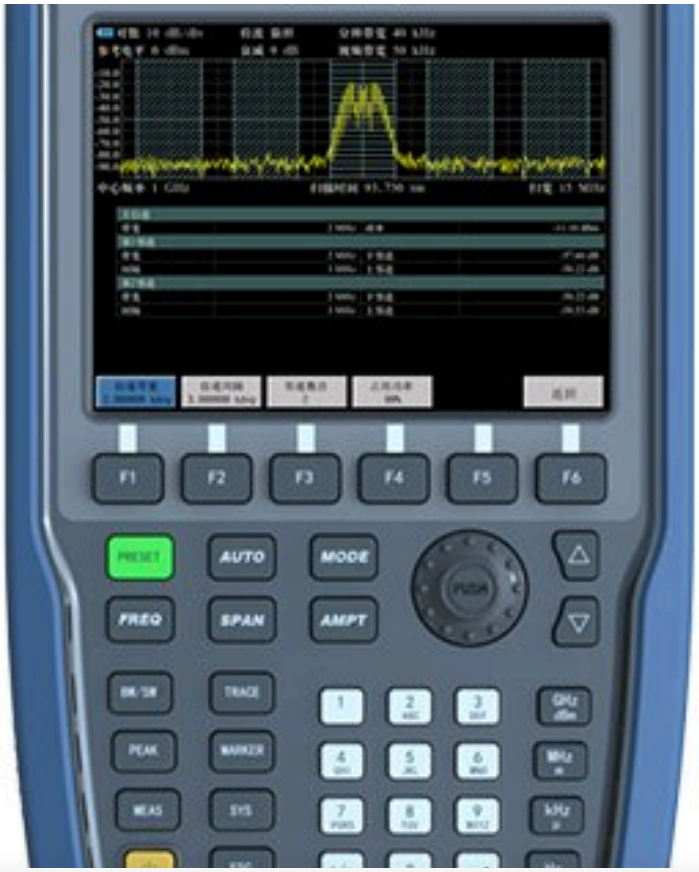
选型指南

Spectrum Analyzer Basics: Frequency Range, RBW and Real-Time Bandwidth

Spectrum analyzer selection essentials: frequency range, frequency resolution, phase noise, real-time bandwidth, resolution bandwidth and tracking source — with a JXBY handheld spectrum analyzer model comparison.

Frequency range: how far up you can measure



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Published frequency ranges of JXBY handheld spectrum analyzers:

Model	Frequency range	Max real-time BW	Resolution BW
JXBY-080	9kHz–20GHz	40MHz	1Hz–10MHz
JXBY-200	9kHz–26.5GHz	40MHz	1Hz–10MHz
JXBY-260	9kHz–1.8GHz	—	1Hz–3MHz

Selection rule: set the upper limit by the **highest operating frequency** of the system under test, then leave one tier of margin below (since real measurements often include harmonics and spurs).

Frequency resolution: how close two signals can be

Frequency resolution determines the ability to distinguish two closely spaced signals.

The corresponding signal-generator parameter is “frequency resolution”, published in two grades: 0.23Hz and 0.01Hz.

Typical consequences of insufficient resolution: missing an adjacent narrowband signal, or misreading two signals as one. If you measure multipath signals, sidebands or narrowband filters, insufficient resolution makes the whole measurement meaningless.

Phase noise: how weak a signal you can dig out



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Published examples:

- Signal generators: ⩽-93dBc/Hz@10kHz, ⩽-98dBc/Hz@10kHz, ⩽-115dBc/Hz@10kHz (typical)
- Handheld spectrum analyzer: -95dBc/Hz@10kHz

The difference between **typical** and **guaranteed** values matters: typical is what a typical sample achieves, guaranteed is the floor all products meet. For strict acceptance, look at the guaranteed value.

Real-time bandwidth: how fast a signal you can see

Real-time bandwidth is the maximum bandwidth the analyzer can capture continuously — it determines how fast a signal you can observe and whether you can see transients like frequency hopping or modulation.

The published max real-time bandwidth of the handheld spectrum analyzer is 40MHz, with resolution bandwidth 1Hz–10MHz.

Resolution bandwidth (RBW) affects frequency resolution; real-time bandwidth affects time resolution — the two cannot be optimal at once, an inherent trade-off of spectrum measurement.

Tracking generator: turning the analyzer into a frequency-response tester



A tracking generator (TG) is the analyzer’ s built-in swept source; with a detector it can measure the

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The JXBY handheld spectrum analyzer lists “tracking generator: optional” — not standard, must be ordered as an option.

If you will **stimulate** rather than only **observe**, the tracking generator is a must; for observation only, it is unnecessary. This item is often missed at order time.

Handheld or benchtop?

Handheld analyzers are portable, start fast and suit the field; benchtops offer dynamic range, display resolution and built-in analysis.

A common workflow: use the handheld in the field to locate the band and interference source, then make precise measurements on the benchtop back in the lab.

Also, the handheld’s displayed average noise level is published as -160dBm — this figure determines weak-signal detection capability.

FAQ

Q Which parameters matter most in spectrum analyzer selection?

A Three groups: coverage (frequency range — what you can measure), resolving power (frequency resolution and phase noise — how close signals can be separated and how weak signals can be found), and real-time capability (real-time bandwidth and RBW — how fast a signal you can see). Also confirm whether a tracking generator is needed.

Q What goes wrong when frequency resolution is insufficient?

A You miss adjacent narrowband signals, or misread two close signals as one. When measuring multipath signals, sidebands or narrowband filters, insufficient resolution makes the whole measurement meaningless. JXBY signal generators publish frequency resolution grades of 0.23Hz and 0.01Hz.

Q What is the difference between typical and guaranteed phase noise?

A Typical is what a typical sample achieves; guaranteed is the floor all products meet. Strict acceptance looks at the guaranteed value. For example, the published handheld figure is -95dBc/Hz@10kHz — confirm whether that is typical or guaranteed when comparing.

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A Yes. The tracking generator is the analyzer’ s built-in swept source; with a detector it measures frequency response of filters, amplifiers and cables. For observation only it is unnecessary. Note the JXBY handheld’ s tracking generator is optional — state it explicitly when ordering.

This guide is based on the official product pages and solution descriptions /products/spectrum-analyzer/. Parameters are quoted verbatim, without secondary processing.

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Related Instruments & Equipment





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BB60C Real-Time Spectrum Analyzer & RF Recorder, 9 kHz to 6 GHz

VSG200 Vector Signal Generator, 100 kHz to 20 GHz



RFS44 4-Port SP4T Absorptive Solid-State RF Switch, 100 kHz to 44 GHz

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