

5G & Cellular Coverage

Validate networks, optimize coverage, and plan deployments with walk-test and drive-test measurements that reach all the way up to mmWave 5G.

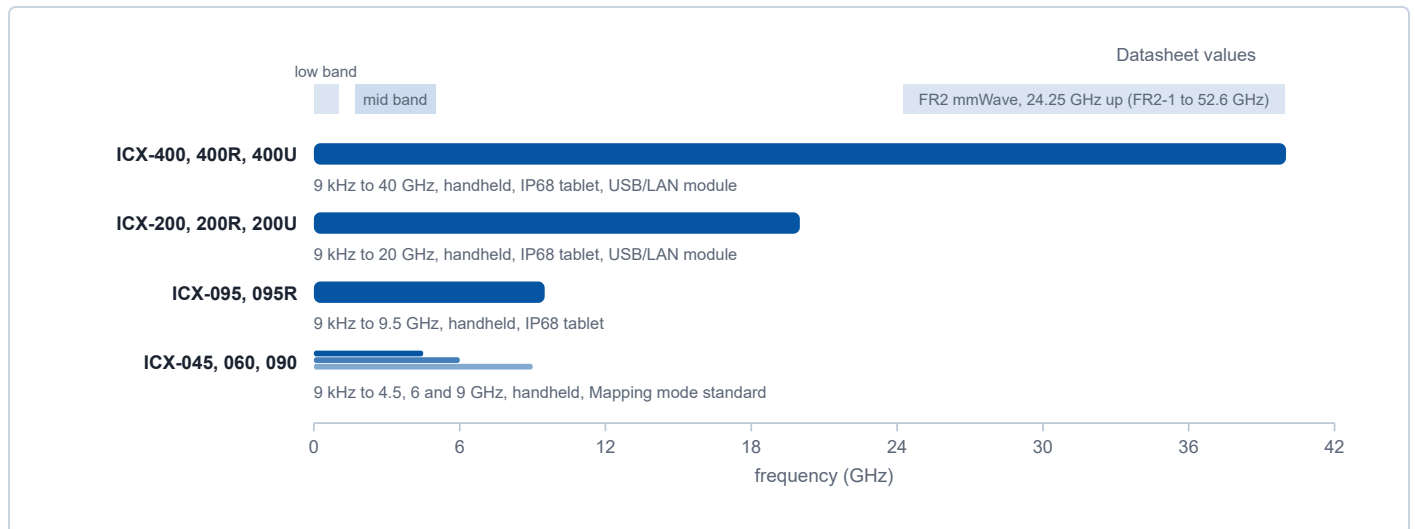


APPLICATION BRIEF · ICX-FIELDHAWK · dc-62022201

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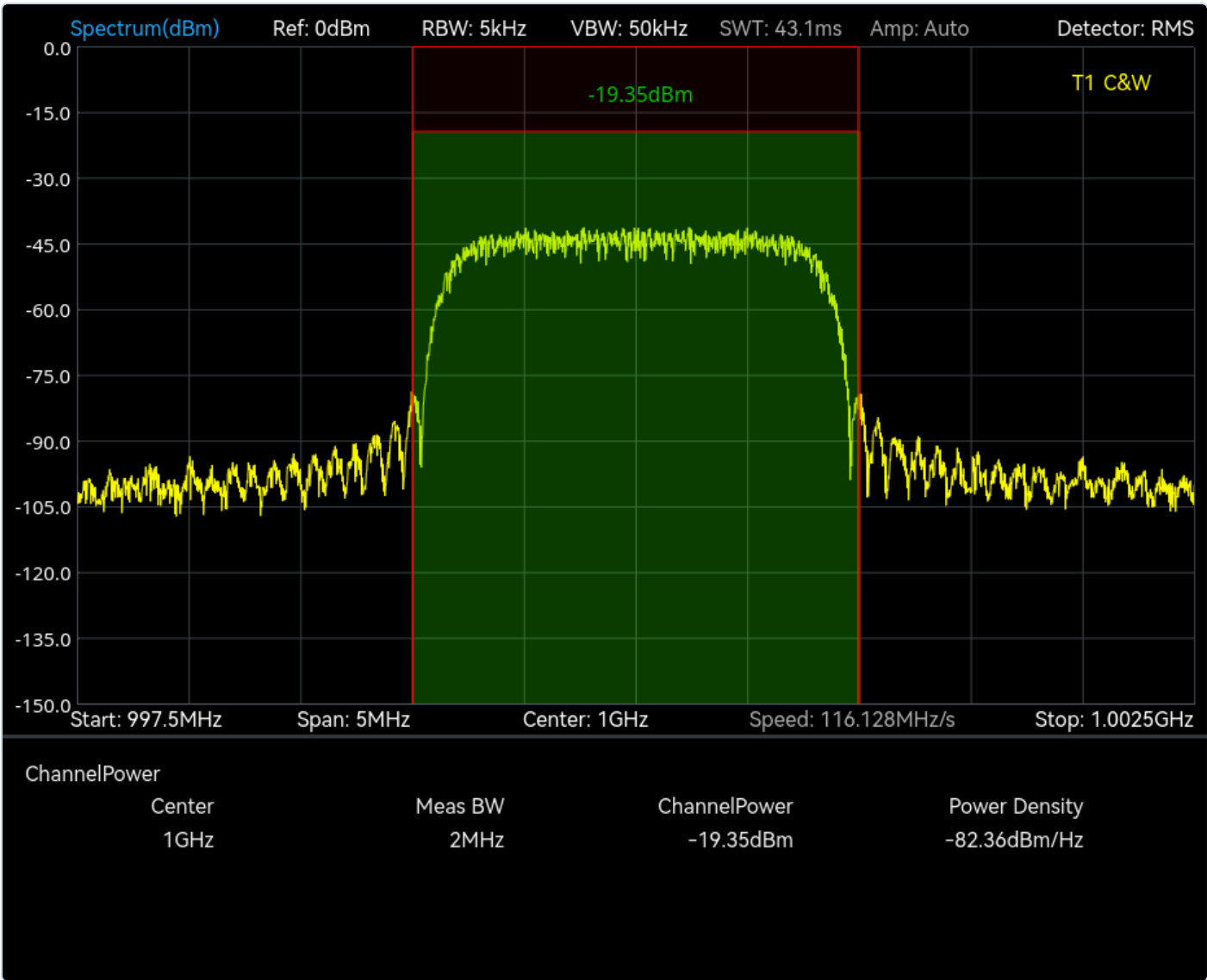
Cellular coverage is a promise made in radio. The network plan says a cell should reach a neighborhood at a usable signal level. Whether it does is a field question, and the answer comes from measurement. Operators and integrators run coverage surveys to confirm that what was designed is what got built, to find the gaps before subscribers do, and to plan where the next site should go.

5G makes this harder in two ways. First, the spectrum is wide and fragmented, from sub-1 GHz low band through mid-band and on into the millimeter-wave frequencies above 24 GHz. A receiver that stops at a few gigahertz does not reach the FR2 bands that carry the most capacity. Second, mmWave signals are fragile. They fade fast, bounce off glass, and drop behind a wall or a parked truck. Coverage that looks fine on a planning map can collapse over a few meters of real street. That behavior is characterized on foot and by vehicle, point by point, across the bands in service.



■ **DERIVED** **Figure 1.** From the datasheets: the ICX-400, 400R and 400U span 9 kHz to 40 GHz; the ICX-200 tier reaches 20 GHz, the ICX-095 and 095R 9.5 GHz, and the ICX-045, 060 and 090 handhelds 4.5, 6 and 9 GHz with Mapping mode standard.

How the ICX-FieldHawk line solves it



MEASURED Figure 2. Channel power at 1 GHz, 2 MHz measurement bandwidth, 5 MHz span, RBW 5 kHz, RMS detector: channel power -19.35 dBm, power density -82.36 dBm/Hz.

The ICX-FieldHawk platform brings frequency reach and field portability into one instrument. Coverage extends to 40 GHz on the ICX-400, which puts the FR2 bands n257, n258, n260 and n261 in range alongside low-band and mid-band cellular; n259 runs to 43.5 GHz and is covered in part. One analyzer covers the survey instead of forcing a team to carry a separate box for the high band.

The SpectraCore software drives the measurements that coverage work depends on, and both are standard on every model. Channel power gives a calibrated read of how strong each carrier arrives at the test point. ACPR, the adjacent channel power ratio, shows how cleanly a transmitter stays inside its assigned channel and how much energy spills into its neighbors. Together these answer the two core questions of any coverage survey: is the signal strong enough here, and is it clean enough to coexist with the channels around it.

The workflow is built for movement. In a walk test, an operator carries the analyzer through a building, a venue, or a campus and records measurements along the route. In a drive test, the same instrument rides in a vehicle and logs the same metrics across miles of road. On the ICX-045, 060 and 090, Mapping mode is standard and stamps each reading to its GNSS

position on a heat map. On the 9.5, 20 and 40 GHz models the survey software matches each reading to its own GNSS log by timestamp, with the analyzer's 1PPS synchronized to ± 100 ns. Either way the result is a picture of how coverage rises and falls across the area served, rather than a single number.

Which models and accessories fit



■ **PHOTO** Figure 3. ICX-FieldHawk handheld analyzer (ICX-090, 9 kHz to 9 GHz; the ICX-400 reaches 40 GHz)

For walk tests and indoor surveys, the **ICX-FieldHawk** handheld is the practical choice: a 1.5 kg instrument with a 10.1-inch display and about 3 hours of battery (2.5 hours on the ICX-045/060/090), so an engineer can sweep a floor, a stadium concourse, or an office tower without a laptop. The result is faster routes and fewer things to break.

For drive tests and vehicle-mounted survey rigs, the **ICX-Series USB** analyzer (ICX-200U to 20 GHz, ICX-400U to 40 GHz) integrates cleanly into a logging setup. It draws 10 to 14 W over its Type-C connection and streams measurements to the survey software running on the test computer, which makes it a good fit for permanent or semi-permanent vehicle installations.

For survey teams that work outdoors in heat, dust, and rain, the **ICX-FieldHawk-R** variant carries the same measurement capability in an IP68 impact-protected chassis with temperature classes to -40 °C. When direction toward a specific cell or interferer matters, the **RFA-3100-N** directional antenna adds a directional front end from 500 MHz to 10 GHz with a 20 dB amplifier that can be bypassed, useful for isolating one carrier from a crowded skyline.

Mind the high band

mmWave 5G coverage can change over a few steps. Survey it on a tighter measurement spacing than you would use for sub-6 GHz, and confirm the analyzer is configured for the full frequency reach before you start the route.

Use cases in the field

Network operators use coverage surveys to validate new builds against the original RF plan, signing off only when measured signal levels match the design. Deployment teams use the same data to plan where capacity is thin and a new small cell or site would earn its keep. Venue and enterprise integrators run indoor walk tests to confirm that distributed antenna systems and in-building 5G reach every corner that needs service, then hand the customer a measured record rather than a verbal assurance.

Recommended configuration

For a team that splits its time between indoor walk tests and vehicle drive tests, pair an **ICX-FieldHawk** for on-foot surveys with an **ICX-Series USB** analyzer for the drive-test rig, both running SpectraCore and both configured for the full reach up to 40 GHz so mmWave stays in view. Teams working primarily outdoors should specify the **ICX-FieldHawk-R** IP68 chassis, and any group doing carrier isolation or interference work should add the **RFA-3100-N** directional antenna.

To match a configuration to your bands, survey style, and fleet, contact Berkeley Nucleonics at info@berkeleynucleonics.com or 800-234-7858.

For a quick question, chat with an engineer at berkeleynucleonics.com.

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Application Brief

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