WSA PRODUCT SERIES BRIEF

2025-12 Rev. 1

SAGE INSTRUMENTS

Intended customers and possible applications

WSA is a Wireless Signal Analyzer series product from Sage Instruments and QB Advanced. The intended customers include the following exemplary but non-exhaustive list:

Intended customers	Possible applications
Mobile phone companies (telecom service providers or carriers)	1. Wireless network optimization (where and how to add new cell sites or adjust antenna angles and/or power etc.); 2. Objective and quantitative characterization of downlink signal coverage quality; 3. Interference (especially uplink interference) signal finding and trouble-shooting; 4. New base station installation and existing base station maintenance etc.
Telecom equipment vendors, manufacturers and installers	Verifying, trouble-shooting and characterizing all wireless communication terminals, from base stations, to Wi-Fi routers, to satellite and microwave relay transceivers and even mobile phones at different stages from design, to production, to installation and to actual field testing etc.
Infrastructure enterprise customers	Those enterprises responsible for the safe operations of airlines, airports, high-speed rails, port terminals, power and energy transmission facilities, and Low Altitude Economy drone flights etc., all need professional RF instruments to check the wireless signal integrity that's absolutely required for the safe operations of those infrastructure components.
Government agencies	1. FCC (Federal Communications Commission) or equivalent agencies that are responsible for monitoring and regulating radio spectrum usage. 2. Police and emergency service departments. 3. Public Utility agencies etc.
General purpose lab tools	Spectrum analysis, signal level and quality precision measurements for R&D, education, production and EMI/RFI emission certifications etc.

Signal intrusion detection	Anomalous wireless signal detection as a way to detect 1. illegal drone invasion; 2. illegal border crossings; 3. potential espionage activities etc.
EW (Electronic warfare) and SIGINT (signal intelligence)	Spectral monitoring and real-time analysis plus IQ data gathering with unlimited possibilities and potentials.

Product Series

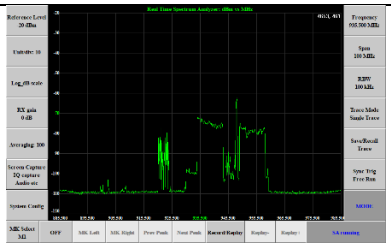
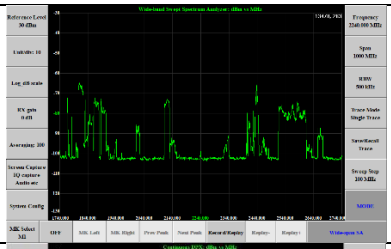
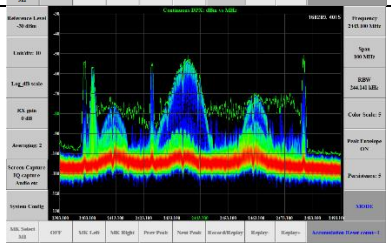
Model	Description	Weight and size	Picture
WSA-408	Complete portable instrument with built-in touch screen and battery, ideal for all application scenarios, both indoors and outdoors.	Approx. 3.5 kg 30cm X 25cm X 8cm	
WSA-308	An instrument test head that works with user PC via ethernet cable. Fanless thick-shield build ideal as a quiet lab instrument, 4G/5G drive test scanner, or permanently installed in the field and operated remotely via a simple 4G-modem backed “thin” network connection. Requires a simple 12V/2A DC power supply only.	Approx. 1.5 kg 20cm X 10cm X 5cm	

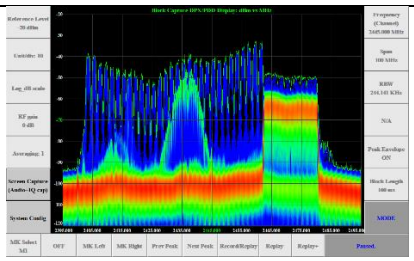
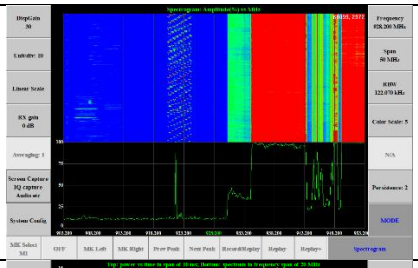
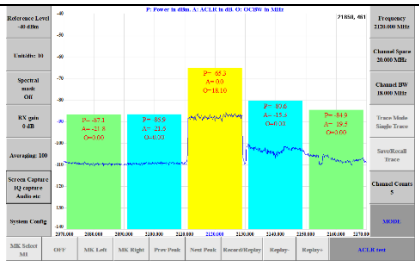
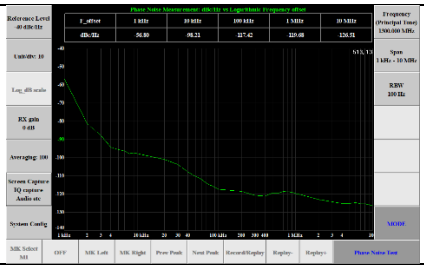
WSA-308B	WSA-308 along with battery in a backpack connected to a tablet PC mounted on a directional antenna, designed for easy interference signal source locating in the field on foot.	Approx. Backpack: 3 kg 30cm X 20cm X 5cm Directional antenna and touch screen: 1.5 kg 30cm X 20cm X 10cm	
WSA-208	A bare minimum version of WSA-308 with thin light shield designed to be integrated into other systems as an embedded high-end radio receiver	Approx. 0.45 kg 15cm X 15cm X 1cm	
WSA-508 and UAV-WSA-508	A WSA-208 integrated with a multi-directional-antenna set through electronic RF switch plus electronic compass for rapid Signal Direction Finding. This can be mounted on a drone, a car, a tripod, a ship or a robotic dog etc. Coupled with geographic map information, this is an ideal automatic signal detection and direction-finding system product.	Approx. Total size and weight depend on antenna configurations. Generally: 3 kg 30cm X 30cm X 30cm	 

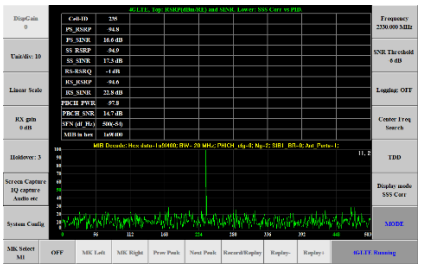
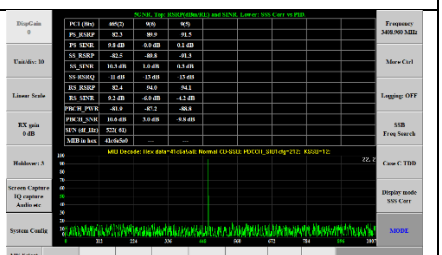
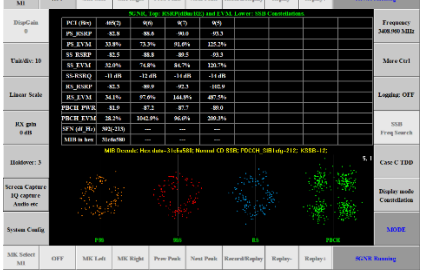
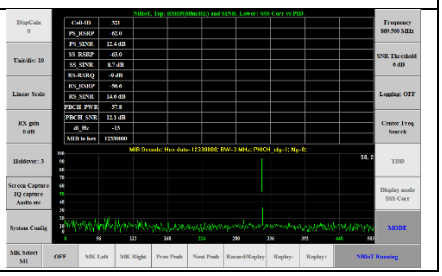
Key performance specifications

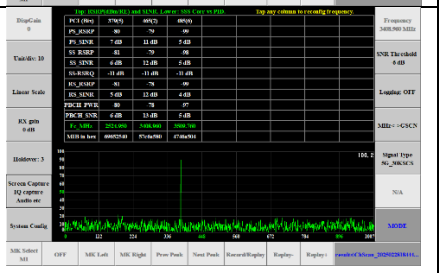
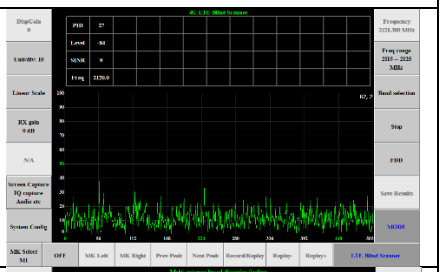
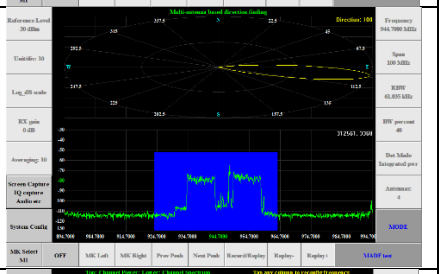
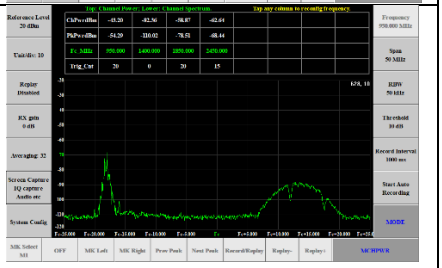
Frequency coverage	8 kHz to 8 GHz
Analysis bandwidth	100 MHz
Max signal input level	+ 30 dBm
Typical normalized DANL (Displayed Average Noise Level)	-160 dBm/Hz with pre-amp OFF -170 dBm/Hz with pre-amp ON
Theoretical max dynamic range (max non-over-driving input – DANL)	>138 dBc/Hz
SFDR (Spurious Free Dynamic Range, 2*(IP3-DANL)/3)	>116 dBc/Hz
Known residual spurs	< 3 dB above noise floor
Image and out of band rejections	>80 dB
Amplitude accuracy and in-band response flatness	Within 0.5 dB
Frequency stability	20 ppb when free running; 10 ppb with external reference clock or GPS discipling
Marker accuracy	Amplitude: 0.1 dB; frequency: within 0.5 RBW
Max Spectrum Analysis speed	>14000 traces/sec for RTSA (span<=100 MHz) >300 GHz/sec for wide-band sweeping mode (span>100 MHz)
4G/5G analysis and scanning speed NB-IoT analysis speed GSM/EDGE analysis speed	>3 times per second >5 times per second >7 times per second

Software features

Real time Spectrum Analysis	Perform real-time FFT spectrum analysis within 100 MHz span all at once without sweeping	Ideal for all purpose detailed and high-res/high-precision spectrum analysis, especially on those fast changing, frequency hopping and pulsed and elusive short-duration signals	
Wide-span Spectrum Analysis	Perform sweeping analysis for span>100 MHz with sweeping step of 50 or 100 MHz	Ideal for quick reconnaissance of sparse signals across a wide range of frequencies	
Continuous DPX	Digital Phosphorous Display of RTSA results in continuously decaying and refreshing fashion	Ideal for capturing intermittent signals	

Block DPX	Digital Phosphorous Display of RTSA results per block of signal with block length user settable	Ideal for 4G/5G/Wi-Fi type of TDD signals and for RF-AI model training and synchronized image and IQ data capturing	
Spectrogram (waterfall display)	Displays the most current spectral trace at the bottom and past traces as color coded lines at the top	Ideal for viewing the complete history of fast changing signals	
Synchronized Time-domain power and Spectrum co-display	Displays the time-domain power of the whole 10 to 40 ms signal plus the corresponding spectrum at each signal segment under user control	Ideal for visualizing both time and frequency domains of a TDD type signal. Perfect for finding uplink interference in 4G/5G signals	
Adjacent channel power	Performs wide-span spectrum analysis and integrates and displays the powers of multiple adjacent channels, and computes their power differences and estimates the occupied bandwidth	Part of the 3GPP standard-based test requirement for assuring an active base station transmitter does not emit excessive out of band signal to the adjacent channels	
Phase noise test	This measures the phase noise profile of a signal source	Ideal for characterizing the single tone signal source purity from a generator or oscillator etc.	

4G-LTE analyzer	Perform detailed analysis on all control signals (PSS, SSS, RS and PBCH) embedded within a 4G-LTE carrier that may come from all sectors of one cell site and/or from all adjacent cell sites. Decode MIB data if CRC check passes. MIB decodability (CRC checkability) serves as the best signal coverage indicator at the observation point.	Ideal for certain area's downlink 4G signal coverage quality measurement and quantitative characterizations	 
5G-NR Analyzer	Perform detailed analysis on all beams of SSB (Synchronization Signal Block) coming from all nearby cell sites and sectors. Decode MIB data if CRC check passes. MIB decodability (CRC checkability) serves as the best signal coverage indicator at the observation point.	Ideal for certain area's 5G downlink signal coverage quality measurement and quantitative characterizations	 
NB-IoT Analyzer	Same principle as in 4G-LTE, just targeting at NB-IoT signal	Same as 4G-LTE case	

GSM/EDGE Analyzer	Perform detailed analysis on all 8 time-bursts within a time-slot	Ideal for downlink GSM signal coverage quality testing and characterization	
Multi-channel Scanner	Perform detailed analysis “simultaneously” on multiple 4G, or 5G signal channels selected by a user	This is essentially the drive test scanner feature for surveying the downlink signal coverage quality of multiple signals within a certain area	
4G-LTE Blind Scanner	Search for all possible 4G-LTE signals within the selected frequency range	Ideal for finding all active 4G signals within the band of interest at certain area	
Multi-Antenna Direction Finding	Finding where (which direction) the signal of interest comes from.	Ideal and robust way to find signal direction	
Multi-channel Spectrum Analysis and Automatic Trigger-based Recording	This feature performs autonomous (just the embedded DSP inside a WSA-208/308 without the need for external PC attachment) spectrum analysis on multiple noncontiguous channels preset by a user. If the measured spectral power is above	Ideal for autonomous signal intrusion detection by a simple WSA-308 permanently installed in the field or by a WSA-208 mounted on a drone along sensitive border region or other sensitive areas.	

	preset trigger level, the spectral data within that band is recorded and can be later retrieved and uploaded to a PC, or sent to a cloud server in real-time if network connection is available.		

Contact information

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