Anritsu has developed based on its active participation in 3GPP standardization and close work with major infrastructure, chipset, terminal, and base station developers, are helping improve time to market and cost-of-manufacturing of LTE devices and systems.

Here we’ve put together LTE sections focused on the latest technologies to provide you essential reference material to appropriate test solutions.

It is the perfect test solution for bringing LTE terminals to market as quickly as possible based on Anritsu’s extensive knowledge of 3G/3.5G technologies.

## Mobile Terminal Test Solutions

<table>
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<th>Core Technology Development Tests</th>
<th>Integration R&amp;D Tests</th>
<th>Conformance Tests</th>
<th>IOT Operator Acceptance Tests</th>
<th>Production Line Tests</th>
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<tbody>
<tr>
<td><img src="image" alt="MD8430A+RTD" /></td>
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<td><img src="image" alt="MG3700A" /></td>
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<td><img src="image" alt="MS269xA/MS2830A" /></td>
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<td><img src="image" alt="MT8820C" /></td>
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<td><img src="image" alt="ME7873L" /></td>
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</tbody>
</table>

## Base Station Test Solutions

<table>
<thead>
<tr>
<th>Core Technology Development Tests</th>
<th>Production Line Tests</th>
<th>Field Tests &amp; Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="MG3700A" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="MS269xA/MS2830A" /></td>
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<td></td>
</tr>
<tr>
<td><img src="image" alt="MS272xB/MS271xE" /></td>
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<td><img src="image" alt="MT822x/MT8212E" /></td>
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<td></td>
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<tr>
<td><img src="image" alt="MP2100A" /></td>
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</table>

*: The article is not published on this catalog. Please refer to the product catalog.

LTE logo is a trademark of the European Telecommunications Standards Institute (ETSI).
The MD8430A Signalling Tester is an essential base station simulator for developing LTE chipsets and mobile terminals. The built-in 3GPP Rel-8 E-UTRA-compliant RF interface and digital IQ interface support all LTE terminal performance tests required for early development, including coding and decoding, protocol, packet communications with external server, and throughput tests.

In addition, the integrated Rapid Test Designer (RTD) tool with intuitive GUI makes it easy to create, execute, and analyze LTE terminal test cases. A system for testing handover with existing systems is easily configured by combining the MD8430A with the MD8480C (UTRAN/GERAN) and MD8470A (CDMA2000).

### Features
- Responsive support for latest 3GPP LTE standard
- One unit supports 2x2 MIMO Intra-RAT handover and 4x2 MIMO DL: 100 Mbps/UL: 50 Mbps
- Maximizing existing hardware investment (MD8480C, MD8470A CDMA2000) with Inter-RAT handover tests
- Investment tailored to applications ranging from R&D to protocol conformance tests
- Easy L3 scenario R&D and full range of analysis tools

### Purpose
- Coding and Decoding tests (RF/Baseband)
- Protocol sequence tests
- Throughput and Stress tests
- Inter-RAT and Intra-RAT handover tests

### Key Applications
- Protocol conformance and Pre-conformance tests
- Network interoperability tests (IOT)
- Network operator acceptance tests
- Fault troubleshooting
- QA terminal operation evaluation

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The MD8430A/MX786201A Signalling Tester/Rapid Test Designer (RTD) supports LTE chipsets and is an ideal mobile development solution. It includes a built-in 3GPP Rel-8 E-UTRA-compliant RF interface and digital IQ interface to support all LTE terminal performance tests. The integrated Rapid Test Designer (RTD) tool simplifies the creation, execution, and analysis of LTE terminal test cases, making it a versatile solution for both R&D and protocol conformance tests.
Digital Fading Simulator Supporting LTE 2x2 MIMO 2-cell and W-CDMA/HSPA

The MF6900A Fading Simulator supports LTE and W-CDMA/HSPA mobile terminals with a full range of preset 3GPP fading profiles as well as easy configuration of fading performance and stress test environments. The dedicated digital interface for connecting the MD8430A or MD8480C Base Station Simulator guarantees high simulation reproducibility, easy maintenance, and calibration-free stability. Dual LTE 2x2 MIMO and LTE ↔ W-CDMA/HSPA handover tests are made easy by this all-in-one unit.

Features
- High reproducibility and maintainability due to full digital baseband processing
- All-in-one unit supports LTE 2x2 MIMO 2-cell and LTE 2x2 MIMO ↔ W-CDMA/HSPA dual test environment
- Easy fading settings using dedicated interface with MD8430A/MD8480C Signalling Tester
- Highly extendible hardware platform

Purpose
- Coding and Decoding tests (RF/Baseband)
- Fading performance tests
- Throughput performance tests

Key Applications
- RF Conformance and Pre-conformance tests
- Network interoperability tests (IOT)
- Network operator acceptance tests
- QA terminal operation evaluation

The MD8480C Signalling Tester for W-CDMA supports all-in-one LTE/W-CDMA inter-system handover tests (with MF6900A-001 option installed).
Anritsu Protocol Conformance Test System for LTE

The ME7832L Protocol Conformance Test System (PCTS) is an integrated solution for UE protocol conformance test, with an easy to use graphical interface application correctly configured with the Protocol Conformance Toolkit (PCT) for the required operation. It allows customers to verify that their device meets the 3GPP standard and to gain GCF and PTCRB certification.

3GPP TS 36.523 LTE Protocol Conformance Solution
Integration with the MD8430A LTE Signaling Tester, GCF Protocol Conformance Test Toolkit eliminates troublesome setup, such as cable connections, software installation, and level correction, to maximize protocol conformance testing efficiency and shorten time to market. An existing ME7832A, PCTS for W-CDMA can also be upgraded to LTE providing a Multi-RAT solution. PCTS can also be purchased for use with an existing MD8480-based platform for W-CDMA or MD8430A-based platform for LTE.

Key Benefits
• Reduce external test house costs
• Provide repeatable & reliable test results
• Create test sequences efficiently using the graphical user interface
• Remote & UE control provide enhanced automation environment
• Uses less space in the laboratory
• Execute tests faster than on any other platform (Future plan)

Features
• Covers test cases for LTE UE protocol conformance test
• Intelligent test sequencer to schedule tests using drag and drop graphical interface
• Extensive library of GCF & PTCRB test cases
• Creation of PICS/PIXIT data automatically and modification of deviations manually
• Analyze results by Passed/Failed verdict and easily re-run any failed tests
• Protocol analyzer shows entire test Sequence of all layers, with time stamps for analysis
• Ability to view TTCN-3
• Detailed analysis of any message highlights difference in expected and received data
The ME7873L test platform is for testing RF TRx characteristics, performance requirements, and RRM performance of LTE mobile terminals in compliance with the requirements of 3GPP TS 36.521-1 Chapter 6 (Transmitter Characteristics), Chapter 7 (Receiver Characteristics), Chapter 8 (Performance Requirement), Chapter 9 (Reporting of Channel State Information) and TS 36.521-3 RRM.\(^*\), \(^*\) Moreover, support for Inter-RAT tests including LTE→GSM/UMTS/CDMA2000, UMTS→LTE handover is planned. In addition, support for TDD service mainly for China is planned too.\(^*\)\(^2\)

Supporting Most GCF\(^*\)/PTCRB\(^*\) Approved Test Cases
This GCF/PTCRB-compatible test platform targets the most and first Test Cases approved at quarterly GCF/PTCRB meetings. It uses the MD8430A Signalling Tester as a LTE base station simulator, and is configured from various test instruments and dedicated software. It supports RF/RRM tests while communicating with LTE mobile terminals.

LTE and W-CDMA Parallel Test Capability
Parallel LTE and W-CDMA Testing
Supports parallel independent LTE and W-CDMA RF Conformance tests with upgrade from ME7873F W-CDMA TRX/Performance Conformance Test System or ME7874F RRM Conformance Test System. Simultaneous parallel measurement of LTE and W-CDMA terminals cuts test times and optimizes equipment cost-performance investment.

Measurement Functions for Efficient R&D
The easy-to-use GUI supports a search mode for Rx and performance tests, automatic extraction and retry for failed tests, SS log viewer, and simple parameter changes for efficient R&D and approval tests.

Supports Global Mobile Terminals
Not only are GCF/PTCRB-approved Band 1 (2100 MHz), 4 (1700 MHz /2100 MHz), 7 (2600 MHz), 12 (700 A block), 13 (700 C block), and 17 (700 B block) planned for use in Europe and North America fully supported, but the following bands defined by 3GPP are also supported too. Unlisted bands can be supported by request.

<table>
<thead>
<tr>
<th>E-UTRA Operating Band</th>
<th>UL Operating Band (MHz)</th>
<th>DL Operating Band (MHz)</th>
<th>Operation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1920 to 1980</td>
<td>2110 to 2170</td>
<td>Europe, Asia</td>
</tr>
<tr>
<td>2</td>
<td>1850 to 1910</td>
<td>1930 to 1990</td>
<td>North America</td>
</tr>
<tr>
<td>3</td>
<td>1710 to 1785</td>
<td>1805 to 1880</td>
<td>Europe, Asia</td>
</tr>
<tr>
<td>4</td>
<td>1710 to 1755</td>
<td>2110 to 2155</td>
<td>North America</td>
</tr>
<tr>
<td>5</td>
<td>824 to 849</td>
<td>869 to 894</td>
<td>North America, Asia</td>
</tr>
<tr>
<td>7</td>
<td>2500 to 2570</td>
<td>2620 to 2690</td>
<td>Europe</td>
</tr>
<tr>
<td>8</td>
<td>880 to 915</td>
<td>925 to 960</td>
<td>Europe</td>
</tr>
<tr>
<td>9</td>
<td>1749.9 to 1784.9</td>
<td>1844.9 to 1875.9</td>
<td>Japan</td>
</tr>
<tr>
<td>10</td>
<td>1710 to 1770</td>
<td>2110 to 2170</td>
<td>North America</td>
</tr>
<tr>
<td>11</td>
<td>1427.9 to 1447.9</td>
<td>1475.9 to 1495.9</td>
<td>Japan</td>
</tr>
<tr>
<td>12</td>
<td>698 to 716</td>
<td>728 to 746</td>
<td>North America</td>
</tr>
<tr>
<td>13</td>
<td>777 to 787</td>
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<td>14</td>
<td>788 to 798</td>
<td>758 to 768</td>
<td>North America</td>
</tr>
<tr>
<td>17</td>
<td>704 to 716</td>
<td>734 to 746</td>
<td>North America</td>
</tr>
</tbody>
</table>

\(^*\) RRM: Radio Resource Management
\(^*\) In principle, defined by GCF Work Item\(^*\) and targeting measurement items certified by GCF/PTCRB. (Contact our sales staff for timing of supported items and option configurations.)
\(^\star\) GCF (Global Certification Forum): Certifies conformance to standards for mobile terminals and test systems. Composed mainly of operators, mobile terminal vendors and chipset vendors and performs certification for frequency bands used in Europe.
\(^\star\) PTCRB (PCS Type Certification Review Board): A similar test system certification organization to GCF composed mainly of N. American carriers and UE vendors and performing conformance certification for frequency bands used in N. America.
\(^\star\) Name of function test items selected by GCF for mobile terminal approval.
MT8820C
Radio Communication Analyzer

All-in-one RF Tx/Rx Measurement Solution for LTE FDD Mobile Terminal R&D and Manufacturing

The MT8820C combines high-level signalling and high-performance RF measurement technologies in a single hardware platform covering a wide frequency range from 30 MHz to 2.7 GHz. Installing the LTE FDD Measurement Software MX882012C and LTE FDD Measurement Hardware MT8820C-008 in the MT8820C supports high-speed and high-accuracy RF Tx/Rx testing LTE FDD terminals with UE category 1 and 3 on production lines in either the UE-connected mode or Test mode.

Features
• Supports RF Tx and Rx Tests in UE-Connected and Test Modes
• Supports 3GPP-standard Test Signals
• All-in-one unit supporting LTE FDD/W-CDMA/GSM R&D and manufacturing

LTE FDD UE Evaluation
RF Tx and Rx Testing in UE-Connected and Test Mode
All RF Tx and Rx tests recommended by 3GPP (TS 36.521-1 chapters 6 and 7) can be performed in both the LTE FDD UE-connected mode and Test mode (UE not connected). In addition, various RF Tx and Rx test-related parameters can be changed.

One-touch Setting of Tx Test Items
Settings for 3GPP-compliant main Tx tests are made by one touch operation. Evaluation starts when measurement is completed by pressing “Single”, continuously, allowing even novices to perform accurate measurements successfully. In addition, control programs can be created simply and test speed can be faster using relevant GPIB commands.

For example, pressing sets the parameters to measure the mobile terminal maximum output (QPSK Full RB) automatically and simultaneously. The overall evaluation, and Pass/Fail items (displayed in red) can be seen at a glance at measurement completion.

* Requires MT8820C-008 and MX882012C for the main Tx and Rx characteristics of LTE FDD terminal with Call Processing function.
* Requires MX882042C for the main Tx characteristics of LTE FDD terminal without Call Processing function.
MX882042C is non-Call Processing product. Refer to the MX882012C or MX882042C catalog for detail.
* For terminal connectivity, contact your Anritsu sales representative.
The MX370108A LTE IQproducer is GUI-driven PC application software for generating waveform patterns in compliance with 3GPP LTE FDD (Uplink, Downlink). The MX370110A LTE TDD IQproducer is GUI-driven PC application software for generating waveform patterns in compliance with 3GPP LTE TDD (Uplink, Downlink). The generated waveform patterns are downloaded to the MG3700A Vector Signal Generator to output signals. In addition, combination with the separately sold MX370107A Fading IQproducer generates waveform patterns for SISO/SIMO/MISO/MIMO signals.
MS2690A/91A/92A, MS2830A
Signal Analyzer

One Unit Supports Tx Characteristics Evaluation

Installing the MX269020A LTE Downlink Measurement Software, MX269021A LTE Uplink Measurement Software or MX269022A LTE TDD Downlink Measurement Software in the MS269xA or MS2830A supports high-speed high-accuracy evaluation of RF Tx characteristics for LTE base stations and mobile terminals. In addition, installing the Vector Signal Generator option supports simple measurement system setup and cuts the equipment footprint, investment, and running costs (calibration, maintenance and power).

Measurement Functions

- **Text Display**
  - Frequency Error
  - Output Power
  - EVM (Peak/RMS)
- **Constellation Display**
  - Constellation
- **Spectrum Display**
  - Adjacent Channel Power
  - Channel Power
  - Occupied Bandwidth
  - Spectrum Emission Mask
- **Graphical Display**
  - EVM vs. Subcarrier
  - Spectral Flatness
  - EVM vs. Symbol
  - RE Map (DL)
  - EVM vs. Resource Block (DL)
  - Power vs. Resource Block (DL)
  - In-Band Emission (UL)
  - Time Based EVM (UL)
  - EVM vs. Demod-Symbol (UL)

**Replay Function for Troubleshooting Faults**
Up to 200 frames of LTE signals can be captured as a file for replay by the LTE measurement software to perform analyses, such as EVM measurement.

- **R&D use:** Supports comparison of retrofitting improvement effects
- **Production line use:** Supports rechecking of performance data for troubleshooting post-shipping faults

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**Vector Signal Generator (option)**
Built-in Spectrum Analyzer and Signal Generator in one unit.

**MX269020A**
LTE Downlink Measurement Software

**MX269021A**
LTE Uplink Measurement Software

**MX269022A**
LTE TDD Downlink Measurement Software

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**RE MAP Screen**
**In-Band Emission Screen**
**Modulation Analysis Screen**
Simultaneous BER measurements and Eye/Pulse analysis using BERTWave increase efficiency and cut measurement time by eliminating time consuming setup. As a result, the BERTWave series is the ideal all-in-one solution supporting both R&D and manufacturing. Fully supported LTE CPRI v4.1 bit rates (6.14, 4.92, 3.07, 2.46, 1.32 Gbit/s) make the BERTWave series ideal for LTE CPRI optical transceiver inspection tests*. And the custom lineup of three configurations cuts equipment costs.

* Special order

Evaluating LTE CPRI v4.1 Optical Modules

Supporting BER Measurements and Eye Pattern Analysis

Typical Waveform

Lineup

MP2100A BERTWave

MP2101A BERTWave PE

MP2102A BERTWave SS
ML2490A/ML2480B
Pulse Power Meter/Wideband Power Meter

Power Meters and Power Sensors for LTE

ML2490A with MA2411B: Ideal for FDD and TDD LTE

Key Features

- **Industry best Video Bandwidth**
  39 MHz BW for combination of meter and sensor covers all LTE channel bandwidths to 20 MHz and future proof for wider applications.

- **High sample rate**
  62.5 MS/s sample rate with Random Repetitive Sampling to 1 GS/s.
  is ideal for accurate measurements on TDD based LTE.

- **Dual Input Model**
  The ML2496A supports A, B and ratio measurements A/B for amplifier and return loss measurement applications.

- **Color Display**
  Highly visible color display with the functionality and features of a power meter. The results can be displayed graphically or as a direct numerical readout.

- **Gates and Markers**
  Multiple measurement gates and markers for the precise capture and measurement of the correct section of a complex signal. 4 independent gates and 8 repeated gates can be set for TDD applications. 4 Markers and a delta marker enable the user to pinpoint relevant features of the signal.

- **Sensor MA2411B**
  40 GHz frequency range make the MA2411B an excellent sensor for a wide variety of applications in addition to LTE.

ML2480B with MA2490A: Ideal for FDD LTE

Key Features

- **Wide Video Bandwidth**
  20 MHz BW for combination of meter and sensor covers all current LTE channel bandwidths.

- **High sample rate**
  62.5 MS/s sample rate provides accurate measurements on wideband signals.

- **Dual Input Model**
  The ML2488B supports A, B and ratio measurements A/B for amplifier and return loss measurement applications.

- **Color Display**
  Highly visible color display with the functionality and features of a power meter. The results can be displayed graphically or as a direct numerical readout.

- **Sensor MA2490A**
  MA2490A sensor supports 8 GHz requirements.