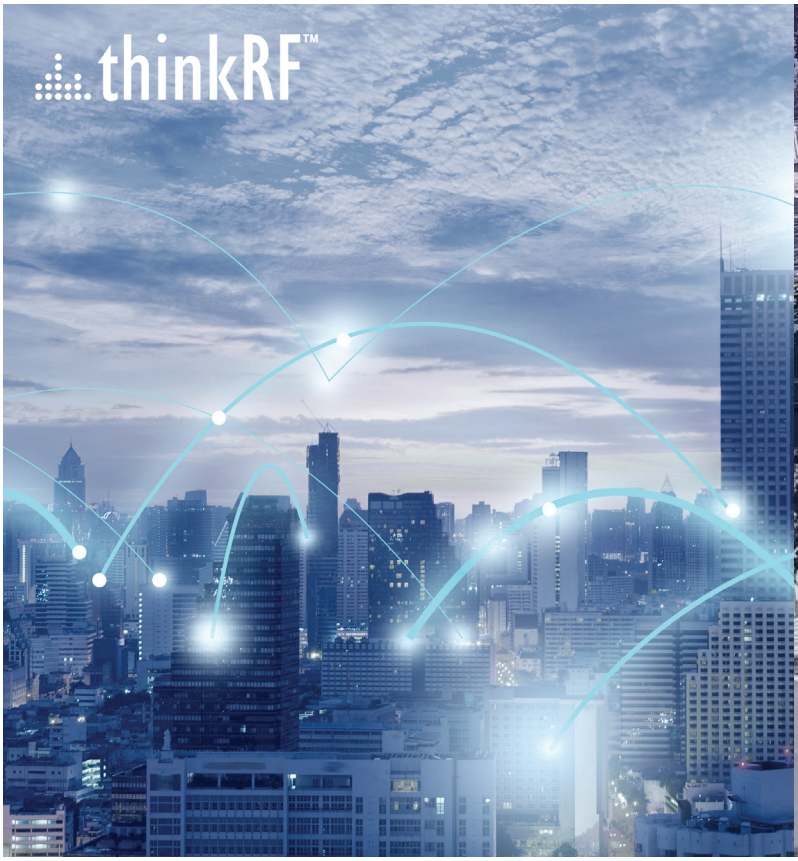
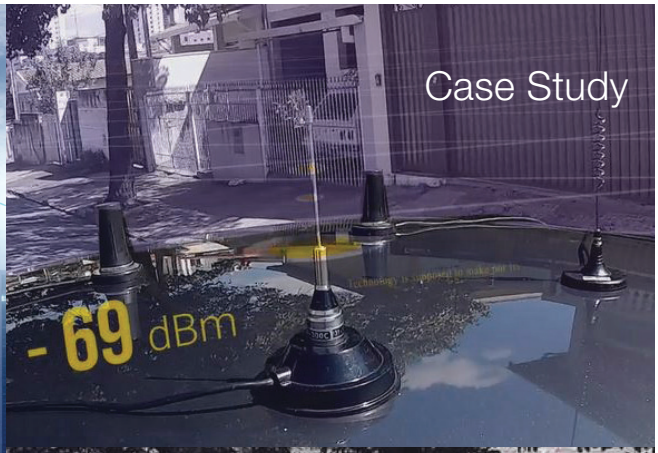
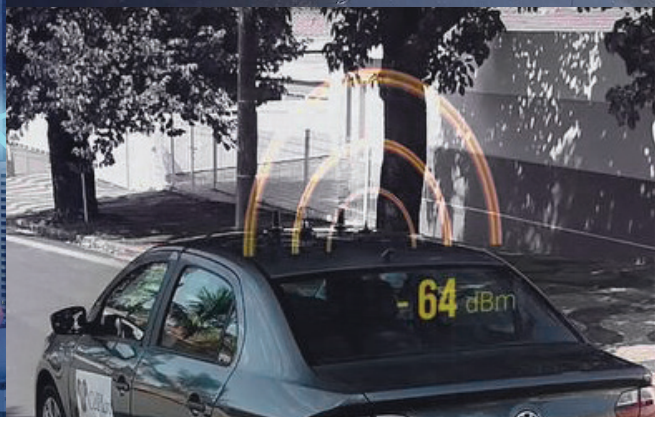






ThinkRF Powers CelPlan to Capture Multiple Bands In a Single Drive Test Without Wasting Time and Resources

CelPlan is a leading provider of radio frequency planning & optimization tools, value-added consulting, engineering, and training services to the wireless industry. Whether in the lab, facility, field or across the city, CellSpectrum™ is the only platform that enables universal spectrum analysis (licensed and non-licensed) and RF path characterization for all wireless communications. Samples are geo-referenced and can be collected simultaneously in multiple bands (contiguous or not). The advanced mobile spectrum analysis solution allows for comprehensive drive testing and coverage mapping capabilities.

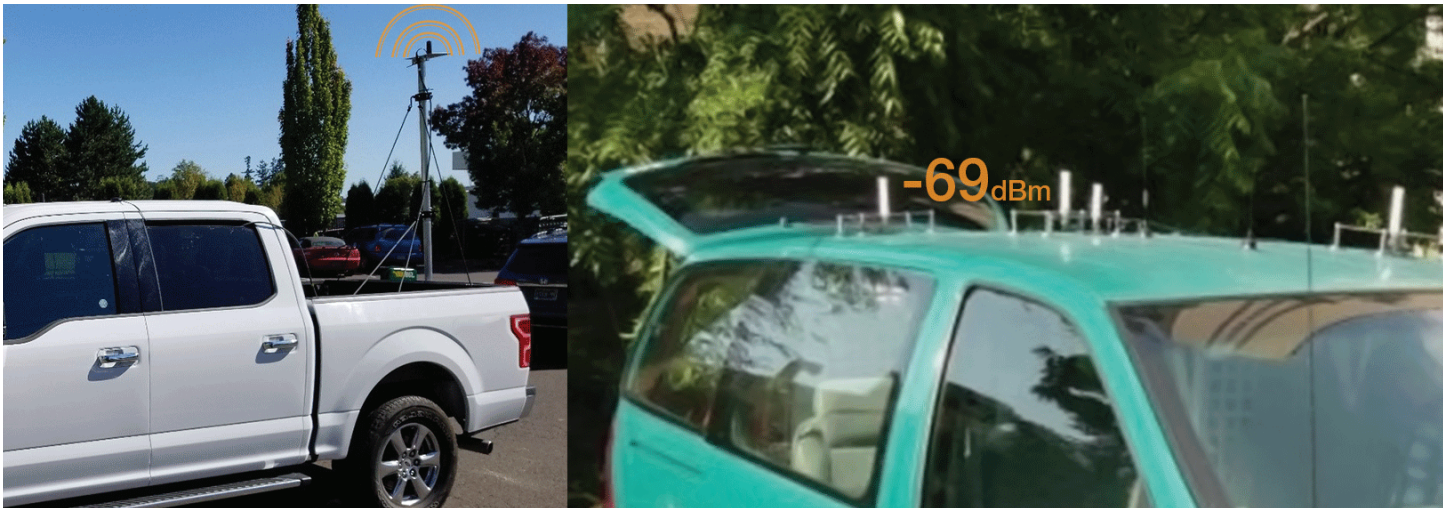
CellScanner™ is a specialized and detailed Technology Analyzer able to simultaneously detect and analyze 2G, 3G, 4G and 5G signals for use in optimization and capacity monitoring tasks.

CellDigitizer™ collects I and Q data and stores it, allowing replays to perform different spectrum and technology queries, also ideal for use as forensic evidence.

ThinkRF and CelPlan provide a complete drive testing solution with one single equipment: Spectrum capturing, Technology analysis, and I/Q storage.

APPLICATIONS

- Wireless network planning and optimization
- Network performance and coverage mapping
- Spectrum clearing and interference analysis
- Performance evaluation and benchmarking
- Propagation characterization



The Scenario

The complexity of the RF spectrum environment continues to increase as new standards, technologies, and bands are made available for commercial use. Telecommunication companies and mobile operators use multiple bands and technologies in their network, and a single operator may use a mix of 2G, 3G, 4G/LTE, CBRS and 5G technologies spread across various frequencies.

To assess coverage, calibrate propagation models, evaluate network performance, and identify and mitigate RF interference, operators must conduct regular mobile drive tests. With traditional equipment, each test is only able to cover a single band or technology, such as GSM, LTE, CBRS, 5G, etc. Operators must purchase new hardware or pay further software licensing fees to measure additional bands on future tests.

These hardware limitations make drive tests expensive, time consuming, and inefficient.

CelPlan identified the need for a solution that enabled spectrum analysis and scanning across multiple technologies and bands in a single drive test. They required an RF receiver that met the performance, portability, flexibility, and cost requirements for the solution, and they needed a platform that could easily integrate with third-party hardware and software.

The Requirements

When designing a drive test solution for mobile operators and telecommunication companies, CelPlan identified the following requirements:

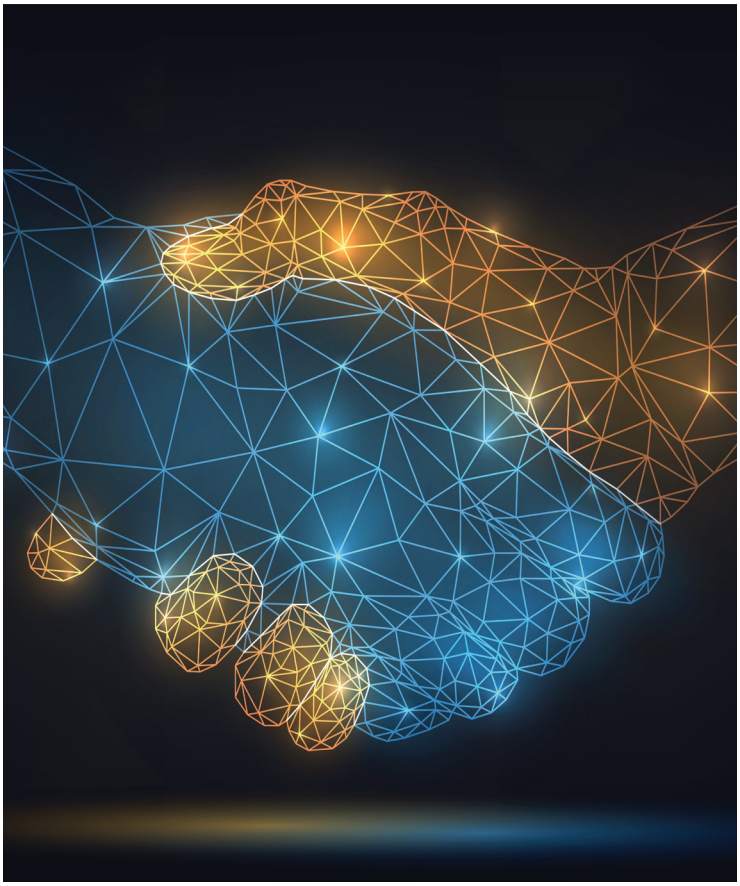
- Ability to capture multiple bands and technologies during a single drive test
- Ability to record and store I/Q data for post-analysis
- Cost-effective platform with high frequency and bandwidth performance
- Portable, lightweight, and deployable in a vehicle or carried by a user
- Easily integrated with CelPlan software and hardware
- Easy to use in the field by RF Engineers
- Ability to extend data storage without relying on the RF receiver

The Engagement

CelPlan was seeking a technology partner to provide the RF receiver for their solution. After comparing vendors and evaluating the various spectrum analysis platforms available, CelPlan selected ThinkRF Real-Time Spectrum Analyzers. ThinkRF worked closely with CelPlan to introduce new features and improve performance of the platform to meet the evolving needs of mobile test customers.

Throughout the relationship, CelPlan valued ThinkRF for their responsiveness, flexibility, and support. The development team commented that the platform was very easy to integrate, and that the ThinkRF team was extremely accommodating throughout the engagement. The platform's ability to store and record I/Q data, flexibility and versatility, real-time bandwidth up to 100 MHz and frequency performance up to 40 GHz* made ThinkRF the best fit for CelPlan's solution.

*with ThinkRF D4000 RF Downconverter/Tuner



The Solution

CelPlan integrated the ThinkRF Real-Time Spectrum Analyzer as an RF receiver for their CellSpectrum and CellScanner solutions. The solutions provide users with complete, multiband, and versatile mobile testing capabilities and remove the need for additional hardware and software purchases.

Users can capture multiple bands in a single drive test while also capturing technology measurements and spectrum measurements at the same time. Powered by a standard PC, users can upgrade computing performance and easily program the software for their application. When equipped with directional antennas, users can detect and locate sources of disruptive RF interference, while record and playback capabilities allow users to conduct in-depth analysis after the test is complete.

The combined solutions include:

- ThinkRF R5x50 Real-Time Spectrum Analyzer
- CelPlan software
- GPS
- Power supply
- Standard PC
- Antennas

The Results

Leveraging the performance of ThinkRF platforms, CelPlan delivered a complete mobile testing solution for end-users. The combined solution drastically reduces the time and cost required for drive testing by capturing multiple bands and technologies in a single drive test. Operators can analyze their entire network without the need for additional equipment or software, and new networks can be tested and optimized with greater efficiency.

The solution enables mobile drive test applications such as propagation characterization, wireless network planning and optimization, network performance and coverage mapping, and performance evaluation and benchmarking.

> “We’ve been working with ThinkRF since 2011 and have built a strong relationship with their team. We value the support, responsiveness, and flexibility ThinkRF provides in every interaction, and they continue to improve their technology and provide additional capabilities that help our users in the field.
>
> The unique combination of frequency performance, versatility, and cost-effectiveness made ThinkRF the ideal platform for us to integrate with as we developed our mobile testing solutions for end-users.”

Leonhard Korowajczuk, CEO/CTO of CelPlan Technologies

ABOUT THINKRF

ThinkRF is the leader in software-defined spectrum analysis solutions that monitor, detect and analyze complex waveforms in today’s rapidly evolving wireless landscape. Built on patented technology and quality by design principles, the ThinkRF platform offers greater versatility, better performance and additional capabilities for 5G, monitoring, signals intelligence (SIGINT), technical surveillance countermeasures (TSCM), and test and measurement applications.

Aerospace and defense companies, spectrum regulators and wireless communications providers use the remotely deployable, PC-driven and easily-upgraded platform to replace traditional lab equipment for wireless spectrum analysis.

For more information, visit www.thinkrf.com, contact info@thinkrf.com or on Twitter, LinkedIn and YouTube.

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