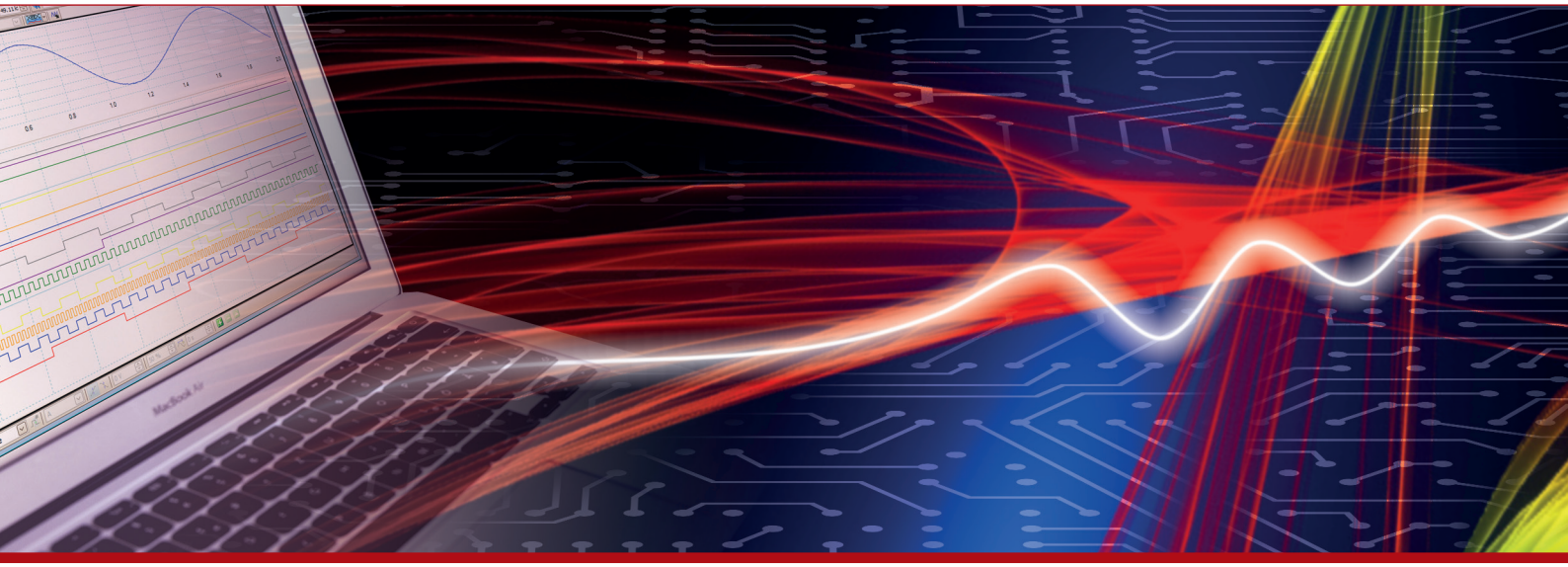
Product Datasheet - Technical Specifications



More information in our Web-Shop at ▸ **www.meilhaus.com** and in our download section.

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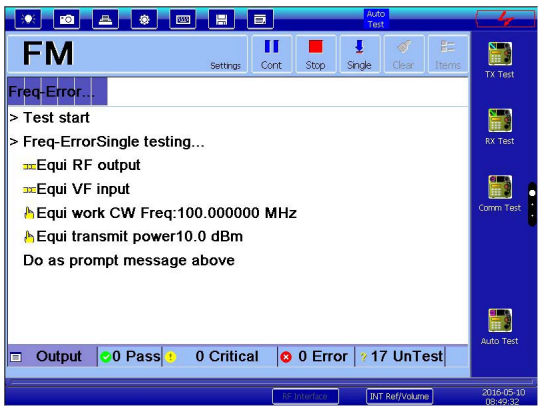
Product Overview

The 4945 Series Radio Communications Test Set, which is a multifunctional and portable model based on software radio architecture, integrates plentiful functions, like frequency-hopping signal generation and analysis, vector signal generation and demodulation analysis, analog modulation signal generation and demodulation analysis, audio signal generation and analysis, audio oscilloscope, automatic testing and so on.

The tester is capable of major performance testes on transmit and receiving of radio communication equipment, measurement and analysis on feature parameters of RF, modulation, audio, and digit etc. Wide applications of the tester cover R&D, production, verification, maintenance and repair, and testing on radio communication equipment, including short-wave/ultra short-wave radio stations, data link systems, communication and surveillance satellites, radio relay equipment. Military mobile carriers with radio communication terminals like communication vehicles, surveillance vehicles, vessels and ships, as well as external field tests can use this tester conveniently.

- Multiple RF testing functions: sweep spectrum analysis, broadband and narrow band power measurement, frequency error measurement, RF signal source.
- Analog standard communication testing: AM, FM, SSB signal generation and demodulation analysis. Equipped with graphic display of demodulation audio, SINAD, SNR, distortion degree, modulation rate and other measurement functions. The built-in speaker outputs demodulation voice in real-time. Modulation signal generator and modulation source support external audio and microphone.
- Digital standard communication testing (option): 10MHz bandwidth digital vector signal generation and analysis, bit error rate measurement, with real-time output interface of digital demodulation.
- Frequency-hopping testing (option): 60MHz transient bandwidth frequency-hopping signal generation and analysis. Frequency-hopping analysis supports measurements types like waterfall chart and frequency-time. Single capture lasts 1.3s at the bandwidth of 60MHz and the time resolution is 10ns.
- Audio signal testing: audio signal generation and analysis, the max. audio input level reaches 30Vrms (high impedance), the max. audio output level reaches 7Vrms (high impedance); capable of measurements on frequency, level, SINAD, SNR and distortion degree; audio generation supports dual-tone output; individual adjustment is ailable for dual-tone frequency and amplitude, phase is adjustable relatively.
- Dual-channel oscilloscope (option): DC...4MHz.
- Auto testing software: on-line editing of DUT (device under testing) parameters, auto pilot testing, yield of testing reports and other functions. The PTT control interface regulates transmit and receiving of DUT.
- Built-in attenuator with high power: the max. input power is as high as 150W.
- Portable structure: external dimensions (without handles): W426×H222×D180mm, easy for carry-on and application.
- Diversified power supply modes: the standard configuration supports AC220V or DC24V, built-in lithium battery is available.
- Support network interface programming control.
- 10.4" large screen, resistor touch screen, English/Chinese interface.
- Supports simultaneous operations on multi-function windows, up to 4 windows can be operated at the same time.

Auto testing functions of radio communication equipment

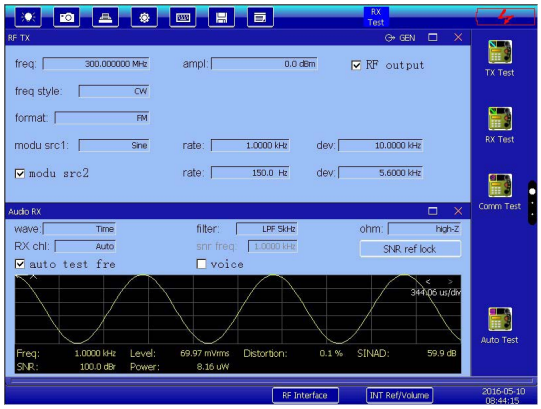


Can create and edit models, parameters and qualified specification limits of DUT. Choose your DUT and connect testing cable, the comprehensive tester will automatically conduct the testing. It controls transmit and receiving of the DUT by PTT. When the DUT needs setup or the cable needs being changed, the tester will automatically halt the testing and indicate further operation. The testing goes on after the operation is finished. Qualified and unqualified items will be listed directly. Other functions, like storage, viewing, comparison and remote readout, are also available.

Transmitter testing

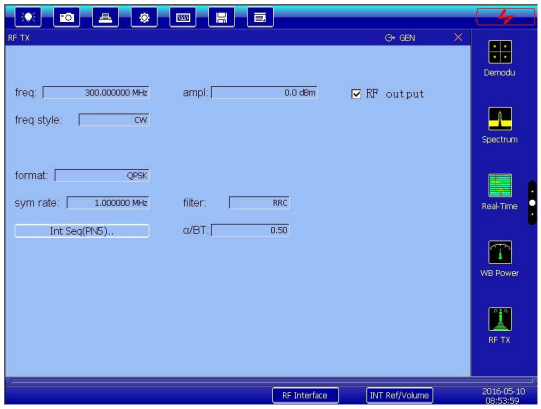
It can conduct simultaneous tests on various performance specifications of transmitters, like signal power, frequency error, signal modulation characteristics, demodulation audio, and so on. Audio signals of transmitters can be provided and single/double tones are ailable for your choice. It can simulate pilot signals.

Receiver testing



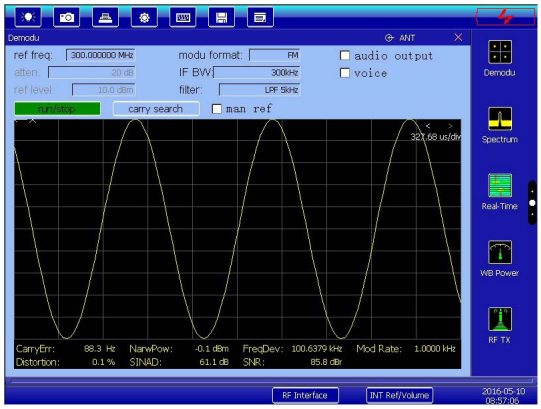
It's able to send out FM, AM and SSB RF signals; analyze audio demodulation of the receiver; measures accurately audio frequency, voltage, distortion degree, SINAD and SNR.

Function as a RF signal generator



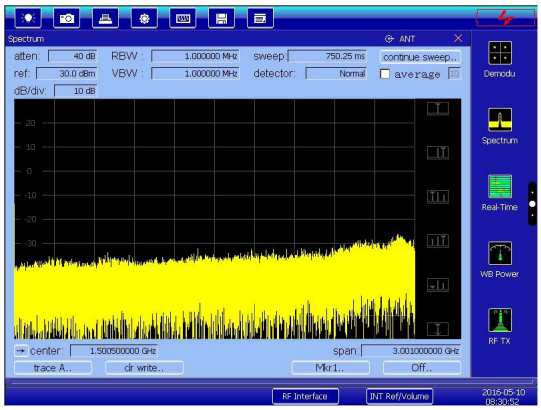
Analog modulation of FM, AM, SSB etc and digital modulation of BPSK, QPSK, 8PSK, GMSK,16QAM and so on can all be output. The max. symbol rate of digital modulation is 5MHz. The tester upholds generation of 60MHz transient bandwidth frequency-hopping signals.

RF receiving and demodulation



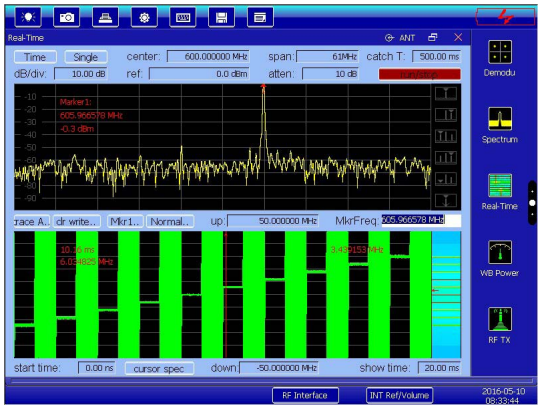
The tester is capable of demodulation and analysis of analog modulation like FM, AM, SSB etc and that of digital modulation signals including BPSK, QPSK, 8PSK, GMSK and 16QAM. Demodulation parameters and waveforms can be output. The max. demodulation bandwidth of analog modulation signals reaches 300kHz and the max. symbol rate of digital modulation and signal demodulation is 5MHz. Narrow band power measurement is available.

Sweep spectrum analysis



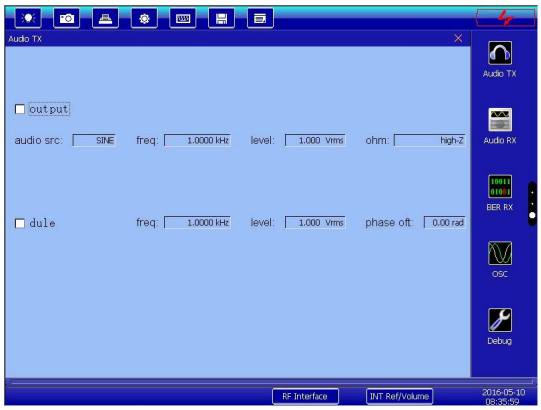
It enjoys wide frequency band, high resolution, high sensitivity, big dynamic range and other characteristics.

Frequency-hopping signal analysis



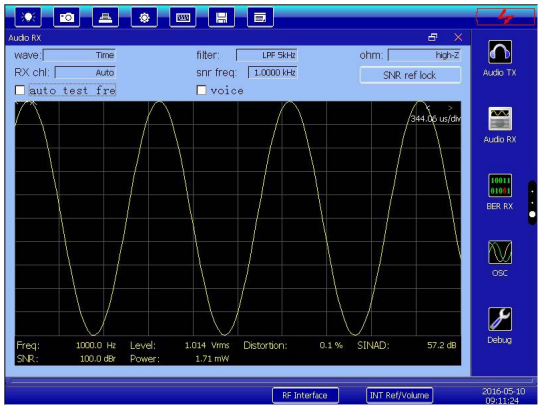
The max. transient analysis bandwidth of frequency-hopping signals is 60MHz. The display types are three-dimensional spectrum graph, time-frequency graph and time-amplitude graph. The tester can capture, store and analyze frequency-hopping signals. You can view spectrum and modulation domain graphs at any time. When modulation domain measurement is in progress, it is capable of accumulation and display of frequency points within any timeframes. Frequency-hopping points can be observed directly. Pulse signals and transient signals can also be measured.

Audio signal generation



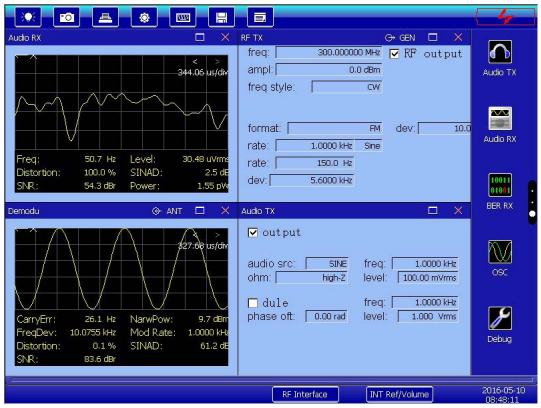
Single and double tones are ailable for your choice. The max. output level reaches 7Vrms.

Audio signal analysis



Audio filter is optional. The max. input level is up to 30Vrms. The tester supports measurements on frequency, level, distortion degree, SINAD and SNR, as well as audio waveform display.

Simultaneous operation on multiple windows



Support simultaneous operation of 4 windows at most, each window can be enlarged individually.

Specifications		
RF single generation	Frequency range	1MHz...1.05GHz (4945B,up to 100kHz), 1MHz...3GHz (4945C,up to 100kHz)
	Frequency resolution	1Hz
	Output level range	GEN: -120dBm...+5dBm (max. modulation 0dBm) T/R interface: -130dBm...-35dBm
	Level resolution	0.1dB
	Level accuracy	±1.5dB (≥-110dBm),±2.0dB (<-110dBm)
	Single sideband phase noise	-93dBc/Hz@20kHz (≤1.05GHz),-90dBc/Hz@20kHz (>1.05GHz)
	Harmonic	Better than -25dBc (>1MHz,≤0dBm)
	Non-harmonic	Better than -35dBc (>1MHz,+5dBm output)
	Internal analog modulation source	Sine, square wave, triangle, saw-tooth, dual-tone (analog pilot)
	Internal FM	Max. frequency offset: 150kHz Accuracy: ±5% (frequency offset 5kHz...150kHz) Modulation rate: 20Hz...20kHz
	Internal AM	Modulation range: 0...100% Accuracy: ±5% (relative value,depth 10%...90%) Modulation rate: 20Hz...20kHz
	Internal SSB	Modulation options: USB, LSB Modulation rate: 300Hz...5kHz
	External FM/AM/SSB	Modulation rate: 20Hz...15kHz (FM, AM), 300Hz...3kHz (SSB)
	Vector signal generation (option)	Modulation type: 2ASK, 2FSK, GMSK, BPSK, QPSK, 8PSK, 16QAM Max. modulation bandwidth: 10MHz Max. symbol rate: 5MHz Digit source: PRBS, whole 0, whole 1, 0 and 1 alternation, external digital filter: RC, RRC, GAUSS EVM: ≤2%rms (symbol rate≤1MHz), ≤3%rms (symbol rate>1MHz)
	Frequency-hopping signal generation (optional)	Max. frequency-hopping transient bandwidth: 60MHz Max. non-repetitive hopping graphic length: 4000 Frequency agility time: <10μs Max. hopping rate: 100,000 times/sec Hopping type: internal stepping repetition, external frequency control
Broadband power measurement	Frequency range	400kHz...1.05GHz (4945B), 400kHz...3GHz (4945C)
	Measurement range	0.1mW...100mW (ANT interface), 100mW...150W (T/R interface, > 40W, continuous input for a single time should not be longer than 1 min, interval between two consecutive input should not be shorter than 2 min.)
	Measurement accuracy	15% (≤120W, CW or frequency modulation)

Narrow band power management	Frequency range	300kHz...1.05GHz (4945B, low frequency depends on small IF bandwidth) 300kHz...3GHz (4945C, low frequency depends on small IF bandwidth)
	Measurement range	+51dBm...-40dBm (T/R interface, low frequency depends on small IF bandwidth) +10dBm...-80dBm (ANT interface, low frequency depends on small IF bandwidth)
	Measurement accuracy	±2dB
	Receiving bandwidth	6.25, 8.33, 10, 12.5, 25, 30, 100, 300kHz
Frequency error meter	Frequency range	300kHz ... 1.05GHz (4945B, low frequency depends on small IF bandwidth) 300kHz...3GHz (4945C, low frequency depends on small IF bandwidth)
	Accuracy	Frequency standards±1Hz
	Waveform	Sine, square wave, triangle, saw-tooth
	Signal type	Single-tone, dual-tone
	Frequency	20Hz...20kHz (sine), 20Hz...4kHz (square wave, triangle, saw-tooth)
= Audio signal generation	Frequency resolution	0.1Hz
	Level range	1mV...7Vrms (10kΩ load)
	Level accuracy	±5% (10kΩ load≥10mVrms)
	Input impedance	150Ω, 600Ω, high impedance
	Max. input level	30Vrms (high impedance)
	Audio filter	Low-pass: 300Hz, 5kHz, 15kHz, 20kHz Band-pass: 0.3...3.4kHz, 0.3...5kHz, 0.3...15kHz, 0.3...20kHz
	Frequency meter	Frequency range: 20Hz...20kHz Input level: 20mV...30Vrms Resolution: 0.1Hz Precision: 1Hz
	Level meter	Frequency range: 20Hz...20kHz Input level: 1mV...30Vrms Unit: V, dBV, dBm Precision: ±5% (High impedance, ≥10mVrms)
Audio signal analysis	SINAD meter	Measurement range: 3...60dB Precision: ±1.0dB (SINAD>3dB, ≤40dB, 5kHz low-pass) Frequency range: 300Hz...5kHz Input level: 0.1...30Vrms
	Distortion meter	Measurement range: 0...90% Precision: <±0.5% (distortion degree <10%), <±1.0% Frequency range: 300Hz...5kHz Input level: 0.1...30Vrms
	SNR meter	Measurement range: 3...60dB Precision: ±1.0dB (SNR>20dB, ≤40dB) Frequency range: 300Hz...5kHz Input level: 0.1...30Vrms

Sweep spectrum analyzer	Frequency range	100kHz...1.05GHz (4945B), 100kHz...3GHz (4945C)
	Sweep width	0Hz...whole frequency bands
	Level precision	±1.5dB
	Min. average noise level displayed	Better than-125dBm (ANT interface), -75dBm (T/R interface)
	Resolution bandwidth	30Hz...3MHz (1-3 stepping)
Demodulation and analysis of analog modulation signals	Frequency range	300kHz ... 1.05GHz (4945B, low frequency depends on small bandwidth) 300kHz...3GHz (4945C, low frequency depends on small IF bandwidth)
	Signal format	FM, AM, SSB
	Demodulation bandwidth	6.25, 8.33, 10, 12.5, 25, 30, 100, 300kHz
	Demodulation audio filter	Low-pass: 300Hz, 5kHz, 15kHz, 20kHz, Band-pass: 0.3...3.4kHz, 0.3...5kHz, 0.3...15kHz, 0.3...20kHz
	Frequency range of demodulation counter	20Hz...20kHz
	Demodulation counter resolution	0.1Hz
	FM	Frequency offset range: 0...150kHz Precision: ±5% (frequency offset range 5...150kHz, modulation rate 1kHz) Modulation rate: 20Hz...20kHz
	AM	AM depth range: 0...100% Precision: ±5% (relative value , modulation range 30% ... 90% , modulation rate 1kHz) Modulation rate: 20Hz...20kHz
Demodulation and analysis of vector signals (option)	Sensitivity	≤-100dBm (10dB SINAD, ANT interface)
	Frequency range	300kHz ... 1.05GHz (4945B, low frequency depends on small IF bandwidth), 300kHz ... 3GHz (4945C, low frequency depends on small IF bandwidth)
	Signal format	GMSK, BPSK, QPSK, 8PSK, 16QAM
	Demodulation bandwidth	10kHz...10MHz
Frequency-hopping signal analysis (option)	Max. symbol rate	5MHz
	Filter	RC, RRC, GAUSS
	Transient bandwidth	60MHz, 30MHz, 15MHz, 7.5MHz, 3.75MHz, 1.875MHz
	Capture storage depth	8Gb
	Analysis domain	Time-frequency (modulation domain), time-amplitude, time-spectrum (waterfall chart), spectrum at random time
	Min. time resolution	10ns

Dual-channel oscilloscpe	Frequency range	DC...4MHz
	Vertical scale	10mV..10V/mark..., 2, 5 stepping)
	Horizontal scale	1us...1s/mark (1, 2, 5 stepping)
	Coupling type	DC, AC
	Input impedance	1MΩ
Digital sequence generation and bit error rate measurement (option)	Digit format	PN3, PN5, PN9, PN11
	Baud rate	300bps...1Mbps (BPSK, GMSK, 2FSK, 2ASK)
	Bit error rate measurement range	0.1...0.000001
Internal time-base	Frequency: 10MHz; aging rate: 1×10-7/year; temperature stability: ±0.05ppm (0...50°C)	
Working temperature	0°C...+50°C	
Storage temperature	-40°C...+70°C	
Dimensions	External dimensions (without handles and auxiliaries): W×H×D=426×222×180mm	
Weight	Not more than 12kg	
Power	Internal AC : 220V±10%, frequency 50Hz±5%; external DC : 24V±2V (16V is acceptable) Built-in and rechargeable battery: ≥11000mAh (option)	
Consumption	<100W	
Cooling type	Internal air cooling	
Interface	RF: GEN interface (TNC), T/R interface (type N), ANT interface (TNC) BNC: audio input, audio output, oscilloscope input etc Others: network port (support remote control), 26-core testing bus interface, USB-host interface etc.	