HAMEG® Instruments

MERaTEST Meracie a testovacie prístroje

HM 8135

RF Synthesizer 1Hz – 3 GHz

- **Wide frequency range : 1 Hz to 3 GHz**
- **Output level from –144 dBm to +13 dBm**
- **High frequency precision : ± 1 . 10^{-8} as standard**
- **Modulations : AM, FM, Pulse, ΦM, FSK, PSK**
- **Fast pulse modulation (200ns) as standard**
- **RS232/USB Interface as standard, GPIB optional**
- **Internal modulation generator 10 Hz to 300 kHz**
- **High spectral purity: <-95 dBc/Hz at 1 kHz offset from carrier at 1GHz, harmonics < -35 dBc**
- **30 dB Electronic attenuator for a wide glitches level range.**

Detailed features :

Frequency

Range	1 Hz ti 3000 MHz
Resolution	1 Hz
Switching time :	< 10ms

10 MHz Reference :

Stability (0 to +50°C) :	≤ ± $1x10^{-8}$
Aging :	≤ ±5.10^{-8} / yr

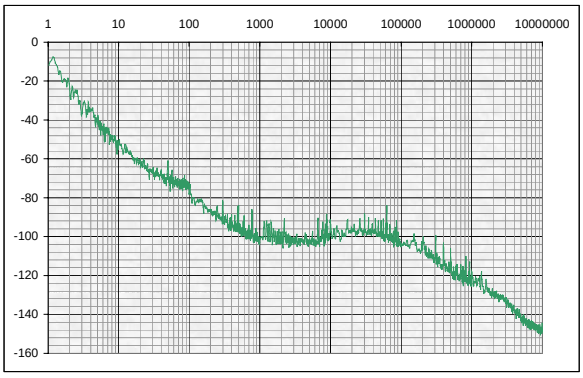
Int ref output on back panel :	
Level :	TTL
Ext ref input on back panel :	
Level :	> 0 dBm

Spectral purity
(without modulation)

Harmonics :	≤ -40 dBc
No harmonics : (at > 15kHz from carrier)	≤ -60 dBc

Phase noise :(at 20 kHz from carrier)

<16 MHz	≤ -130 dBc/Hz
16-250 MHz	≤ -95 dBc/Hz
250-500 MHz	≤ -107 dBc/Hz
500-1000 MHz	≤ -101 dBc/Hz
1000-2000 MHz	≤ -95 dBc/Hz
2000-3000 MHz	≤ -90 dBc/Hz



(Typical phase noise at 1GHz)

Output level

Range : -144 to +13 dBm
Resolution : 0.1 dB
Precision : ≤ ± 0.5 dB
(For level > -57 dBm)
Impedance : 50 Ω
VSWR : ≤ 1 :1.5

Modulation Source

Internal : 10Hz to 300kHz sinus
10Hz to 100kHz square, triangle, ramp
Resolution : 10 Hz
External : Input on front panel
Impedance : 10 kΩ, <50 pF
Input level : 2 Vpp for full scale
Coupling : AC or DC
Output : Front panel, 1kΩ
Output level : 2 Vpp

Amplitude Modulation

(Level ≤ +7 dBm)

Modulation source: internal, external
Modulation rate : 0 to 100%
Resolution : 0.1 %
Precision : ± 4% displayed rate ± 0.5%
(taux ≤ 90%, Fmod ≤ 1kHz)
Ext frequency response : (to –1dB)
10 Hz – 300 kHz AC coupling
Distortion rate : < 2% (rate ≤ 60% to 1kHz)
<6% (rate ≤ 80% and level +7dBm from 10Hz to 100 kHz)

Frequency modulation

Modulation source: internal, external
Deviation : ± 200Hz to 400kHz*
(* :according to frequency band)
Resolution : 100 Hz
Precision : ± 5% + FM residual
Ext frequency response : (to –1 dB)
DC Coupling : 0 to 300 kHz
AC Coupling : 10 Hz to 300kHz
Distortion : < 3% for deviation ≥ 10 kHz

Phase modulation

Modulation source: internal, external
Deviation : 0 to 3.14 rad (< 16 MHz)
0 to 10 rad (> 16 MHz)
Resolution : 0.01 rad
Precision : ± 5% to 1kHz + residual PM
Ext frequency response : (to –1 dB)
DC Coupling : 0 to 300 kHz
AC Coupling : 10 Hz to 300 kHz
Analog PM: DC – 100 kHz
Distortion rate : < 3% for mod=1kHz, dev.=10rad

FSK Modulation

Range : 16 to 3000 MHz
Mode : 2 FSK levels
Data source: external
Max rate : 10 kbit/s
Shift (F1-F0): 0 to 10 MHz
Resolution : 100 Hz
Precision : see FM

PSK Modulation

Mode : 2 PSK levels
Data rate : external
Max rate : 10 kbit/s
Shift (Φ1-Φ0): 0 to ±3.14 rad (< 20 MHz)
0 to ±10 rad (> 20 MHz)
Resolution : 0.01 rad
Precision : see PM

PULSE Modulation

Source : external
Dynamic range : > 60 dB
Rise/fall time: < 200 ns
Delay : < 100 ns
Max frequency : 2.5 MHz
Input level : TTL

Frequency sweep :

Range : 1 Hz to 3000 MHz
Depth : 500 Hz to 3000 MHz
Nber of pts : 10 to 500
Mode : free, single, manual
Trigger : internal, external
Time/step: 1ms to 1s
Resolution : 1ms

Protection

The synthesiser is protected against reverse power applied on RF output up to 50W for a 50 Ω source and against any DC source up to ± 50V. The protection disconnects the output until manually rearmed by operator.

Miscellaneous

Remote control : serial RS232 9pts
Option : optocoupled RS232 25 pts
optocoupled IEEE-488 Bus
USB Interface type B
IEEE-488 bus equipment: (T6),(L4), SH1, AH1, RL1, DC1, DT0 et SR0
Configuration memories: 10
Operating temperature: 0°C to +50°C
Warm-up time : 30 min
Dimensions : 390x290x85 mm
Weight : <7 kg
Power consumption : around 40 VA
Humidity : 10 % - 90 % without condensation
Power supply : 115/230 V ± 10%, 50/60 Hz
Elec. Security : Class I (IEC 1010-1 / VDE 0411)