Innovative Approach in the Handset Repair Marketplace

By Carla Slater, Anritsu Company

Production lines for handset manufacturers must operate at breakneck speeds to meet the high demand for cellular phones. In fact, it is estimated that 350 million new cellular phones will be manufactured this year, of which about 77 million will be shipped to North America. While the large increase in cell phone production brings with it tremendous market growth, it has also created growth in the less appealing arena of handset repair.

At an estimated 10% field failure rate, cellular phone repair places a heavy burden on both service providers and manufacturers. Of the 10%, or seven million phones, returned for repair each year, it can be estimated that about half of the phones are fixed by the service provider and manufacturer. Repairing a greater number of phones at the service provider and manufacturer repair facilities means additional investment in resources and capital equipment would have to be made, which compromises efficiency when repair volumes vary from month to month. To handle the remaining volume of phone repairs, service providers and manufacturers have turned to service contractors that are in the business of repairing multiple types of phones from various manufacturers.

For the service provider, signing repair contracts with these cellular phone repair facilities provides a more efficient and often more cost-effective solution to handset repair. Since the majority of phones returned are under warranty, service providers must work with several manufacturers for the repair of their phones. However, an agreement can be signed with a service contractor to repair all warranty phones, which relieves the service provider of that task. The service provider is also not burdened with costs involved in the expenditure of capital equipment required when repairing a high volume of phones.

Handset manufacturers sign agreements with service contractors to off-load additional volume and lessen the drain on valuable resources that can be devoted to more profitable operations. In order for such agreements to be equally beneficial from the service contractor's perspective, increased throughput, greater efficiency and lower costs must be achieved to maximize profits.

Realizing these goals presents a challenge in any test environment. There are several reasons, including test time. The time required to test a phone is dependent on the speed of the test operator and test equipment. If tests have to be made manually, test time is heavily dependent on the expertise of the operator. A more experienced technician garners higher wages. The measurement time of some test equipment can severely lag that of other more state-of-the-art models. Another reason is the variety of phones on the market that support different formats. A phone may support TDMA/AMPS, CDMA/AMPS, CDMA only, GSM only or AMPS only. In many cases, one test station is devoted solely to repairing one type of phone. When the volume of one type of phone varies from month-to-month, the efficiency of that test station is compromised.

In light of these challenges, service contractors have had to look to innovative

solutions that can alleviate these concerns. Thankfully for all involved, there have been test advancements that increase handset repair throughput and contribute to greater efficiency, which reduces overall costs.

Testing Advances Simplify Analysis

Initial handset testers were designed for dual format testing; i.e. supporting one of the digital formats and AMPS. More recent test instruments, called radio communications analyzers, can test many different handsets supporting a variety of formats. This enables a single test station to test multiple types of phones regardless of format, which ultimately reduces the amount of equipment downtime. The result is greater efficiency and higher throughput.

To provide the essential measurement analysis during call processing needed to meet handset minimum performance requirements, radio communication analyzers combine multiple instruments in one. Those instruments include a digital modulation generator, audio analyzer and generator, analog modulation analyzer, and a digital modulation analyzer. A built-in power meter and sensor are used for more accurate power measurements. A spectrum analyzer is sometimes added as an option to the radio communications analyzer for the purpose of troubleshooting and checking for out-of-band spurious.

While the radio communications analyzer provides the necessary functions to fully analyze multiple types of phones, it is the ease in which measurements can be made that is essential to increasing throughput and reducing costs. Cellular repair contractors are discovering new test automation tools that remove the need for experienced technicians to manually conduct tests. Cellular repair automation is achieved when the radio communications analyzer is combined with innovative software that makes high quality analysis as easy as a few clicks of a mouse. Cellular repair software, developed using National Instruments LabView development environment and TestStand in the Windows environment, provides a great amount of flexibility. Multiple test scenarios (called &quottest sequences&quot) can be set up for multiple types of phones and customized to execute a variety of tests. Once the test sequences have been defined and saved, they can be downloaded to multiple test stations. At the individual test stations, the test operator needs only to select the type of phone to be tested and the corresponding service provider and execute the test. The software automatically recalls the defined test sequence and completes the required set of tests via the radio communications analyzer, which is controlled remotely. When a phone is tested, a data file of test results is automatically saved.

Top: The Anritsu Radio Communications Analyzer, combined with the Cellular Repair Center Application (CRCA) software, forms a single test solution for fast, automated testing of TDMA, CDMA, GSM, and AMPS cellular phones. Bottom: Anritsu's CRCA software automates testing in the cellular phone repair environment

The benefits of this solution are obvious. Test automation reduces test time and increases throughput. Since the software simplifies the test process, less experienced test operators can be used, productivity is enhanced, and training is minimized. In addition, the solution can be used to test multiple types of phones, which adds flexibility to the test stations and contributes to reduced downtime and greater efficiency overall.

Monitoring test results is particularly valuable in identifying whether test goals are being met. As a result, the cellular repair software adds the tools that aid in generating statistical data on individual test results. The data file created following a test contains such information as a time and date stamp, test operator name, station ID, phone model and ID, test sequence used, test time, measurements completed and their results, and an overall PASS/FAIL verdict. Because this data file is saved in a tab-delimited format, the information contained can be easily extracted to run reports.

Test results of a particular phone, test station and test operator can be tracked through the software. Statistical data showing repeated failures of a test can be important in identifying problems with a certain phone model. Armed with this data, the service contractor can impart valuable information to the handset manufacturer. Similarly, multiple test failures involving a particular test station may identify problems such as faulty connectors or incorrect instrument settings. Productivity problems can also be identified with a particular test operator when the number of phones being tested is decreasing. This type of analysis becomes critical to monitoring the quality of the test process.

Because the software uses a single screen for the operator interface, navigating the software is easy. The result is a simple and straightforward method for conducting cellular phone testing. Accurate analysis is accomplished with no cellular phone test experience required.

In addition to simplifying cellular phone repair, the cellular repair software provides a level of security that is often missing in the cellular repair test environment. Users (identified as &quotoperator&quot or &quotadministrator&quot) are required to log in their user name and password. Only administrators are provided access to the test sequences defined for a particular phone. This ensures that changes are not made to test limits that may incorrectly pass a phone that would otherwise fail. As a result, the integrity of the test process and test parameters, as configured by the

administrator, is protected.

As the number of cellular phones on the market continues to increase, handset manufacturers and service providers will rely heavily on contractors to handle the high volume of cellular phone repair. Further demand to meet throughput objectives and improve test quality will push the advances in cellular phone test solutions, which will result in more reliable and efficient handset repair provided by repair facilities.

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