

# Efficient Field Tests at Benchttop - Field to Lab -

ACE RNX Channel Emulator

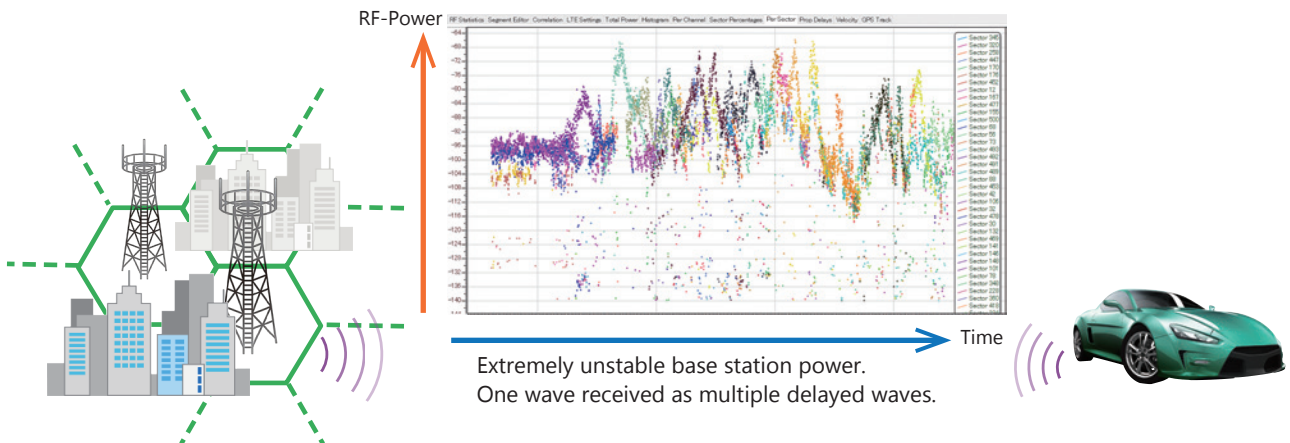
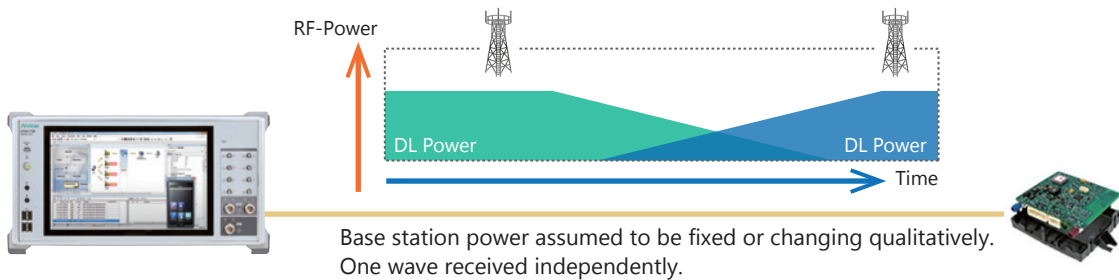


## Evolution of 'Connected Car'

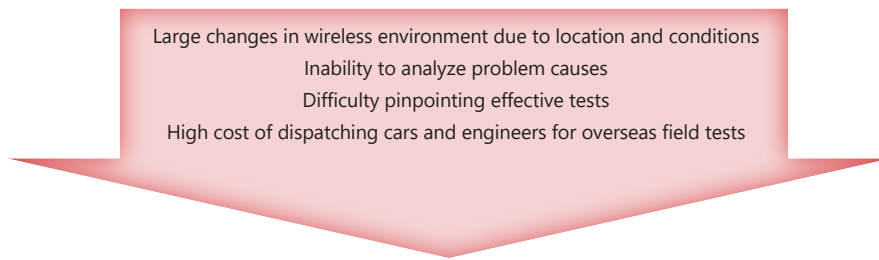
Automobiles communicating via cellular network connections is one key focus of international automotive makers. Cellular network communications are an indispensable part of further development of the 'connected car' using the latest mobile communications technologies as well as in development of self-driving vehicles. Anritsu is a world leader in evaluation of mobile communications technologies and is playing a major role in development and growth of the 'connected car' based on the company's wealth of experience and technical knowhow gained from its work in the smartphone market.

## Importance and Disadvantages of Field Tests

Using a tester is a fundamental and effective method for 'connected car' wireless evaluations. A tester checks the functions and performance of the communications module (TCU) by signals under ideal conditions for the test. However, since the actual wireless environment is never ideal, the same performance as when evaluating with a tester is never obtained, which can cause unanticipated problems.



Consequently, in addition to running function and performance tests using a tester, although field tests are much more useful, the following problems can occur at field tests.



## Building Benchtop Field Test Environment with ACE RNX

The above problems are solved using the ACE RNX to reproduce the field RF environment supporting stable benchtop simulation testing and analysis. The ACE RNX makes it easy to simulate both power changes in accordance with field logs as well as the RF environment by applying 3GPP-defined fading models to the RF signals.



Capabilities	S/W & Platform	Specifications
<p><b>MIMO:</b> 2×2U/B, 4×4U/B, 8×8U/B*</p> <p><b>Dynamic Playback:</b> 1 ms playback Reciprocal path loss</p> <p><b>Carrier Aggregation:</b> Multi CC support Internal RF circuitry for splitting/combining</p>	<p><b>Software:</b> Scenario Builder with built in standard, operator scenarios SOAP Automation - C#, TCL, Java, Python, etc.</p> <p><b>Platform:</b> RF IN RF OUT Virtual Network Environment (VNE)</p>	<p><b>Specifications</b></p> <p>Frequency: 380 MHz to 6000 MHz            Bandwidth: Up to 100 MHz            8 RF/32 Digital Channels/4 LOs            Input: +23 to -50 dBm            Output: -25 to -120 dBm            EVM: -40 dB            Noise Floor: -166 dBm/Hz            Insertion Delay: 1.1 μs</p>

\*: Require 2 sets for 8×X

Simulating the field environment using the ACE RNX minimizes differences between field and lab. This helps reduce problems discovered in the field after commercial release, in turn helping slash costs. Moreover, since actual TCU performance in a degraded field environment can be diagnosed, applications matching TCU performance can be developed more easily. Last, a wide range of applications, such as benchmarking for regression testing and acceptance inspection, is also supported.

	<h3>"Real-world" &amp; Global Testing</h3>	<ul style="list-style-type: none"> <li>• Reproduce global field tests</li> <li>• Diagnose device throughput performance, etc.</li> </ul>
	<h3>Benchmarking &amp; Regression Testing</h3>	<ul style="list-style-type: none"> <li>• Compare device/chipset performance under various field conditions</li> <li>• Perform regression testing at firmware/software updates</li> <li>• Perform acceptance inspection with benchmarks</li> </ul>
	<h3>Debugging Issues</h3>	<ul style="list-style-type: none"> <li>• Debug call dropping and handover, etc.</li> <li>• Recreate the field condition corresponding to an issue reliability and repeatability</li> <li>• Validate the fixed for issue</li> </ul>