discover...

The complete WLAN test set from Anritsu

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The new Anritsu MT8860A WLAN Test Set is dedicated to testing WLAN devices conforming to the IEEE 802.11 standards.

The new Anritsu MT8860A WLAN Test Set is designed to meet the production test requirements of all products integrating IEEE 802.11 Wireless LAN technology. MT8860A is a single box test set for both transmitter and receiver measurements. Through its highly integrated design, the MT8860A replaces the separate test instruments and Gold Radios common in current test systems. MT8860A is suitable for both production and product design proving. The user interface is implemented through the supplied LANLook software package.

The IEEE standard defines limited test modes for 802.11 devices. This has resulted in chip set developers and product manufacturers having to develop proprietary test systems for each device. MT8860A simplifies testing by offering a generic solution for all chip sets. Receiver sensitivity measurements are performed using an integrated reference radio, which makes a connection to the DUT. Packet Error Rate (PER) is calculated from the ratio of transmitted packets to received acknowledgements. Transmit levels down to -100dBm can be set.
This measurement approach offers a rapid set-up and reliable test method for receiver sensitivity measurements.

A high-speed spectral processor with 70MHz real time bandwidth performs all transmitter measurements in parallel. DUT power, frequency, carrier suppression, spectral characteristics and power profile are all measured many times faster than is possible with spectrum analyzers and power meters.

- Integrated test set for 802.11 transmitter and receiver measurements
- Calibrated receiver Packet Error Ratio (PER) measurements
- Automated sensitivity search measurements
- Spectral processor with 70MHz bandwidth
- High speed transmitter measurements
- Built-in reference radio
- Inputs for external Golden Radio and interfering signal sources
- LANLook software for instrument configuration and results display
- Advanced triggering and gating features for detailed packet analysis
- GPIB remote control

5 reasons to choose the MT8860A WLAN Test Set

1.Shorter production test times

High speed spectral processing delivers all transmitter measurements in parallel with test times up to 90% faster than spectrum analyzers and power meter based systems. A single test port for both transmitter and receiver measurements reduces the number of connections to test a device.

2.Reduced test system design time

MT8860A integrates the key test instruments into a single package. This reduces the time required to integrate separate test instruments and simplifies the design of the test program. Test programs are easier to write as LANLook provides example test routine in Visual Basic. Single GPIB commands for test configuration and results capture are possible as the MT8860A is a dedicated WLAN tester, making programs faster and easier to write.

3.Lower through life manufacturing costs

An integrated test set means only one instrument to calibrate instead of many. The test system is also easier to move within a manufacturing plant, or even between plants in differing countries. Anritsu offer a single point of technical support for all your WLAN test queries, so you no longer need to contact multiple suppliers for support.

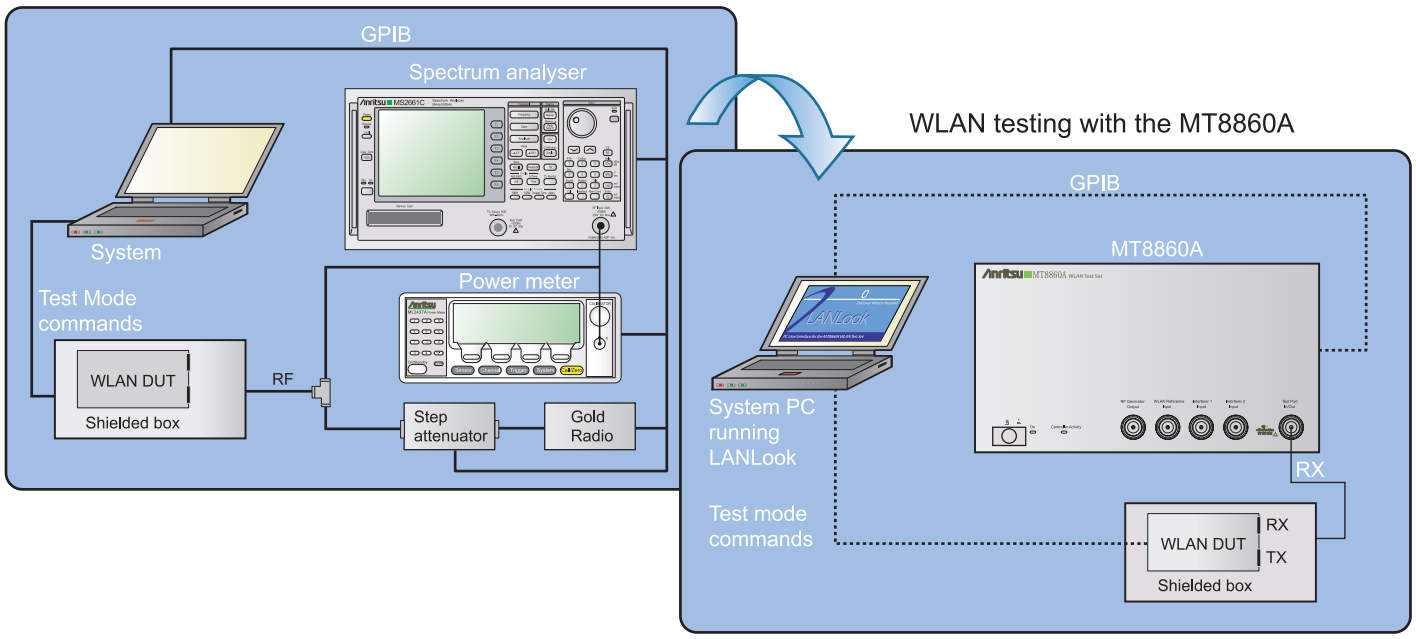
4.Increased product quality

Test systems based on an assembly of test instruments and Gold Cards are hard to maintain. Interconnecting RF cables can easily become lose and the performance of the Gold Card is likely to drift with time in an unpredictable way. Calibration of these test systems is easily invalidated by connectors becoming lose or cables being replaced. This leads to variability in measurements and uncertainty in test results. The MT8860A provides a single test port for all measurements with calibrated measurements traceable to national standards.

5.Universal solution for all chip sets

MT8860A can test all radios conforming to the supported 802.11 standards. It is no longer necessary to change the test system when products are manufactured with chip sets from differing suppliers. This reduces production set up time and increases the flexibility of manufacturing facilities.

Typical WLAN prodcution test station today



LANLook measurement software

LANLook is a PC based user interface for the MT8860A WLAN test set. LANLook is written in Visual Basic and full source code is supplied along with the executable program.

LANLook uses standard GPIB commands to configure the MT8860A test set, read back results and display results. LANLook provides a suitable interface for all standard WLAN measurements, ideal for development engineers validating the performance of a DUT. For production test engineers, LANLook can be used as the basis for a test system program. By integrating the test mode software of the DUT, full test programs can be created.

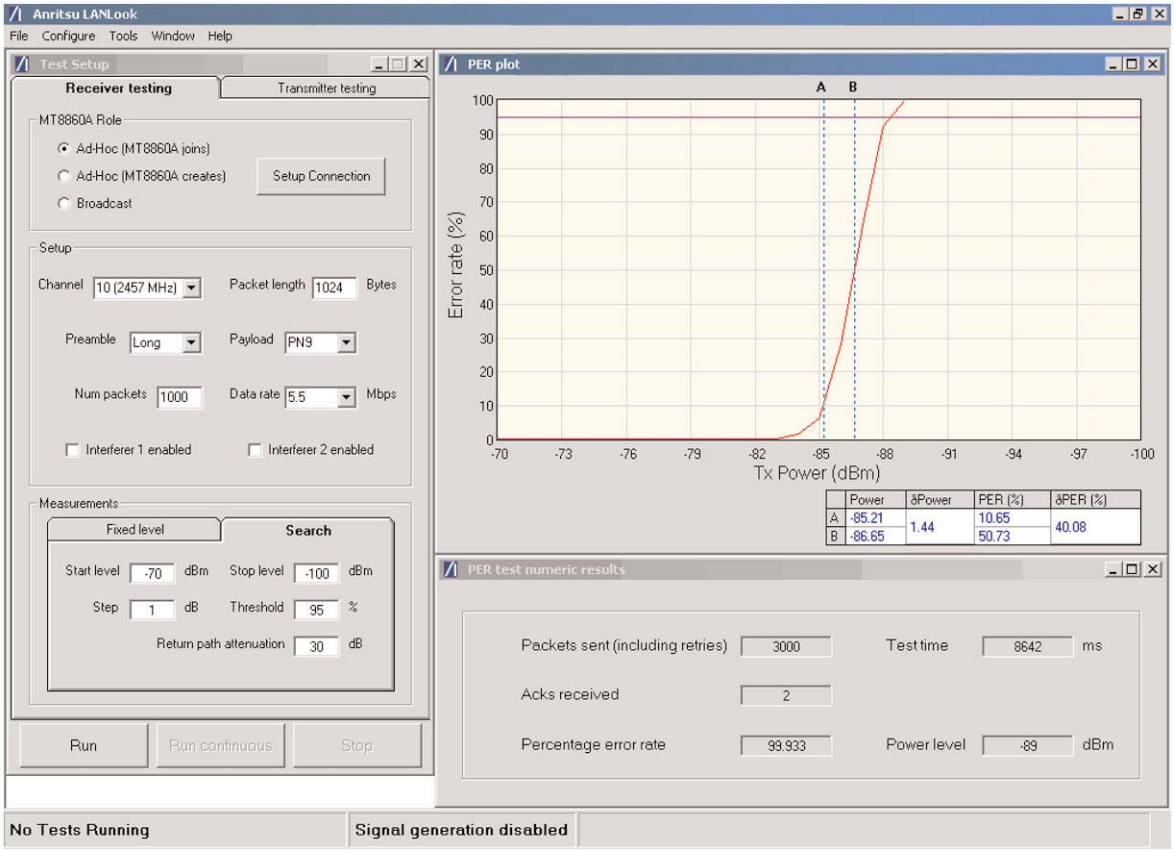
Receiver testing

MT8860A measures receiver sensitivity with a simple three-step process:

Step 1. Create an Ad-hoc connection to the DUT

Step 2. Transmit user defined packets to the DUT between 0dBm and -100dBm

Step 3. Count the number of returned Acknowledge packets and display the Packet Error Rate (PER)



The MT8860A forms an Ad-hoc network with the DUT and transmits a user-defined number of packets. The transmit signal level can be set in the range 0dBm to -100dBm. The MT8860A then counts the number of Acknowledge packets that the DUT returns to the MT8860A. The ratio of transmitted packets to received Acknowledgements gives a direct measurement of the packet error rate. Packets can be configured for: pre-amble length, payload data, data rate and packet length. No access to proprietary DUT software or test modes is necessary when using this test method.

An automatic sensitivity search routine graphically displays the PER against receiver input level. This facilitates identification of the 8% PER level, and shows how the receiver performance degrades.

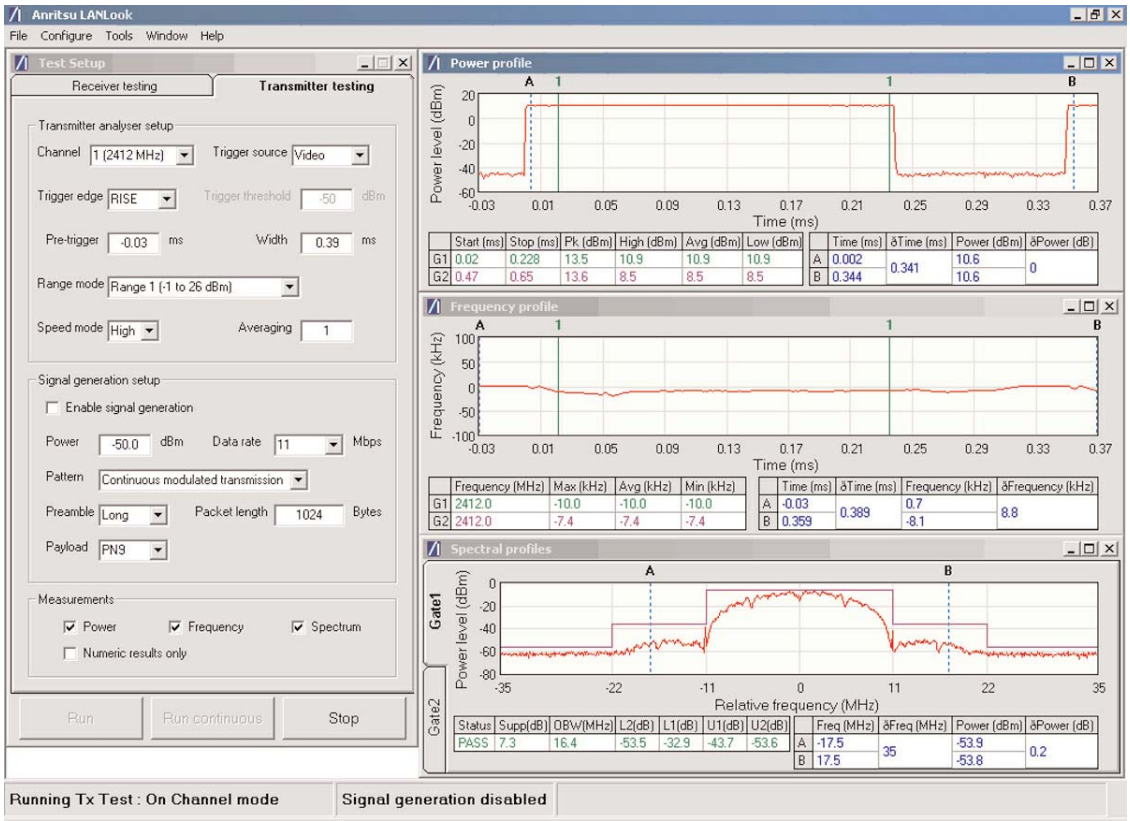
The MT8860A can alternatively be configured to broadcast packets to the DUT. With this test method, the user must read from the DUT registers the number of correctly received packets. This will require DUT specific software from the device developer.

Transmitter testing

The MT8860A's high-speed spectral processor performs standard 802.11 transmitter measurements in parallel and with high measurement speed. Transmit directly into the test port and power, frequency and spectral measurements are displayed simultaneously.

Power measurements are displayed against time. Measurement triggers initiate the capture of up to 6ms of data. Two gates can be used to measure peak and average power in any defined section of the trace. This gives the user the option of measuring power in the pre-amble and payload independently. The capture time can be set down to 10us, which gives clear displays of burst rising and falling edges.

Frequency is measured continuously during the burst capture. A graph displays frequency error against time during the measurement period. Any frequency drift during the burst is clearly visible.



Two spectrum traces are available, one for each of the gate periods defined in the power profile. The spectrum of different parts of the burst can therefore be viewed independently. A limit mask is automatically applied to the peak of the spectral trace for rapid pass/fail analysis against the IEEE standard. Two markers facilitate the measurement of relative and absolute powers and frequencies at any point on the trace. On the spectrum traces, an automatic measurement of carrier suppression is displayed.

Power, frequency and spectral data are all updated in parallel for the fastest possible device characterisation. When traces are not required, the results can be output in numeric format. This reduces the total measurement time further.

Signal source

The MT8860A reference radio can be used as a stand alone 802.11 signal source. A separate signal source output is provided. Basic measurements on amplifiers such as gain and spectral spreading due to distortion are simplified as the MT8860A can be configured for basic network measurements.

MT8860A option 12 - 802.11g measurements

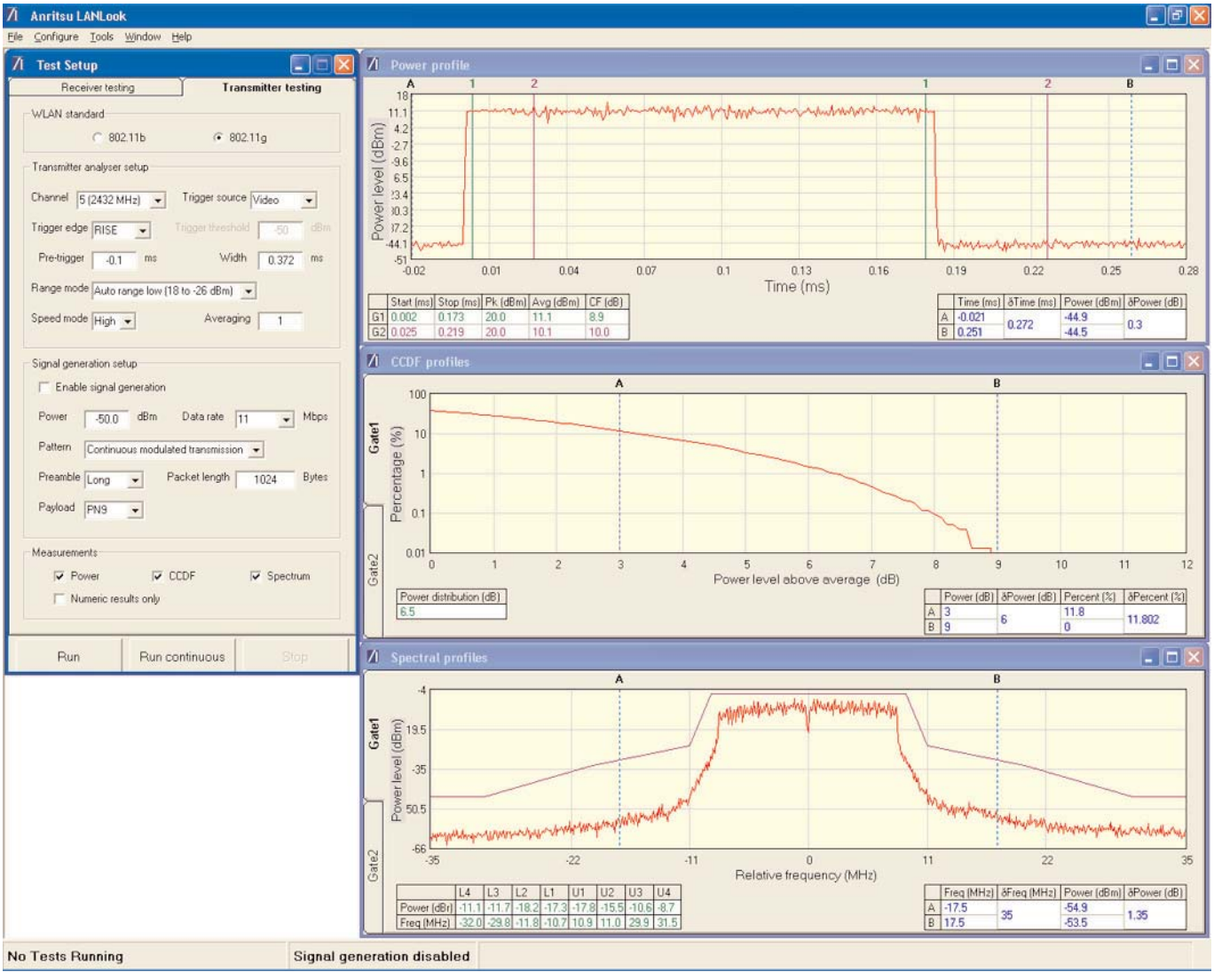
MT8860A-12 adds the 802.11g measurements of average power, peak power, crest factor, Complimentary Cumulative Distribution Factor (CCDF) and spectral mask compliance to the standard MT8860A.

MT8860A captures 802.11g signals in either continuous or bursted format. The high-speed spectral processor then performs all measurements in parallel minimising total test time. The power profile trace can be formatted to display either average power or maximum/minimum power levels. 802.11g signals have high crest factors of typically 9dB. If the device output amplifiers are saturating the power peaks, then symbol errors will occur resulting in transmission errors. The result is slower user data rates and packet retransmissions.

By viewing the power profile alongside the CCDF graph, users can quickly identify devices that are not performing to the required specification. The CCDF trace displays the percentage of samples at a given power level above the average power. When an amplifier starts to saturate, the power peaks become compressed resulting in fewer samples at the higher levels above the average.

802.11g signals implement OFDM modulation with 52 sub-carriers. This gives a spectral profile with a flat top over nominally 18MHz. MT8860A-12 displays the DUT spectrum and automatically tests to the spectral limit mask defined in the IEEE Std 802.11a-1999 spectral mask (also used for 802.11g). A table displaying pass/fail status for each mask segment is displayed.

This measurement suite delivers a fast analysis of the performance of 802.11g transmitters. The built in leveling loop and attenuator can be used with an external independent radio to perform 802.11g receiver testing if this is required at data rates greater than the 11Mbps supported in the standard MT8860A.



LANlook screen image of 802.11g measurements

Specification 802.11b Measurement Suite

Connectivity	MT8860A mode	Ad-hoc connections	
	Linking to the DUT	Active scanning	
Reference radio transmitter (at test port)	Frequency range	IEEE Std 802.11b - 1999, channels 1 to 14	
	Output power	0 dBm to -100 dBm	
	Accuracy	± 1.0 dB (0 dBm to -94 dBm, CW, 18 to 28 degrees C); ± 2.0 dB (<-94 dBm to -100dBm, CW, 18 to 28 degrees C)	
	Settable resolution	0.1 dB	
	Output impedance	50 Ohms (nominal)	
	Frequency accuracy	±20 ppm	
	Modulation	1Mbps 11-chip Barker DBPSK, 2Mbps 11-chip Barker DQPSK, 5.5Mbps CCK DQPSK, 11Mbps CCK DQPSK	
	Modulation accuracy	Typically <10% RMS EVM channels 1 to 13	
Reference radio receiver	Frequency range	IEEE Std 802.11b - 1999, channels 1 to 14	
	Maximum input	+30 dBm	
	Damage level	+35 dBm peak power	
	Input VSWR	1.5:1	
	Sensitivity	- 40 dBm (for < 0.1% PER)	
RF generator output	Frequency range	IEEE Std 802.11b - 1999, channels 1 to 14	
	Output power	0 dBm to -100 dBm	
	Accuracy	± 1.5 dB (0 dBm to -80 dBm, CW, 18 to 28 degrees C)	
	Settable resolution	0.1 dB	
	Output impedance	50 Ohms (nominal)	
	Frequency accuracy	±20 ppm	
	Modulation	1Mbps 11-chip Barker DBPSK, 2Mbps 11-chip Barker DQPSK, 5.5Mbps CCK DQPSK, 11Mbps CCK DQPSK	
	Modulation accuracy	Typically <10% RMS EVM channels 1 to 13	
Measurement Controls	Triggers	Free run	Continuous triggering
		RF edge	On rising or falling edge detected at RF input, user set trigger level
		Video	Trigger at IF, trigger level auto set
		External	TTL input, BNC on rear panel
	Gates	Two gates for power, frequency and spectrum measurements	
Measurements	Power	Definition	DUT channel Average and Peak power
		Range	+26 dBm to -60 dBm average power (+30 dBm peak)
		Accuracy	± 0.6 dB (+26 dBm to -30 dBm), ± 1.0 dB (< -30 dBm to -50 dBm)
		Resolution	0.1 dB
		Bandwidth	Selectable, 15 to 22 MHz (default 18 MHz)
	Frequency	Definition	DUT channel frequency and frequency error
		Accuracy	±1 kHz ± reference frequency oscillator error (ppm) for gate > 1 ms
		Resolution	100 Hz
	Spectral mask	Definition	Compliance to IEEE Std 802.11b - 1999 spectral mask and occupied bandwidths
		Range	+20 dBm to -40 dBm modulated carrier power
		Dynamic range	>50 dB (IEEE Std 802.11b - 1999, high speed mode, usable dynamic range)
		Flatness	±1 dB
		Linearity	± 0.8 dB (50 dB dynamic range)
		Resolution	0.1 dB
		Resolution bandwidth	Equivalent to 100 kHz Gaussian
		Frequency span	70MHz (fc ± 35 MHz)
		Noise floor	Minimum -110 dBm
	Carrier suppression	Definition	Relative level of the carrier to highest sideband, for a 10101010 test pattern
		Range	+20 dBm to -40 dBm modulated carrier power
		Dynamic range	> 50 dB (IEEE Std 802.11b - 1999, usable dynamic range)
		Flatness	±1 dB
		Linearity	± 0.8 dB (50 dB dynamic range)
		Resolution	0.1 dB
	Receiver sensitivity	Definition	Frame Error Rate (FER) at defined input level
		Number of frames	1 to 10,000 user defined
		Payload length	1024 bytes (or user defined payload length)
		Preamble	long , short
		Payload	All zeros, all ones, 1010, 0101, PN9
		Data rate	11, 5.5, 2, 1 Mbps
	Power burst profile	Definition	Display of the power in each bit of the measured frame against time.
		Range	+26 dBm to -50 dBm average frame power (+30 dBm peak)
		Dynamic range	> 50 dB
		Power accuracy	± 0.6 dB (+26 dBm to -30 dBm), ± 1.0 dB (< -30 dBm to -50 dBm)
		Resolution	0.1dB
		Time window	10µs to 5.95 ms
		Time resolution	0.1 µs

Specification 802.11g Measurement Suite - Option 12

Measurement Controls	Triggers	Free run	Continuous triggering
		RF edge	On rising or falling edge detected at RF input, user set trigger level
		Video	Trigger at IF, trigger level auto set
		External	TTL input, BNC on rear panel
	Gates	Two gates for power, frequency and spectrum measurements	
Measurements	Power	Definition	DUT channel Average, Peak and crest factor power
		Range	+18dBm to -50dBm average power (+30dBm peak)
		Accuracy	± 0.6dB (+18dBm to -30 dBm average power) ± 1.0 dB (-30 dBm to -50 dBm average power)
		Resolution	0.1 dB
		Bandwidth	Selectable, 15 to 22 MHz (default 18 MHz)
	Power burst profile	Definition	Display of the power in each bit of the measured frame against time.
		Range	Average frame power +18dBm to -50dBm (+30dBm peak)
		Dynamic range	> 40 dB
		Power accuracy	Average frame power ± 0.6 dB; >-30 dBm, ± 1.0 dB; >-50 dBm
		Resolution	0.1 dB
		Time window	10 µs to 5.95 ms
		Time resolution	0.1 µs
	CCDF	Definition	Displays cumulative distribution of the difference between instantaneous power and average power
		Format	Percentage of samples (log scale) vs dBs greater than average power
		Resolution	0.1 dB
	Spectral mask	Definition	Compliance to IEEE Std 802.11a-1999 spectral mask (also used for 802.11g) and occupied bandwidth
		Range	+18dBm to -40dBm modulated carrier power
		Dynamic range	For 802.11g signals with 8dB crest factor ± 11 MHz from F_c 30dB (typical 46dB) ± 20 MHz from F_c 40dB (typical 48dB) ± 30 MHz from F_c 43dB (typical 50dB)
		Flatness	± 1 dB
		Linearity	± 0.8 dB (46 dB dynamic range)
		Resolution	0.1 dB
		Resolution bandwidth	Equivalent to 100 kHz Gaussian
		Frequency span	70MHz (fc ± 35 MHz)
		Noise floor	Minimum -110 dBm

General Specification

Reference frequency oscillator	Frequency	10 MHz
	Ageing	<± 1 ppm / year, <± 2.5 ppm / 10 years
	Drift	<± 0.5 ppm, 0 to 45 °C
Power supply	Voltage	85 to 264 volts AC
	Frequency	47 to 63 Hz
	Power	100 VA Max
Size and weight	Dimensions	180mm x 320 mm x 350 mm
	Weight	<10 kg
Environmental	Operating temperature	+5 to +40°C
	Operating humidity	<75 % non-condensing
	Safety	Complies with BS EN 61010-1 (Equivalent to IEC 61010-1)
	EMC	Conforms to the protection requirements of EEC Council Directive 89/336/EEC
Front panel inputs and outputs	Test Port - connection to DUT or transmitter analyser input, N type (f) 50 Ohms nominal WLAN Reference Input - Input from external reference radio, N type (f), 50 Ohms nominal, typically >+12dBm required for leveling External interferer 1 - Input for external source, N type (f), 50 Ohms nominal; path loss to Test Port, 20dB nominal External interferer 2 - Input for external source, N type (f), 50 Ohms nominal; path loss to Test Port, 20dB nominal RF Signal Generator output - N type (f), 50 Ohms nominal	
Rear panel connectors	GPIB, Ethernet RJ45 (for future application), USB (for future application), RS 232 (for future application), Definable digital input 1, BNC (f), Definable digital input 2, BNC (f), Definable digital output 1, BNC (f), Definable digital output 2, BNC (f), 10 MHz reference input, 10 MHz reference output.	

ordering info

MT8860A	WLAN Test Set
	Supplied accessories Power cable CD containing :- • LANLook software • Lab View GPIB drivers for the MT8860A • Source code for LANLook • Operation manual (pdf) • Remote programming manual (pdf)
Options and accessories	
MT8860A-10	2.4 GHz WLAN antenna and adaptor.
MT8860A-12	Software option for support of 802.11g transmitter measurements.
MT8860A-98	Calibration to Z540 ISO guide 25.
MT8860A-99	Premium calibration.
B0395A	Rack mount kid.
B0331C	Front handles.
13000-00198	Manual pack containing hardcopy versions of Operation and Remote Programming manuals.

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