Discover What's Possible™ Anritsu

TECHNICAL NOTE

ML8720C/ML8740A

GSM/ W-CDMA Area Tester

GSM/ W-CDMA Area Scanner

The Value of Anritsu Scanners

ANRITSU CORPORATION

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Anritsu Corporation
Wireless Measurement Division

The Value of Anritsu Scanners

1. Design concept and features

Anritsu developed the ML8720C (GSM/ W-CDMA Area Tester) and ML8740A (GSM/ W-CDMA Area Scanner) as precision scanners that focus on optimization in densely populated areas where analysis of multiple paths and interference are critical. ML8720C is an enhanced version of the ML8720B, equipped with GSM measurement capability and suitable for indoor measurement and network maintenance. ML8740A has no display and is a dedicated model for drive testing. The ML8740A platform is the same as ML8720C, and one can use it in conjunction with drive test software with the same remote commands. However, the physical interface is different -- ML8740A is equipped with a USB interface for connecting to a PC.

The key features of Anritsu scanners are:

a. Convenient and lightweight instruments with long battery life for portability
b. Real-time measurements using high speed sampling for accuracy and optimization
c. Stable measurement algorithms to test fading and the Doppler effect within a drive test area
d. Optimized circuitry design to avoid the effects of interference
e. Precise data collection in complicated multi-path environments

With the above unique features, Anritsu provides the reliable and precise measurements required in densely populated areas. When one considers measurement precision, the above items b, c, and d are critical parameters for network optimization. It is essential to satisfy these conditions to achieve a reliable and optimized network rollout.

2. The value of a hardware solution

To evaluate the signal environment correctly, it is necessary to consider fading and the Doppler effect. Anritsu scanners meet all the environmental requirements by utilizing AGC (Auto Gain Control) and AFC (Auto Frequency Control). In addition, each instrument is equipped with an original Matched Filter for fast correlation, which provides quick channel select and reselect (10 ms/ch for W-CDMA).

It is possible to provide these features using DSP measurement algorithms alone, but this would sacrifice high-speed operation. Unfortunately, any delay in measurement sampling will lead to a serious impact on the total measurement accuracy: we can expect only scattered measurement data in an environment where fading is present. After pursuing an initial DSP-based design using simulation prior to product development, we elected not to choose a DSP measurement algorithm approach and adopted a hardware solution instead. The hardware solution also enables high-speed measurement from a train. Anritsu scanners guarantee RSCP measurement values with an accuracy of ±2 dB up to 300 km/h , so one can perform optimization on a high-speed train.

3. The value of real-time dual frequency measurements

In order to make true accurate measurements on two RF channels, there are two options. Some scanners employ a method of switching a single receiver between the two channels. While this may keep the price low, this test methodology has the same issues as mentioned above. How can one compare two RF sources in a fast fading environment? Anritsu's test methodology is to utilize two independent Rake Receivers capable of operating simultaneously on independent frequencies. This ensures all network conditions are measured in real time. With the additional hardware, it is also possible to synchronize multiple scanners and a single GPS. This is ideal if one needs to analyze conditions in a multi-operator W-CDMA environment.

4. Guarding against interference

It is very important to select only the desired BTS signal in a certain geographical area, avoiding all kinds of interference signals. To enable this, Anritsu not only reduced the noise floor inside the instrument but also developed an original Matched Filter. With these elements, we are able to correctly choose the desired signal among all the noise. As a result, Anritsu scanners guarantee correct measurement data collection under tough urban area environmental conditions (Ec/NO < -17dB, but typically, the maximum coverage is Ec/NO >= -22dB). It is also possible to achieve correct measurements using DSP measurement algorithms. However, as we explained above, the calculation time for the huge amount of data is very critical, and neither measurement error nor measurement delay is acceptable. We strongly recommend that our customer investigate this prior to selecting a scanner.

5. Antenna Diversity

As network loading increases, operators may employ antenna diversity methods. When used in combination with its optional diversity function, the ML8720B offers even higher-accuracy measurements, such as CPICH transmit diversity format. Anritsu believes our ML8720B/C is the only W-CDMA scanner that is future-proofed by offering these measurement capabilities at the time of initial purchase or as an upgrade option.

6. BCH (Broadcast Channel) Demodulation

With this option (MX872002B), the ML8720B/C and ML8740A provide BCH demodulation. SIB (System Information Block) information contained in SIB Messages helps solve problems such as call drop and handover failure. For example, it is possible to check if a UE receives a signal from the nearest cell through SIB3 (Cell ID). Demodulation of SIB3 and SIB11 is necessary for analyzing handover errors. SIB7 (UL Interference) reports whether there is high level interference in a cell. If this option is used in conjunction with a second Rake Receiver, our scanner provides simultaneous BCH demodulation for two frequencies in real time. This function is very useful for benchmarking other operators. Simultaneous demodulation of multiple BCH and is not performed by other scanners because they do not have any additional Rake Receiver capability.

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Specifications are subject to change without notice.

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