G9200
Radio Conformance Analyzer

ALL-IN-ONE SOLUTION FOR DEVELOPMENT, VERIFICATION AND CONFORMANCE TESTING OF LTE MOBILE EQUIPMENT
The G9200 Radio Conformance Analyzer (RCA) is an advanced test solution for mobile LTE, and other radio technology equipment. It provides built-in multiple test equipment functionality, including a Base Station Emulator (BSE) with up to three cells, VSA, VSG, Protocol Tester, Fading emulator, power meter, audio analyzer, and DC power supply in a single highly integrated benchtop instrument.

G9200 replaces over 10 test instruments providing a unique ‘lab-in-a-box’ solution that significantly reduces test times and costs.

The RCA is able to perform analysis of LTE mobile devices at all layers from the physical to the application layer, and is suitable for development, conformance, pre-conformance, and production test applications. It ships pre-loaded with ready-to-run automatic tests that test conformance according to 3GPP 36-521, 36-521-3, 36-523 standards.

You can run standard tests, customize existing tests, or create new tests using the powerful RCA script. Tests can be executed conditionally and/or repeatedly in loops, as a function of parameter values, counters, and Equipment Under Test (EUT)-supported features. The appearance of the tests, and presentation of results is fully configurable, and you can arrange graphs, tables, and test parameter controls and set limits, as required. In this way, you can create as many virtual instruments as you require. You can view, tune to, compare, analyze, and present measured signals using time and frequency domain graphs, EVM, IQ, constellation graphs, tables markers, marker functions, statistics, limits, and annotations. You can also export results data to other applications (e.g., MS Excel, or Mathlab) for further analysis.

The G9200 uses variety of user interfaces which provides a flexible and convenient test execution environment.

Inputs are possible from the built-in touch screen, front panel controls and remote control devices. Combined with the intuitive user interface, it reduces the test time and eliminates the need to integrate and control multiple test equipments.

When combining multiple instruments, even from a single vendor, it requires a high degree of support and integration. The G9200 needs no integration and is ready to run out of the box.

The RCA Intuitive, easy-to-use GUI facilitates management of a database of tests, test actions and settings, projects, virtual instruments, reports, samples, and client information. It includes New, Edit, Group, Duplicate, Cut, Copy, Paste, Search, and Sort operations. You can run tests directly, or you can create projects with multiple tests that store results automatically.
Project creation by drag and drop

Results display, analysis and manipulation
Key Features:

- All-in-one test solution for LTE handset:
  - Development
  - Verification
  - Conformance
- RF and Radio measurements
- Protocol testing
- Performance testing
- MIMO 2x2 and 4x2
- FDD and TDD support
- Built-in bases station emulator with 3 cells, vector signal analyser and generator
- Fading and AWGN emulation
- Voice Quality and VoLTE testing
- TCP/IP application & performance testing
- 3GPP 36-521, 36-521-3, 36.523 standards support
- ‘Lab-in-a-box’ integrated environment for running, building and management of tests, virtual instruments, projects and standard suites
- Powerful graphical script for test creation and automation
- Automatic test reports generation in RTF, HTML, PDF format
- Remote operation and automation of the instrument
- Remote control of external equipment
- Bench top instrument with built-in large touch screen Windows 8 PC, USB, Ethernet ports
- Comprehensive online help

A graphical screen enables convenient presentation and management of internal RF modules interconnections with external devices (cables, attenuators, amplifiers, splitters, couplers, etc.), and the EUT. Fixed and frequency dependent Attenuation/Gain correction factors can also be defined for external devices. The RCA also includes built-in calibration tests, and enables you to backup and restore all instrument data to/from an internal, external, or network drive.

The G9200 comes with test suites ready for testing according to the supported standards. Tests can be performed automatically, either one by one or in a sequence. No user interaction is required apart from the setting any prompts appearing on the screen during initialisation. Test can be run automatically or manually and results provided in many ways to suit the need of the user / customer.

Until now the choice of test equipment for terminal development and proving was a complex, expensive rack full of equipment or a simple call box. Hermon Laboratories is now able to provide a flexible compact bench top product that provides a no compromise solution for modern wireless terminals.
Applications
• Conformance testing
• Pre-conformance testing meets 3GPP specs
• R&D testing
• Regression testing
• QA testing
• Production testing
• Application testing
• Call box
• Stand-alone instruments

Operation Modes
• LTE Conformance Testing Mode
• 3GPP RCT suites (see below)
• 3GPP PCT suites (see below)
• 3GPP TS 26.131 and TS 26.132 (mobile terminals)
• acoustic testing
• Development mode
• Call Box
• Standalone VSA
• CW Signal Generator
• In the future releases
• Inter-RAT handover support
• eNB Measurements
• Audio quality measurements

Test flow creation by drag and drop
Our 25 years of experience, enables us to design test equipment that addresses comprehensively the chip designer, terminal manufacturer, test lab and network provider testing needs

User defined tests
User can create tests from the scratch not just modifying the existing test. See the manual. The user can define and build his own tests or he can use the pre-defined tests and change them to his requirements. The test creation is easily done using the “drag and drop” interface. A TTCN3 engine allows the user to run protocol conformance and also to implement its own TTCN3 test scripts.

The tests included give the building blocks to create comprehensive test capability for RF, AF, Protocol and Applications.

Application tests
IP data flow and error checking is provided with access to flows like http, ftp, UDP, TCP. In this mode the user is capable of creating simple data traffic flows or different PRBS (to be defined), with predefined traffic patterns, and sending them to the UE. Complex traffic flows are possible using the internal IP protocol stack or external application simulation software.

Voice quality and acoustic testing is provided based on PESQ and POLQA algorithm.

TTCN3 engine and PICS/PIXIT
The TTCN3 engine allows to run standard TTCN3 test scenarios.

By making use of the PICS/PIXIT feature, tests are populated with the correct parameters that correspond with the capabilities of the terminal under test. This is the same method used in conformance testing and minimises set up times while reducing errors.

Message log
With so much data to be analyzed, Protocol testing needs to be available with good filters and visual highlights so that issues are identified easily. The G9200 has a trace log that captures run time data and presents this with the decoded messages in a easily understood format.

VSA
Live uplink analysis & measurements while in a call are provided. Measurements include EVM, I/Q, Frequency error, Power measurement. Can also be used standalone. The standard VSA measures signals up to 3.8GHz, with the option to have a 14GHz VSA where the additional spurious signal measurements are required.

Measurements screen configuration
The user has variety of possibilities to customise the measurement screen, which allows focus on the areas that are under scrutiny. These may be saved and recalled for rapid diagnosis of faults and intermittent errors.

Fader and AWGN source
The Channel Emulator emulates multi-path Rayleigh fading channel and AWGN noise (AWGN). The following Channel profiles are supported by the emulator.

- No channel emulation
- No channel emulation Boosted
- Static Propagation - Extended Pedestrian A 5Hz
- Extended Vehicular A 5Hz
- Extended Vehicular A 70Hz
- Extended Typical Urban 70Hz
- Extended Typical Urban 300Hz
- Two-tap for CQI tests
- High Speed Train

Multipath fading profiles supported:
- EPA5
- EVA5
- EVA70
- ETU300
Pre-conformance
Because the G9200 includes many 3GPP conformance tests it provides the ability to run many tests before the expense of a full laboratory test session.
Products can be modified before lab entry: saving time and money.

Conformance
Analysis of LTE mobile devices at all layers from the physical to the application layer is possible for conformance. It ships pre-loaded with ready-to-run automatic tests that test conformance according to 3GPP 36-521, 36-521-3, 36-523 standards.

Regression
The supplied tests can be run or customized to create new tests using the powerful scripting tool. Tests can be executed conditionally, repeatedly in loops, as a function of parameter values, counters, etc.
The appearance of the tests, and presentation of results are fully configurable, and can be arranged with graphs, tables, and test parameter controls and set limits, as required.

Applications
You can connect to a LAN and/or a variety of external devices through the standard Ethernet and USB ports. It can be connected to GPIB devices via an optional external adapter, and also provides the option to control external equipment via user-defined commands.
LTE Call Box

The LTE Call box application is based on a real LTE protocol stack which ensure real network behavior simulation. With the ability to create scenarios and study link status, statistics and measurements with pass/fail limits. The call box mode is easy to use making it ideal for fast configuration.

RF Conformance

With the 3GPP RCT test suites package, RF conformance tests (TS 35.521-1) can be made. These include transmitter and receiver characteristics, FDD and TDD performance requirements and Channel State Information. Additional user defined

Protocol Conformance

The 3GPP PCT test suites package is available, and with the addition of the TTCN editor, a very flexible testing regime is possible. As well as the 3GPP TS 523-1 tests, variants are easily created to exercise beyond specification and meet the requirements of many Carriers for their acceptance processes.

VSA Functionality

Live uplink analysis & measurements while in a call. Measurements include EVM, I/Q, Frequency error, Power measurement. Can also be used standalone.
Application Level Testing & VoLTE

IP testing with bidirectional testing including complex traffic flows and simulation of the protocol stack. VoLTE voice quality tests can be performed over an IMS gateway in IPV6 and IPV4 mode to tests all the relevant AMR-WB codec modes.

Reporting tool

Automatic test reports generation in PDF, HTML, MHT, RTF, XLS, XLSX, CSV, Text File, Image File, or XPS file formats.

Ordering information

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<tr>
<th>G9200</th>
<th>mainframe with 15” touch screen, BSE (single cell), switching unit, basic software with premade sample tests, report capabilities and automation</th>
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<tr>
<td>Options</td>
<td></td>
</tr>
<tr>
<td>Opt. CELL2</td>
<td>Second cell option</td>
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<tr>
<td>Opt. CELL3</td>
<td>Third cell option</td>
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<tr>
<td>Opt. VSA 3.8</td>
<td>VSA – up to 3.8 GHz</td>
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<tr>
<td>Opt. VSA 14</td>
<td>VSA – up to 14 GHz</td>
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<tr>
<td>Opt. CW 14</td>
<td>CW generator 13GHz</td>
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<td>Opt. CW 18</td>
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<tr>
<td>Opt. FAD</td>
<td>Fader tool</td>
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<tr>
<td>Opt. 3GPP RCT</td>
<td>3GPP RCT test suites package (RF)</td>
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<tr>
<td>Opt. 3GPP PCT</td>
<td>3GPP PCT test suites package (protocol)</td>
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<tr>
<td>Opt. 3GPP AUD</td>
<td>3GPP TS 26.131 and TS 26.132 package (mobile terminals acoustic)</td>
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