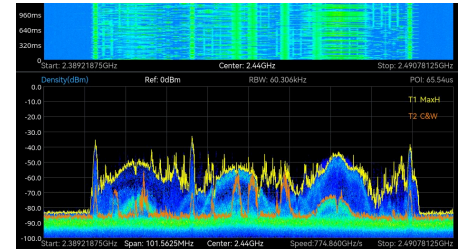


EMI / EMC Pre-Compliance Testing

Find the emission on your own bench, before the compliance house finds it for you. Real-time spectrum analysis from the ICX-FieldHawk line for emissions diagnostics during R&D.

APPLICATION BRIEF · ICX-FIELDHAWK · dc-62022201



ICX real-time density display of the 2.4 GHz band: 2.389 to 2.491 GHz, 101.56 MHz span, 60.3 kHz resolution bandwidth, 65.54 microsecond probability of intercept.



■ PHOTO Figure 1. ICX-400U USB/LAN module, 9 kHz to 40 GHz (render)

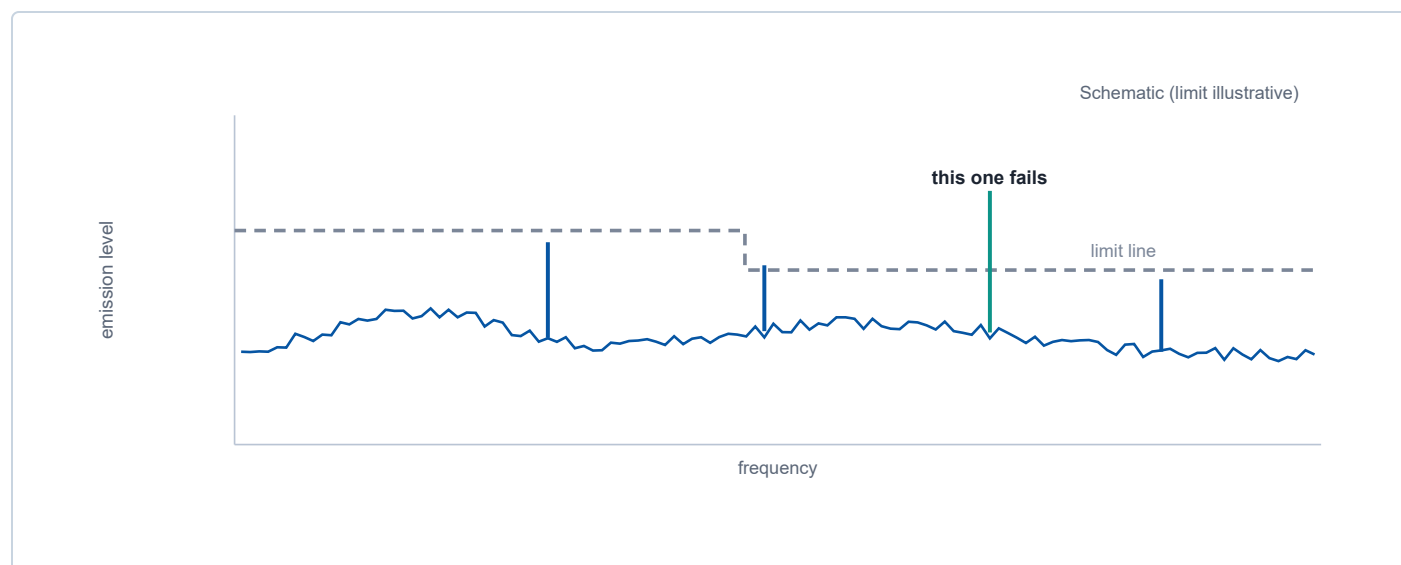
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Every electronic product has to pass emissions testing before it ships, and the accredited compliance house is where that gets settled. The trouble is that a formal test slot is expensive, scheduled weeks out, and brutal when it fails. A single emission a few dB over the limit sends the design back to engineering, and the whole cycle repeats. Teams that wait for the compliance house to find their problems pay for it in time and money they did not plan for.

The fix is to find those emissions earlier, during R&D, on your own bench. The offending signal is often a broadband impulsive burst from a switching supply, or a narrow-band spur from a clock harmonic, sitting low in the ambient noise of a normal lab. A swept analyzer steps across the band one slice at a time, so an intermittent impulsive event can fire and fade in

the gap between sweeps and never show up. The result is a fault that is present but rarely seen.

What pre-compliance work needs is a way to watch the whole band at once, hold onto rare events long enough to recognize them, and pull a weak spur out of the noise floor where it hides. Seeing the spectrum is not enough. The spectrum has to be seen as it behaves over time.



■ **SCHEMATIC** **Figure 2.** Schematic with an illustrative limit line: pre-compliance in one picture. One spur over the line at the compliance house costs a failed slot and a redesign cycle; finding it on your own bench costs an afternoon.

How the ICX-FieldHawk line solves it

The ICX-FieldHawk receivers process the band in real time rather than sweeping it, so the full window is under observation continuously. Gapless capture means an intermittent impulsive burst of 0.512 μ s or longer is caught on every occurrence, not only when a sweep happens to pass. For emissions work that is the property that matters, because an event a swept analyzer visits only occasionally is one the chamber receiver, with its CISPR dwell times, will see.

The real-time density display and a max-hold trace do the rest. The density display colors each point by how often it is occupied, separating a constant carrier from a rare burst by how the trace paints over time. The max-hold trace keeps the highest level seen at each frequency, so a broadband impulsive event or a narrow spur that appears once leaves a permanent mark. A signal buried in ambient noise that a single trace would average away stands out once it has been held.

The SpectraCore software ties this together with the spectrogram and historical trace and the controls to zoom from a wide survey down to a single suspect harmonic. An engineer can sweep a board, spot the emission, characterize it, and verify a mitigation, all on the bench, before committing to a paid compliance slot. The goal is to walk into the chamber with the emissions already found and fixed.

On the ICX-FieldHawk handheld (ICX-045/060/090), that bench diagnostic work is joined by a standards-based measurement: EMI Pre-Compliance Measurement (opt. 74) runs Peak, Quasi-Peak, Average and RMS detectors in parallel at CISPR 16-1-1 resolution bandwidths, checks the trace against a preloaded FCC Part 15 / CISPR 11, 22, 32 / IEC limit-line library, and flags any point that crosses the selected line automatically. The density display and max-hold still do the early hunting: finding and localizing the offending emission. Option 74 is the step after, confirming whether that emission would fail.



■ **ILLUSTRATION** **Figure 3.** Near-field probing of a board inside a shielded enclosure. The probe tip glow and the screens are decorative.

Which models and accessories fit



■ PHOTO Figure 4. ICX-FieldHawk handheld analyzer (ICX-090, the model group that carries option 74)

For bench emissions work, the recommended platform is the **ICX-Series** USB core module. It connects to a laptop or workstation, turning it into a full real-time analyzer with the density display and max-hold trace that pre-compliance work depends on. Driven through a near-field probe set, it lets an engineer hover over a board, a cable, or a connector and localize the source of an emission down to the component, not just confirm that one exists.

Pair the receiver with the **RFA-3100-N** antenna for radiated pickup from 500 MHz to 10 GHz at a short distance, which helps correlate a near-field find with a far-field emission. Below 500 MHz, where CISPR radiated limits begin at 30 MHz and many failures sit, use a biconical or log-periodic antenna with its antenna factor entered through the analyzer's Antenna Factor function. For a fixed bench station, the same real-time engine runs under **SpectraCore** as a benchtop setup, giving a repeatable, documented pre-compliance position that engineering can return to between design revisions.

When the check needs to be measured against a limit line rather than just seen, move to the **ICX-FieldHawk** handheld (ICX-045/060/090) with EMI Pre-Compliance Measurement (opt. 74). It runs the CISPR-standard detector and bandwidth set against a preloaded limit-line library and reports pass/fail margin directly, so the same bench that localized the emission can also predict the chamber result.

Table 1.

Need	Recommended model	Why
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Need	Recommended model	Why
Bench emissions diagnostics	ICX-Series (ICX-200U, ICX-400U)	Real-time density display and max-hold via a laptop or workstation
Source localization	ICX-Series + near-field probe	Hover over a board to find the emitting component
Radiated short-distance pickup	RFA-3100-N	500 MHz to 10 GHz; a biconical or log-periodic antenna below 500 MHz
CISPR-standard limit-line pass/fail	ICX-FieldHawk (opt. 74)	Quasi-Peak/Average/Peak/RMS detectors, CISPR bandwidths, automated margin analysis

Recommended configuration

A practical pre-compliance bench centers on the **ICX-Series** running **SpectraCore** with the density display and max-hold enabled, driven through a near-field probe setup for source localization. Add an **RFA-3100-N** for short-distance radiated measurements. Stand the same configuration up as a fixed benchtop station so the team has a repeatable position to test against between design revisions. That setup catches impulsive noise and narrow spurs early, points to the source, and verifies the fix before the design ever reaches a paid compliance slot. Where the team also needs a documented pass/fail margin against a real limit line, add an **ICX-FieldHawk** with EMI Pre-Compliance Measurement (opt. 74) as the confirming step.

Build the bench around your product mix

Probe selection, frequency coverage, and antenna setup depend on what you build. A Berkeley Nucleonics applications engineer can help spec the right pre-compliance configuration. Reach us 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

ICX-FieldHawk | dc-62022201