % at Δf < 10 kHz and f_{mod} = 0.3 to 3 kHz

DC-coupled FM (option)

Frequency deviation Δf	0 to 5 kHz
Resolution	10 Hz (Δf < 4 kHz) 100 Hz (Δf > 4 kHz)
f_{mod}	0 to 30 kHz
Setting error	< 4 % ± 2 digit
Distortion	< 2 % (f_{mod} = 0.3 to 3 kHz)
Frequency offset	< 150 Hz

Broadband FM
Maximum frequency deviation depending on carrier frequency

0.4 to < 60 MHz	80 kHz
60 to < 120 MHz	20 kHz
120 to < 250 MHz	40 kHz
250 to < 960 MHz	80 kHz

ΦM

Phase deviation	0 to 6 rad
Resolution	0.01 rad
Modulation frequency internal and external	100 Hz to 16 kHz (f_{mod} x rad < 20 kHz)
Setting error	< 4 % ± 2 digit (0.3 to 3 kHz)
Frequency response	< – 3 dB (100 Hz to 16 kHz)
Distortion	< 1 % (0.3 to 3 kHz)

AM
(EMF setting range = 0 dB)

Modulation depth	0 to 90 %
Resolution	0.1 %
Modulation frequency internal	30 Hz to 20 kHz
external	2 Hz to 20 kHz
Setting error for m < 70 %	
f_{mod} = 0.3 to 3 kHz	< 4 % ± 2 digit
f_{mod} = 0.03 to 10 kHz	< 8 % ± 2 digit
Distortion	< 2 % to 50 % AM and f_{mod} = 0.3 to 3 kHz

Test receiver

Frequency measurement

Measuring range	30 kHz to 960 MHz
Resolution	10 Hz
Input level range	
Socket RF	0.3 mW to 50 W
Socket RF DIRECT	3 to 100 mV
Measuring error	like ref. oscillator ± 10 Hz

Frequency-offset measurement

Frequency range	2 to 960 MHz
Measuring ranges	0 to ± 10 / ± 100 kHz
Resolution	1 Hz / 10 Hz
Admissible input level range with < 10 kHz offset	
Socket RF	10 µW to 50 W
Socket RF DIRECT	0.5 to 200 mV

Power measurement

Frequency range	2 to 960 MHz
Measuring range	20 mW to 50 W
Resolution	10 mW < 10 W 0.1 W ≥ 10 W
Measuring error with average indication	
f = 15 to 500 MHz	< 8 % ± 1 digit
f = 5 to 960 MHz	< 12 % ± 1 digit

FM measurement

Frequency range	2 to 960 MHz
Deviation measuring range	0 to 50 kHz
Resolution	10 Hz (Δf < 10 kHz) 100 Hz (Δf ≥ 10 kHz)
Measuring error with Δf < 10 kHz	
f_{mod} = 0.3 to 3 kHz	< 4 % ± 2 digit
f_{mod} = 0.06 to 10 kHz	< 8 % ± 2 digit
Input level range	
Socket RF	0.8 mW to 50 W
Socket RF DIRECT	5 to 200 mV
Demod output	DC to 20 kHz (– 3 dB)

Broadband FM demodulator (option)

Frequency range	2 to 960 MHz
Deviation measuring range	0 to 50 kHz
Input level range Socket RF	10 mW to 50 W
Measuring error with	
f_{mod} = 0.3 to 50 kHz	< 5 % + residual FM
f_{mod} = 50 to 100 kHz	< 9 % + residual FM
Residual FM	
f < 500 MHz	< 350 Hz peak
f ≥ 500 MHz	< 500 Hz peak
Demod output	DC to 140 kHz (– 3 dB)

ΦM measurement

Frequency range	2 to 960 MHz
Measuring range	0 to 6 rad (Δf < 50 kHz)
Resolution	0.01 rad
Measuring error with	
f_{mod} = 0.3 to 3 kHz	< 4 % ± 2 digit
f_{mod} = 0.2 to 10 kHz	< 8 % ± 2 digit
Demod output	150 Hz to 16 kHz (– 3 dB)

AM measurement

Frequency range	2 to 960 MHz
Measuring range	0 to 99 %
Resolution	0.1 %
Measuring error with	
f_{mod} = 0.3 to 3 kHz	< 4 % ± 2 digit
f_{mod} = 0.06 to 10 kHz	< 8 % ± 2 digit
Input level range	
Socket RF	0.1 mW to 50 W peak
Socket RF DIRECT	7 mV to 1 V peak
Demod output	DC to 20 kHz (– 3 dB)

Spurious-modulation measurement

Weighting	true rms
Measuring ranges for measuring error < 1 dB, referred to 3 kHz FM, 3 rad ΦM or 30 % AM	
f < 500 MHz	0 to 60 dB / CCITT-weighted
f ≥ 500 MHz	0 to 56 dB / CCITT-weighted
f < 500 MHz	0 to 48 dB / 0.03 to 30 kHz
f ≥ 500 MHz	0 to 44 dB / 0.03 to 30 kHz
Admissible input level	
Socket RF	> 10 mW
Socket RF DIRECT	> 20 mV

Adjacent-channel power measurement (option)

Frequency range	10.5 to 960 MHz
Input level range	
Socket RF	1 mW to 50 W
Socket RF DIRECT	20 to 200 mV
Measuring range for adjacent-channel power	
f < 499 MHz	– 18 to – 80 dBc
f ≥ 499 MHz	– 18 to – 76 dBc usable from – 15 dBc
Channel spacings	10 / 12.5 / 20 / 25 kHz
Measuring error	< 3 dB

Harmonics measurement	0 to – 70 dBc
Measuring error	< 3 dB to – 60 dBc
Spurious-signal measurement	0 to – 80 dBc
Measuring error	< 2 dB for – 35 to – 75 dBc and carrier offset 50 kHz to 20 MHz
Measuring range for selective level measurement	
Socket RF	– 70 to + 47 dBm
Socket RF DIRECT	– 105 to + 0 dBm
Measuring error	< 4 dB / < 600 MHz
Measuring bandwidth	approx. 3 kHz

Duplex FM/PhM demodulator (option)

Frequency range	27 to 960 MHz
FM measuring range	0 to 20 kHz
Resolution	10 / 100 Hz
ΦM measuring range	0 to 6 rad (f_{mod} x rad ≤ 20 kHz)
Resolution	0.01 rad
f_{mod}	0.2 to 20 kHz
Measuring error (f_{mod} = 0.3 to 3 kHz, P_{in} = 0.5 to 50 W):	
FM	< 5 % + residual FM ± 2 digit
ΦM	< 6 % + residual FM ± 2 digit
Residual FM, CCITT-weighted, rms	
FM	
f ≤ 500 MHz	< 10 Hz
f > 500 MHz	< 2 Hz / 100 MHz
ΦM	
f ≤ 500 MHz	< 0.02 rad
f > 500 MHz	< 0.01 rad / 100 MHz
Squelch threshold	
f ≥ 200 MHz	> 10 mW

General data

Variable modulation generator

Frequency range	30 Hz to 30 kHz
Resolution	0.1 Hz (f < 300 Hz) 1 Hz (f < 3 kHz) 10 Hz (f ≥ 3 kHz)
Fixed frequencies	0.15 / 0.3 / 0.4 / 1 / 1.25 / 2.7 / 3 / 6 kHz
Frequency error	< 0.01 %
EMF range	0.1 mV to 5 V
Load resistance	> 200 Ω
Level resolution	0.1 mV (V = < 0.1 V) 1 mV (V = < 1 V) 10 mV (V = ≥ 1 V
EMF error	< 4 % ± 1 digit (f_{mod} = 0.3 to 3 kHz)
Distortion	< 1 % at f > 50 Hz
Source resistance	< 5 Ω (f =0.3 to 3 kHz) floating or 600 Ω ± 5 %

1 kHz modulation generator

Frequency error	< 0.1 Hz
Distortion	< 0.2 %

AF superposition

Variable modulation generator + 1 kHz modulation generator + external modulation signal

Sum voltage	max. 15 V_{pp}

AF voltmeter

Frequency range	30 Hz to 30 kHz or CCITT-P53-weighted
Measuring range	0.2 mV to 30 V unbalanced 10 V max. balanced
Resolution	0.1 mV (V < 0.1 V) 1 mV (V < 1 V) 10 mV (V < 10 V) 100 mV (V ≥ 10 V)
Measuring error	
f = 0.3 to 3 kHz	< 5 % ± 1 digit
f = 50 Hz to 20 kHz	< 8 % ± 1 digit
Input resistance	100 kΩ ± 10 % or 600 Ω ± 4 % floating or grounded

Distortion meter

Measuring frequency	1 kHz ± 5 Hz
Measuring range	0 to 99 %
Resolution	0.1 %
Measuring error k = 1 to 90 %	< 5 % ± 3 digit
Input level	0.1 to 30 V

SINAD meter

Measuring range	1 to 46 dB
Resolution	0.1 dB (SINAD < 30 dB) 0.5 dB (SINAD ≥ 30 dB)
Measuring error	< 0.8 dB ± 1 digit
Input level	0.1 to 30 V

AF counter

Frequency range	30 Hz to 30 kHz
Resolution	0.1 Hz (f < 300 Hz) 1 Hz (f < 9700 (9999) Hz) 10 Hz (f ≥ 9700 (10000) Hz)
Measuring error	< 0.01 % ± 1 digit
Admissible input level	5 mV to 30 V

DC voltmeter

Measuring range	0 to ± 50 V
Resolution	10 mV (V < 10 V) 100 mV (V ≥ 10 V)
Measuring error	< 5 % ± 1 digit
Input resistance	> 100 kΩ

DC ammeter

Measuring range	0 to ± 15 A
Resolution	1 mA (I < 2 A) 10 mA (I ≥ 2 A)
Measuring error	< 4 % ± 5 mA
Shunt resistance	10 mΩ

SSB stage (option)

TX measurements

Frequency range	2 to 960 MHz
RF power measurement	0.1 W to 50 W (average and peak)
Measuring error	like with standard instrument
Preselectable intermodulation	25 to 40 dB
Test frequencies (AF)	0.7 / 1.7 kHz or 1.1 / 1.7 kHz
Frequency offset	± 50 kHz
Residual FM measurement	like "FM measurement" (page 6)
AF bandwidth	10 Hz to 30 kHz
Carrier suppression	0 to 60 dB (f = 0 to 15 kHz)
Measuring error	± 2 dB (0 to 40 dB)
SB suppression	0 to 60 dB (f = 0 to 15 kHz)

RX measurements

SSB modulation	0 to 30 kHz
Resolution	10 Hz
Frequency accuracy	like reference oscillator
Intermodulation measuring ranges	0 to 50 dB 0 to 60 dB (0 dBm / 600 Ω)
Measuring error	± 2 dB
Testable sensitivity	to 10 dB SINAD
Measuring error	< 0.8 dB ± 1 digit
Offset range	1 kHz (f = 1 kHz)
max. RF level	
Socket RF DIRECT	+ 13 dBm
Socket RF	– 7 dBm
max. RF level for intermodulations measurements	
Socket RF DIRECT	+ 7 dBm
Socket RF	– 13 dBm

Selective call testing

Encoder, decoder and acknowledgement call testing. Tone sequences with up to 8 tones

Call systems	ZVEI1, ZVEI2, CCIR, VDEW, EURO, NATEL and a free programmable tone sequence
Frequency error	< 0.01 %
Distortion	< 1 %
Frequency offset	0 to ± 9.9 %
Tone duration	20 to 999 ms
Pause duration	0 to 99 ms
Decoder bandwidth	± 0.1 to ± 9.9 %

IEEE-bus interface

Standard	IEEE 488
Connector	24-way
Functions	AH1, SH1, L2, T1, SR1, RL1, DC1

Control interface 236 041 (option)

16 on-off relays and 16 switchover relays

VSWR test probe (option)

Frequency range	25 to 500 MHz
VSWR measuring range	1.00 to 9.99
Measuring error	< (VSWR – 0.9)/3
Impedance	50 Ω (VSWR < 1.07)
Forward power	50 mW to 50 W
Connecting cable	6 m

Power supply, dimensions, weight

AC mains	97 to 140 V and 180 to 260 V 47 to 450 Hz, approx. 120 VA
DC Supply	11 to 32 V, approx. 85 W
Operating temperature	+ 5 to + 45 °C
Storage temperature	– 25 to + 70 °C
W x H x D	443 x 264 x 374 mm
Weight	approx. 21 kg (46 lb)

STABILOCK 4040

Frequency Range Extension 222 040 (option)

Specifications

RECEIVER MEASUREMENT

Carrier Frequency	
Frequency range	960...1850 MHz
Resolution	20 Hz
Accuracy	as Reference Oscillator
Output Level	
EMF (FM, ØM only)	
at RF socket	-26 dBm ≙22.4 mV EMF
at RF DIRECT	-6 dBm ≙ 224 mV EMF
Level resolution	0.1 dB
EMF error	
at socket RF	±3 dB (960 ...1850 MHz)
at RF DIRECT	±3.5 dB
Impedance	50 Ω
VSWR	<1.3 (Bu RF)
Interruption free setting range	+6 dB...-12 dB
Spectral Purity	
Phase noise	-120 dBc/Hz typically 25 kHz off carrier
Spurious signals at 0.01...30 MHz	
off carrier	<-65 dBc
Harmonics	<-25 dBc
Subharmonics f/2, 3f/2	<-35 dBc
Residual FM in a 50 Hz to 3 kHz bandwidth	≤6 Hz eff
FM	
Range	0...20 kHz
Resolution	20 Hz, Δf <4 kHz 200 Hz, Δf ≥4 kHz
Modulation frequency	
internal	30 Hz...30 kHz
external	2 Hz...140 kHz (-3 dB)
Error with Δf <20 kHz and	
fmod 0.3...3 kHz	<4 % ±2 digit
fmod 0.03...30 kHz	<8 % ±2 digit
Distortion	<2 % at Δf <10 kHz and fmod 0.3...3 kHz

Wide Band FM

Maximum frequency deviation	0...80 kHz

ØM

Range	0...6 rad
Resolution	0.02 rad
Modulation frequency internal and external	100 Hz...16 kHz (fmod x rad <40 kHz)
Error	<4 % ±2 digit (0.3...3 kHz fmod)
Freq. response	-3 dB (100 Hz...16 kHz)
Distortion	<1 % (0.3...3 kHz fmod)

TRANSMITTER MEASUREMENT

Frequency Offset Measurement

Frequency range	960...1850 MHz
Measuring range	0...±10 kHz/0...±100 kHz
Resolution	1 Hz/10 Hz
Input level range with <10 kHz offset	
at socket RF	>0 dB
at RF DIRECT	>-20 dBm

Power Measurement

Frequency range	960...1850 MHz
Measuring range	20 mW...50 W
Resolution	10 mW <10 W
	100 mW ≥10 W
Accuracy with average indication	
0.96...1.86 GHz	<20 % ±1 digit and input = 0.1...10 W

FM/ØM Measurement

Input level range	
at RF socket	50 mW...50 W
at RF DIRECT socket	20 mV...500 mV

Spurious Modulation Measurement

relative to 3 kHz FM	
CCITT weighted	0 - 50 dB
Input level range	
at RF socket	50 mW...50 W
at RF DIRECT socket	>40 mW

RESTRICTIONS

Not possible above 960 MHz:
Measurement of AM, selective level (adjacent channel power, harmonics, spurious signals) and TX frequency.
Measurement of TX frequency offset is possible.

In the extended frequency range (>960 MHz) the 4040 is operated in the same way as in the basic frequency range.

One must simply observe the restriction stated in the technical data.

Because of the doubler function there is frequency resolution of 20 Hz in the frequency range >960 MHz instead of 10 Hz as in the basic frequency range. Although frequencies can be entered with 10 Hz resolution, only output frequencies with even-numbered resolution (00, 20, 40, 60, 80 Hz) are possible. For odd-numbered entries the next even-numbered value down becomes effective.

In the frequency range >960 MHz the modulation sensitivity is twice as high as in the basic frequency range.

Modulation sensitivity on the EXT MOD input (600 Ω):

0.1 V peak = 5.0 kHz FM or 2.00 rad ΦM.

The modulation display ◇5◇ shows the set value.