H5M noise figure analyzers

Features

— Operating frequency range from 10 MHz to 4/20 GHz

— Noise figure and transmission coefficient measurement

— Measurements of frequency conversion devices with fixed and external heterodyne

— Built-in temperature-stabilized preselector

— High-speed measurements

— External converters provide extended operating frequency range up to 50 GHz

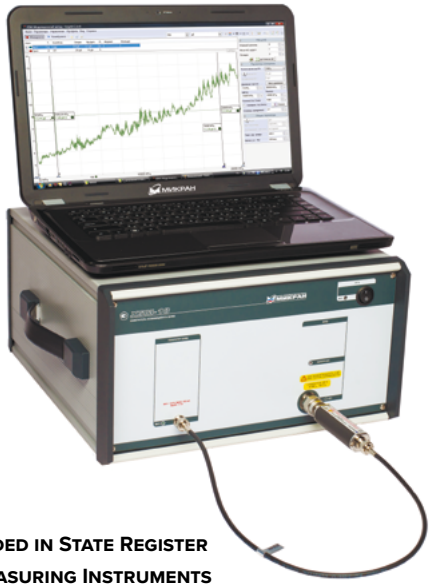
Description

H5M noise figure analyzers (IKSH) are designed to measure noise figure and transmission coefficient of receiving-amplifying devices. H5M operation principle is based on comparison of measured noise with noise of known intensity, generated by measuring noise generator (NG) characterized by excessive relative noise temperature (ERNT). Measurement is preceded by calibration to determine the characteristics of IKSH receive path, required for precise calculation of gain and noise figure of a measured device.

H5M noise figure analyzers include two device types that differ in operating frequency range:

- H5M-04: 10 MHz to 4 GHz;
- H5M-18: 50 MHz to 20 GHz;

H5M is controlled by external PC with Graphit H5M software installed. The device and PC are communicating via Ethernet. Multi-channel synchronization system provides joint operation of H5M series IKSH and other devices. Control of H5M with SCPI commands provides integration of the device with automated instrumentation systems. Depending on combination of hardware options, the noise figure analyzers are subdivided into versions. You may add hardware options to the selected version of the device, which provides extension of device functionality.



INCLUDED IN STATE REGISTER OF MEASURING INSTRUMENTS

Features and options

Output microwave connector type

The following options of H5M define the type of input microwave connector of measurement module:

- 11R option — type N connector (female);
- 13N option — 3.5 mm NMD connector (male).

Built-in controlled attenuator (ATA/70 option)

ATA/70 is a hardware option. Device input is fitted with 0 ... 70 dB electromechanical step attenuator with (10 dB step), which provides measurement of parameters of broadband amplifiers and converters with high gain.

Built-in power adapter (APA option)

APA is a hardware option. Analyzer input is fitted with power adapter that supplies voltage up to ± 20 V and current up to 500 mA to the analyzed amplifiers and converters via coaxial input connector of IKSH, central conductor of coaxial path.

Software capabilities

Graphit H5M software provides the following advantages:

- user-friendly interface;
- flexible reporting system;
- ERNT calibration of noise generator;

- saving/downloading profiles for measuring circuits;
- formula editor for complicated mathematical operations;

Specifications

Operating frequency range		
H5M-04	10 MHz ... 4 GHz	
H5M-18		
with 11R option	50 MHz ... 18 GHz	
with 13N option	50 MHz ... 20 GHz	
Maximum allowable relative frequency setting error	± 2 × 10^{-5}	
Nominal passbands at −3 dB	100 kHz, 300 kHz, 1 MHz , 3 MHz	
Transmission coefficient measurement range	−20 ... 30 dB	
Noise figure measurement range		
for noise generator ERNT from 4 to 7 dB	0 ... 15 dB	
for noise generator ERNT from 12 to 17 dB	0 ... 24 dB	
for noise generator ERNT from 20 to 22 dB	0 ... 30 dB	
Inherent noise figure, max	**Guaranteed value**	**Typical value**
H5M-04		
10 MHz to 4 GHz	8 dB	6 dB
H5M-18		
10 to 50 MHz	—	13 dB
50 MHz to 3.2 GHz	9 dB	5 dB
3.2 to 16 GHz	8 dB	5 dB
16 to 18 GHz	11 dB	5 dB
18 to 20 GHz	14 dB	6 dB
Inherent noise figure for ATA/70 and/or APA option, max		
H5M-04		
10 MHz to 4 GHz	10 dB	7 dB
H5M-18		
50 MHz to 3.2 GHz	10 dB	6 dB
3.2 to 16 GHz	12 dB	7 dB
16 to 18 GHz	12 dB	7 dB
18 to 20 GHz	14 dB	8 dB
Maximum allowable absolute systematic noise figure measurement error	± 0.1 dB	
ERNT calibration error of noise generator	± 0.1 dB	
Maximum allowable root-mean-square deviation of random error of inherent noise figure measurement[1]	0.06 dB	
Maximum allowable absolute systematic transmission coefficient measurement error	± 0.15 dB	
Maximum allowable root-mean-square deviation of random transmission coefficient measurement error[2]	0.06 dB	
Attenuation range of high-frequency attenuator with 10 dB step for ATA/70 option	0 ... 70 dB	
Rated input impedance	50 Ohm	
Maximum operating power at microwave input for 0 dB high-frequency attenuator, min	−30 dBm	
Microwave input VSWR, max		
10 MHz to 4 GHz	1.8	1.5
H5M-18		
10 to 50 MHz	2.8	2.0
50 MHz to 3.2 GHz	1.8	1.4
3.2 to 16 GHz	1.8	1.4
16 to 18 GHz	2.0	1.3
18 to 20 GHz	2.7	1.5

[1] For averaging degree of 18 and selective filter bandwidth of 3 MHz.

[2] For averaging degree of 13 and selective filter bandwidth of 3 MHz.

Ordering information

Basic supply set	
Noise figure analyzer	
Noise figure analyzer supply set	
1) Noise figure analyzer H5M-04/18. 2) Ethernet cable. 3) Power cable. 4) Graphit H5M software. 5) Operational documentation. 6) Carrying case. 7) Calibration certificate. 8) Power cable for noise generator.	
Versions	
H5M-04/1	Noise figure analyzer, 0.01 ... 4 GHz with 11R option
H5M-04/2	Noise figure analyzer, 0.01 ... 4 GHz with 11R and ATA options
H5M-04/3	Noise figure analyzer, 0.01 ... 4 GHz with 11R and APA options
H5M-04/4	Noise figure analyzer, 0.01 ... 4 GHz with 11R, APA and ATA options
H5M-18/1	Noise figure analyzer, 0.01 ... 18 GHz with 11R option
H5M-18/2	Noise figure analyzer, 0.01 ... 18 GHz with 11R and ATA/70 options
H5M-18/3	Noise figure analyzer, 0.01 ... 18 GHz with 11R and APA options
H5M-18/4	Noise figure analyzer, 0.01 ... 18 GHz with 11R, APA and ATA/70 options
H5M-18/5	Noise figure analyzer, 0.01 ... 20 GHz with 13N option
H5M-18/6	Noise figure analyzer, 0.01 ... 20 GHz with 13N and ATA/70 options
H5M-18/7	Noise figure analyzer, 0.01 ... 20 GHz with 13N and APA options
H5M-18/8	Noise figure analyzer, 0.01 ... 20 GHz with 13N, APA and ATA/70 options

Ordering example

- Noise figure analyzer H5M-18/8 — 1 pcs.
- Control and data display device PKU-11 — 1 pcs.