infovista

SOLUTION BRIEF

Automated
Site Verification

Increase the efficiency of your site verification process and activate your 5G sites sooner

Powered by Precision Drive Testing™

The case for automation

Operators are experiencing huge traffic levels and high rates of traffic growth. This means that, in many places, 5G needs to be brought into service urgently. But running on a higher frequency, 5G requires a denser network, with up to 20 times as many base stations as 4G. This means that more sites will need to be rolled out in a shorter time. In turn, this demands rapid site verification, which can only be properly addressed through automation. Automation speeds up data management, data analysis, and task and workflow management, as well as decision automation. With automation, operators can become more proactive and more predictive, and find operational efficiencies that will improve the bottom line.

CHALLENGES FOR SITE VERIFICATION

Engineers have verified sites since the first network was rolled out, typically a manual task including validating and performing test cases, then going back to the office and crunching the data. Repeating this for all sites, until the collection project is finalized. Only when the final report is delivered can acceptance happen. The data collected must be validated, and the reports must be shared.

There is simply not enough time for this anymore. Engineers are scarce and must be used for the most demanding tasks, site verification must be made more efficient, and the time taken to implement projects must be shortened. In essence – automation is needed!

How Infovista can help automate site verification

To start with, all site verification projects need to be organized and managed properly. It is essential to define which sites need to be verified, what test scenarios are applicable, and who should perform the tasks. If progress is monitored and proactive measures are taken, you can avoid delays. A seemingly simple task, one that's often overlooked, is to advise the tester where to go.

Another factor often overlooked is the need for an efficient collection tool that guides the tester through the testing required; where to walk, where to stop, what to do, and most important of all – when it's okay to move to the next task. Also important is an understanding of what features need to be tested at each site. Should you just test the new features, or all the legacy features too? Should you repeat your test route for each technology, or should you test multiple things in parallel? Should you only test the capability of a high-end smartphone, or should you simulate the performance of older devices?

To achieve any type of efficiency, it must be possible to evaluate all the data collected in real-time and to decide if this is acceptable or not. If an error is detected once, should it be reported, is it critical or can it be overlooked? The rules for how acceptance of a site should be done can be complex, but ALL SITES must be approved in the same way. Ideally, this must be possible in real-time so that the tester can repeat the sequence if necessary. So instant measurement evaluation and reports are essential. The tester can never be left in any doubt about what to do next. He or she should never leave the site until its acceptance is absolutely clear. After all, **time is money!**

Running site verification projects

To achieve these goals, part of the solution clearly must reside in the cloud. It offers unparalleled orchestration of your projects, users, and test equipment. In addition, there is no need to invest in expensive servers, the cloud opens for on-demand storage and processing power, just in time.

To ensure that all sites are approved with the same methodology and that the rules are applied equally, all aspects of the workflow need to be handled centrally.

In the Infovista case, this is provided by TEMS Cloud.
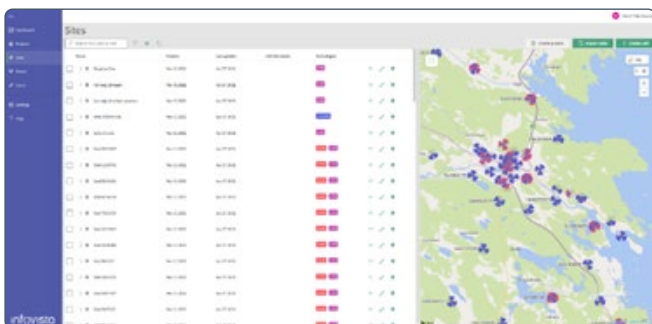
The user will follow the instructions on the application, the progress of each pre-defined task is shown, and when it is time to move to a new location the user is informed with navigation instructions.

Collecting site verification measurement data

Site acceptance is the final stage of any RAN deployment project. At this stage, the sites are turned on, fully configured and all parameters set up, but not available for commercial use.

Before this happens, all the features provided need to be verified. Moreover, whenever the site re-uses common bands and frequencies for new technology like 5G, tests need to be performed to ensure that legacy functionality is not affected.

Often the rules for accepting a site vary from project to project, and occasionally from vendor to vendor. One of the greatest improvements in a successful roll-out is to ensure consistent rules so that all sites obey the same rules. In most cases, an individual site will have multiple cells (in 5G multiple beams), often multiple carriers, and occasionally multiple technologies. This means that the traditional method of performing a couple of stationary tests and a quick drive around the site will not always pick up the potential issues.

By far the greatest cost in any verification project is the need to return to the site to re-perform the tests. Yet this typically happens in a substantial number of projects. Another hidden cost is the tendency to under-invest in test equipment, meaning that the tests must be repeated for each carrier and technology. It is obvious that introducing a modern technology like 5G will need 5G cells and 5G carriers to be verified, and that the handover between cells and beams works successfully. The challenge is often the need to verify the handover to neighboring 5G cells and other technologies if no neighbors exist.

This is especially important when handling voice calls and video streaming where the effect on users is seen instantly. Hence in our cloud-based solution, we recommend both stationary and mobility tests throughout the cell's expected coverage making both data and voice calls.

Traditionally, site verification was performed with troubleshooting tools like TEMS Investigation, using both scanners and the latest smartphones. The advantage is that this equipment was well known and could be re-used later. However, site acceptance is now often performed by non-technical staff needing much simpler tools. RF experts are often able to find and fix faults in real-time, whereas non-technical teams often need results to be coordinated and analyzed remotely. In either case, all data is collected centrally when a site acceptance report can be produced. These reports are often stored for later references and form the basis of most vendor payments.

However, if it turns out that the KPI is not met, the site needs to be re-visited and re-tested. In most cases re-testing is not due to any underlying problem, but often simply because the results were not statistically significant in some parts of the cell. What has become clear is that when non-technical staff are responsible, the proportion of times a re-drive is needed increases.

By combining pre-defined tasks with pass/fail criteria, even non-technical staff can be guided through the tests limiting the risk for re-drives, improving the quality of the work done. With the TEMS SSV App, the application used for data collection is designed to be used by non-technical staff, simply by following the directions provided by the application.
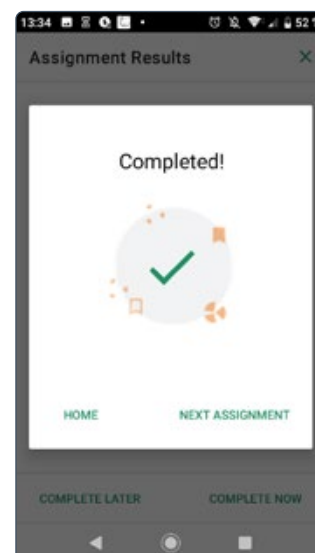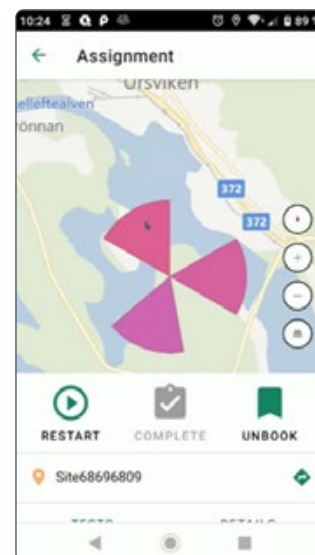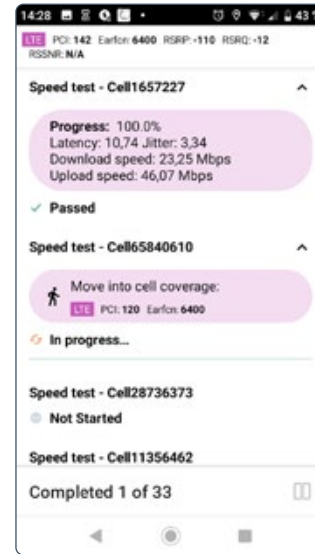
Performing site acceptance

The following tests are performed:

- Stationary tests to confirm that the cell handles traffic
- Intra-site mobility tests (clockwise and anticlockwise) to check handovers between sectors
- Inter-site mobility tests (in and out) to check handovers with neighboring cells

STATIONARY TESTS

Stationary tests verify the normal performance of a cell. These should be performed at 'recommended' sites of higher-than-normal popularity. It is important to verify that all cell hotspots continue to work. But most stationary tests should be done in places of high signal strength to ensure that maximum performance KPIs are met. It is also important to check that all legacy technologies have not been affected.

Stationary tests include:
- Max throughput (DL/UL)
- Latency
- Jitter
- Loss
- Beam coverage
- MIMO availability
- Rank
- Bearer utilization
- RACH
- Audio quality

This test is used to ensure that mobility between sectors on the same site works correctly. It usually requires that the site is driven around in clockwise and anti-clockwise directions. One fringe benefit of this is to find cross-feeder issues.

- Intra-site handover success
- Handover interruption time
- RACH
- Audio quality issues during handover

INTER-SITE MOBILITY TESTS

Driving in and out of site to all 1st and 2nd Tier neighbors (on all main highways that enter/exit the site coverage footprint). One advantage of this is to find the real cell coverage (for each technology), which you can compare with propagation predictions. This helps to find issues with incorrect tilt, pilot pollution, and incorrect neighbor definition.

- Inter-site handover success
- Handover interruption time
- RACH
- Audio quality issues during handover
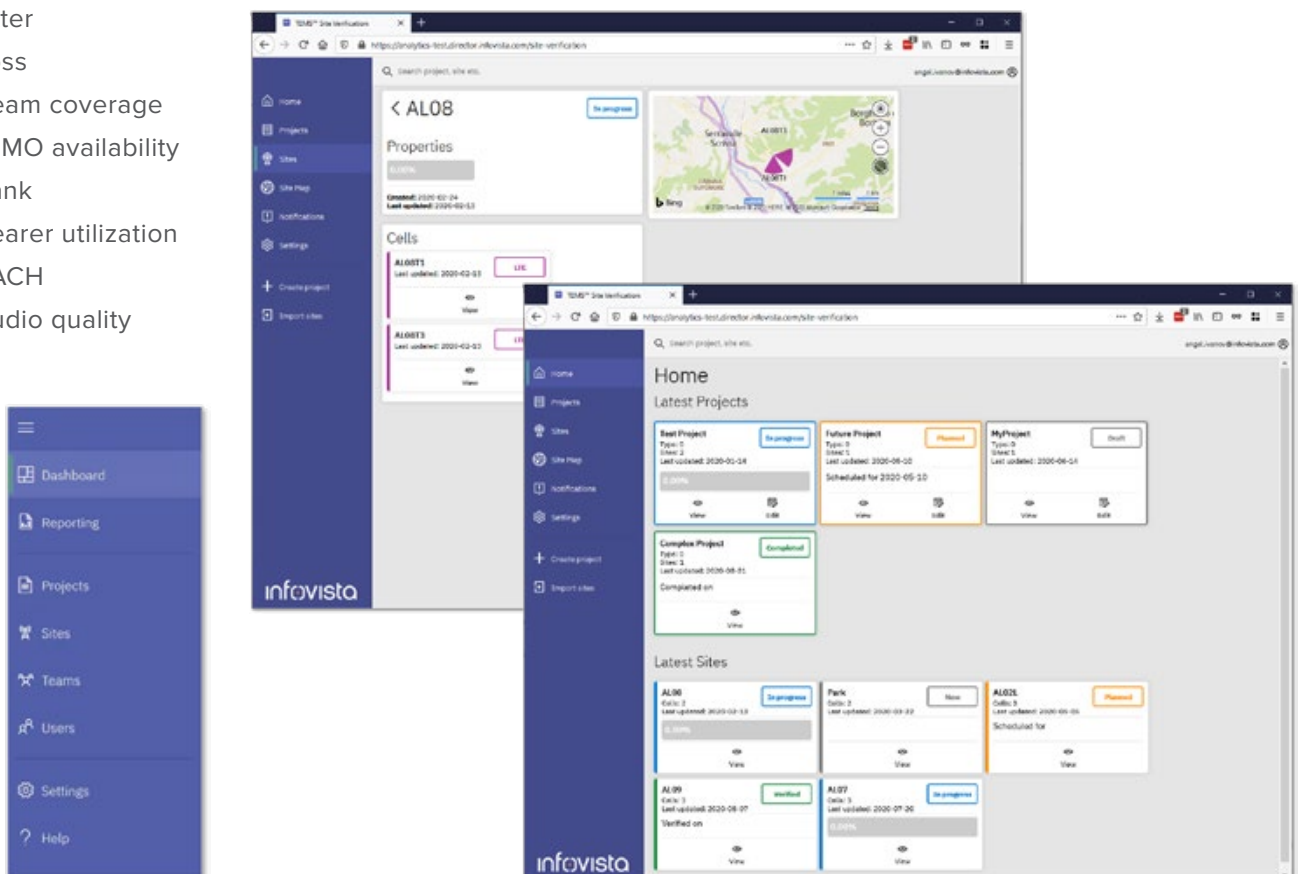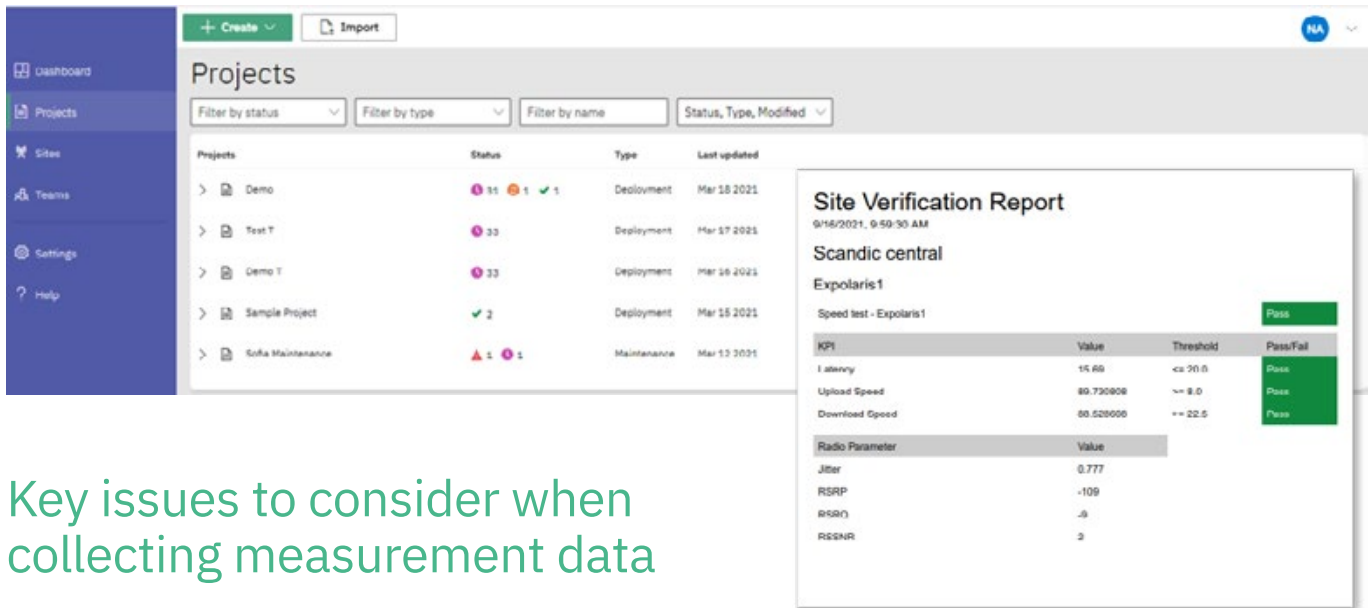
Key issues to consider when collecting measurement data

TIME IS MONEY

Testing on a single site can take many hours, meaning that lots of data are collected, the post-processing of which can take many days. Traditional methods mean that it is often difficult to decide whether ENOUGH measurements have been made to confirm acceptance. An issue found requires the site to be re-visited.

COST OF TESTING

In most cases, site verification is a trivial task but requires highly technical staff to use the equipment correctly and verify that all considerations are been taken into account.

LACK OF STANDARD ROUTINES

Often the site verification is outsourced to third-party companies willing to perform this menial task. However, each may have their own rules and processes they follow. Without a documented standard approach there is an increased risk of human error. If different tools are used and different scripts are applied, the results may be completely misleading.

LACK OF PROJECT MANAGEMENT

Without any remote monitoring of the ongoing project, it is impossible to spot issues in the field.

RE-USE OF TEST EQUIPMENT

In most cases, more testing equipment is needed during the site acceptance phase than during the operational phase. But site verification equipment is often so specialized that it cannot be re-used at later phases of the network lifecycle. With TEMS products all equipment can be re-used, thereby improving the cost of ownership.

Both mobile operators and major vendors would benefit from having a STANDARDIZED, AUTOMATED approach that allowed non-technical staff to be able to perform the CORRECT test, at the CORRECT places, for the CORRECT number of times, to guarantee acceptance.

Powered by Precision Drive Testing™, Automated SSV solution offers:

CONTEXT-SENSITIVE TESTING

One of the unique features supported by our solution is **context-sensitive testing**.

Based on pre-defined information, our solution will decide what tests to perform based on the radio environment encountered. As an example, our solution will perform different data tests depending on whether the test device is connected to a 4G or 5G cell.

PRECISION DRIVE TESTING

In our solution we not only predict where to drive and what tests to perform, but also which hot spots and critical areas should be tested. We call these 'sweet spots'.

Based on the position of the cell, and the available roads surrounding it, we predict the best route to drive, which optimizes the time taken to perform sufficient tests required to determine acceptance.

Optimized routes are based on cell position – the navigation will be optimized to minimize the test time (walking/driving).

Predicting sweet spots for stationary testing can be based either on scout drives or on cell information, calculating where the optimal spot for a particular test will be. The tester will be directed to that spot.

REPORTING AND ANALYTICS

Real-time reporting, fully customizable including Go/NoGo reports.


Advanced reporting using TEMS Discovery

CLOUD-NATIVE SOLUTIONS - THE FUTURE

Are you an Uber driver or drone pilot, or just the owner of a modern smartphone?

By enabling the use of commercial devices in the Automated Site Verification solution, anyone can perform site verification using their phone. Soon, you can just register to the TEMS Cloud, install the application and browse for your next workorder. Follow the instructions (where to go, what to do, how long to stay) and become a site verification tester!

ARCHITECTURE
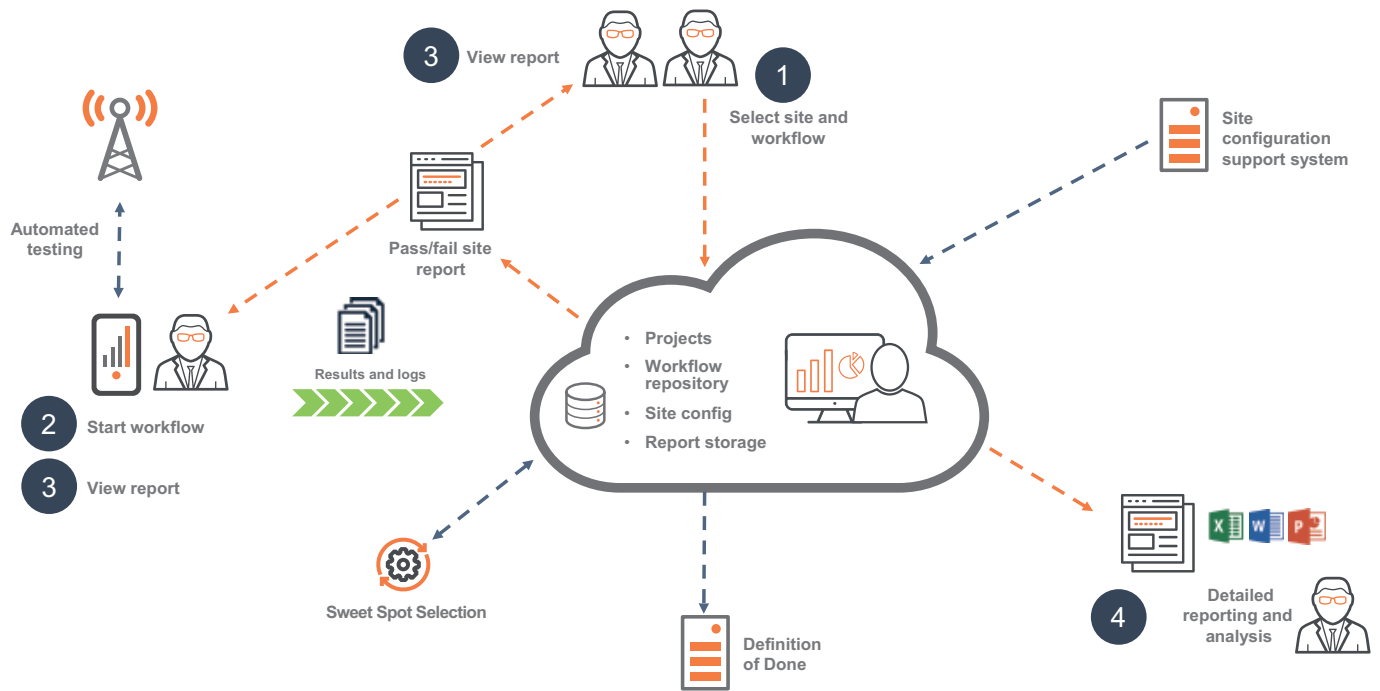
AUTOMATED SITE VERIFICATION BENEFITS

Reduces deployment effort with a cloud-native solution offering

The ability to control and get near real-time statistics from the devices eases new site deployment.

Improves the time to market of new technologies with COTS devices

The ability to use commercial off-the-shelf devices makes the solution market-ready.

Efficient and streamlined workflow execution

Based on Precision Drive Testing™ the revolutionary 'automatic sweet spot selection' and edge analytics based 'Definition of done' features identify the right position to perform stationary tests in a sector along with instant success criteria evaluation for site acceptance.

Leverage the competence in the right areas

No need for skilled engineers for data collection anymore, bring competence back to the office for core optimization tasks, resulting in better operational efficiency.

Fewer site revisits, more cost saving

Right data collection on the first site visit helps reduce the site deployment cost by a considerable margin.

Smart data collection with context-sensitive testing

Precision Drive Testing™ enables the radio environment to identify the right set of test cases during a site verification campaign.

Conclusion

The traditional approach to site acceptance normally requires highly skilled staff to spend hours on a site laboriously collecting data, and then off-site producing a report to document acceptance.

5G introduces additional challenges that make it even more time-consuming, and easier to miss key conditions. Performing the optimal number of tests for each feature at each place is very difficult to agree on.

Powered by TEMS Precision Drive Testing™, the Automated Site Verification solution offers a flexible and feature-rich experience for site acceptance. It ensures consistent processes are followed throughout every site verification project, reducing operational complexity, improving time to market with significant cost saving.

Get in touch with our technology experts to discuss how the **Automated Site Verification solution** can benefit your site acceptance process.

Frost & Sullivan (2022)
5G drive test market leadership Award

Fierce Innovation Awards Finalist (2022)
5G drive test market leadership Award

Light Reading (2022)
Outstanding Test & Measurement Vendor

About Infovista

Infovista is the global leader in network lifecycle automation (NLA) for the next-gen networks era. With its unique NLA approach, Infovista allows communications service providers (CSPs) and enterprises to improve their network performance and customer experience, optimize their productivity, and reduce their costs, while maximizing return on their investments. Spanning the entire network lifecycle, Infovista's products and solutions leverage an open, integrated, cloud native portfolio that automates tasks, flows, analytics, and decisions to the greatest extent possible. More than 1,000 customers, including 400 Mobile Network Operators, around the world rely on Infovista to plan, design, deploy, test, operate, support, optimize, evolve, report on and monetize their networks.