Signalling Tester
MD8430A
Rapid Test Designer (RTD) MX786201A
Early Support for Developing LTE-Advanced Pro (CA/MTC) Chipsets and Mobile UEs

LTE-Advanced Pro is faster than LTE-Advanced and becoming effect radio communications network. The Signalling Tester MD8430A is a key LTE base station simulator for developing LTE/LTE-Advanced/LTE-Advanced Pro-compliant chipsets and mobile UEs. Using its extensive experience in 3G markets, Anritsu has developed the MD8430A as a powerful LTE-Advanced Pro protocol R&D test solution to help developers bring LTE/LTE-Advanced/LTE-Advanced Pro terminals to market as fast as possible.

**Key Features**
- Support LTE-Advanced Pro testing with 6CCs Carrier Aggregation (CA) and less
- Early support 3GPP LTE-Advanced FDD/TDD Release 12
- TDD-FDD joint operation including CA
  - DL 256QAM
  - LTE MTC (Machine Type Communication)
- One MD8430A support CA handover, 4×4 MIMO, 8×4 MIMO, etc.
- Available to testing of full digital fading
- Support DL 2 Gbps, UL 300 Mbps data throughput
- Inter-RAT tests making effective use of previous MD8480C (UTRAN/GERAN), and MD8475A (CDMA2000) hardware investments
- Optimized investment from first R&D to protocol conformance testing
- Full development and analysis toolset cuts L1, L2 and L3 scenario development time and costs
- Support UMTS Release 10, HSPA Evolution, GSM/GPRS/EGPRS

**Main Applications**
- Coding/Decoding tests (RF/Baseband)
- Protocol sequence tests
- Throughout and stress tests (Performance test)
- Intra-RAT/Inter-RAT performance tests
- LTE Pre-conformance/Conformance tests
- Network interoperability tests
- LTE network operator acceptance tests (CAT)
- Troubleshooting field test problems
- UE QC inspection
- W-CDMA/HSPA protocol sequence tests
Main Test Functions
• LTE-Advanced Intra-RAT CA handover test (Hard handover)
• LTE ↔ UTRAN/GERAN Inter-RAT handover test
• eMBMS test
• Digital baseband slow clock test
• Protocol sequence analysis (Log analysis)
• Throughput monitoring
• UE Scheduling function (Time/MCS/Lowest RB/RB)
• H-ARQ Test (ACK/NACK/DTX)
• VoLTE test (SPS, TTI Bundling, DRX, RoHC, CA+VoLTE)
• W-CDMA/HSPA handover test
• Dual Connectivity
• Licensed Assisted Access (LAA)
• Cellular Internet of Things (C-IoT) test (Cat-M/NB-IoT)

Basic Functions (LTE-Advanced)
• Transmit Downlink (DL) signal (Up to 6 GHz)
• Receive Uplink (UL) signal (Up to 6 GHz)
• Call processing
• Transmit Power Control (TPC)
• Baseband interface
• DL 2×2/4×2 MIMO (Test Model: ETM)
• DL 4×4/8×2/8×4 MIMO (Test Model: ETM)
• UL 2×2 MIMO (Test Model: ETM)
• CA 2CCs/3CCs/4CCs/5CCs/6CCs (Test Model: ETM)
• Ciphering (option)

See page 6 for specifications of MD8430A models.

Supports Newest UE Categories
The MD8430A follows UE categories defined on 3GPP specifications, and will support new future categories.

See page 14; UE category table - Signalling Tester MD8430A Specifications for detail.

MD 8430 A
Signalling Tester
Rapid Test Designer (RTD) MX786201 A
Signalling Tester MD8430A Features

For Developing LTE-Advanced Pro Chipsets and Mobile UEs RF/Baseband Tests

Coding/Decoding Test
Coding/Decoding tests of LTE-Advanced Pro terminals are performed by making the RF connections shown in the following diagram.

The MD8430A supports digital baseband I/O as standard functions. Using the baseband interface offers high-reproducibility coding/decoding tests free from the RF section, supporting stable evaluation of LTE chipset baseband performance.

Moreover, LTE coding/decoding tests are supported because the baseband chip can be evaluated using a slower clock than the clock frequency. And connecting the second MD8430A fading function to the digital baseband interface supports slow clock evaluations in a fading environment, which are difficult to perform with an RF fading simulator.

Easy MIMO Test Configuration Settings
The MD8430A has 8 main and sub RF connectors as well as 8 digital IQ connectors as standard equipment for use with the MX843010A/E LTE Control Software to easily configure and monitor various settings, including RF parameters, channel power, MIMO, fading, connector selections, frame timing, BTS cell selections, etc.

Fully Versatile L1/L2 Monitoring Functions
The MX843010A/E software supports LTE development by processing large volumes of low-layer data at very high speeds using a full line of versatile power monitoring, throughput monitoring and log analysis functions. The Measure (Counter) functions can monitor Layer 1/2 (L1/L2) throughputs in real time by counting parameter values such as ACK/NACK/DTX/CQI.
Intelligent Test Creation
The Rapid Test Designer (RTD) MX786201A software tools gives users power to create tests that cannot be done with traditional language based tools. RTD Supports L1/L2/L3 testing using Lower Layer Configuration library and Layer 3 procedure library of UE development.

Moreover, each procedure auto-sets the connection with the lower Layers (L1/L2) based on full compliance with the 3GPP standards. RTD can simulator LTE ↔ UMTS Inter-RAT and LTE ↔ CDMA2000 Interworking by connecting MD8480C and/or MD8475A.

The Reference Library test cases provides a reference to build the customized test cases and libraries with ease.

Cuts Test Case Development Time
The RTD GUI offers intuitive test case creation by linking procedures with parameters, such as network conditions and message data, at easy-to-understand setting screens, quickly increasing the number of working test cases.

In addition, the Built-in Analyzer function checks for programming errors prior to testing, which can start immediately without recompiling after editing and changing settings.

Flexibility in Testing & Analysis
When the test finishes the execution, the RTD provides a preliminary judgment against predetermined criteria. This avoids the need to study complex message sequences and can show a test outcome explained in a local language. The Integrated protocol analyzer with RTD supports very detailed Message Sequence Analysis and provides a facility to export the Protocol Test logs in to HTML format which can be viewed at any PC with a Browser without a RTD license.

RTD Procedure Block

- L3 (NAS/RRC/RR) Message procedures for signalling & automatic configuration
- L1 & L2 system configuration
- Interworking
- Procedure Library CDMA2000
- Low level library UTRAN/GERAN
- Low level library LTE
- L3 procedure library (LTE signalling)
- L3 procedure library (UTRAN/GERAN signalling)

RTD Procedure Block

*: MD8430A can be used on UMTS/GSM test in place of MD8480C.
Testing Throughput for Various Conditions
The MD8430A supports the latest UE categories with download speeds of 2 Gbps and upload speeds of 300 Mbps.

The bundled sample scenarios make it easy to change parameters such as bandwidth, scheduling, HARQ, etc., for testing LTE throughputs under various conditions.

In addition, combination with second MD8430A fading function supporting LTE MIMO via the dedicated digital interface simplifies complex power control procedures for easy throughput testing in a fading environment with simple test setup.

Handover Tests Optimizing Hardware Investment
The MD8430A supports up to six cells (Four active cells) allowing handover tests between two LTE BTS with one tester. In addition, LTE-UTRAN/GERAN Inter-RAT handover tests are supported by connecting the W-CDMA Signalling Tester MD8480C. And the MD8480C is not limited to the globally dominant W-CDMA technology but also supports the HSPA/HSPA Evolution and GSM/GPRS/EGPRS technologies.

When combined with the Signalling Tester MD8475A, CDMA2000 Interworking tests are supported too, maximizing support for both worldwide communications technologies and investment in hardware.

Specifications of Signalling Tester MD8430A Model (ETM)

<table>
<thead>
<tr>
<th>Model/Name</th>
<th>MD8430A-035</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTE Enhanced Test Model (ETM)</td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>RF, Digital IQ, Baseband Fading*1</td>
</tr>
<tr>
<td>Frequency Band</td>
<td>Max. 20 MHz</td>
</tr>
<tr>
<td>UE Category</td>
<td>Category 1, 2, 3, 4, 5, 6, 7, 9<em>2, 10</em>2, 11<em>2, 12</em>2 DL Category M1, 0, 1 bis, 4, 6, 7, 9<em>3, 10</em>3, 11<em>3, 12</em>3, 13<em>3, 15</em>3, 16<em>3, 18</em>3, 19<em>3, 20</em>3 UL Category M1, 0, 1 bis, 3, 5, 7, 13, 15, 20 NB Category NB1</td>
</tr>
<tr>
<td>Max. Data Rate (DL)</td>
<td>1 Gbps (PHY: 2 Gbps)</td>
</tr>
<tr>
<td>Max. Data Rate (UL)</td>
<td>300 Mbps</td>
</tr>
<tr>
<td>MIMO</td>
<td>2 × 2 MIMO</td>
</tr>
<tr>
<td></td>
<td>4 × 2 MIMO</td>
</tr>
<tr>
<td></td>
<td>8 × 2 MIMO</td>
</tr>
<tr>
<td></td>
<td>4 × 4 MIMO*3</td>
</tr>
<tr>
<td></td>
<td>8 × 4 MIMO*4</td>
</tr>
<tr>
<td>Max. No. of Base Station</td>
<td>Active + adjacent BTS: 8*5 (Max. Active BTS: 6)</td>
</tr>
<tr>
<td>Hard Handover (including at MIMO)</td>
<td>Available*4</td>
</tr>
<tr>
<td>Carrier Aggregation:</td>
<td>No. of Component Carriers (DL)<em>7 6</em>8, 9<em>9, 10</em>10</td>
</tr>
<tr>
<td>Carrier Aggregation:</td>
<td>No. of Component Carriers (UL)<em>7 3</em>11</td>
</tr>
</tbody>
</table>

*1: Requires MD8430A-067 and two MD8430A sets for Baseband Fading. (ETM & ETM or ETM & BTM)
*2: Requires two MD8430A sets. (ETM & ETM or ETM & BTM)
*3: Requires MD8430A-075.
*4: Requires MD8430A-076.
*5: Requires two MD8430A sets. (ETM & ETM).
*6: For inter-frequency handover with Carrier Aggregation, requires two MD8430A sets. (ETM & ETM or ETM & BTM)
*7: Requires MD8430A-085.
*8: DL 4 CA operation requires MD8430A-088, DL 5 CA operation requires MD8430A-089, and DL 6 CA operation requires MD8430A-044.
*9: For 3 CA MIMO and 4 CA MIMO, requires two MD8430A sets. (ETM & ETM or ETM & BTM)
*10: For DL 5 CA MIMO and 6 CA MIMO, requires two MD8430A sets (only ETM 2 sets configuration)
*11: UL 3 CA operation requires MD8430A-045.
Optimized Hardware Investment
The MD8430A supports to design for early chipset and mobile UE, function tests, and performance tests ranging from carrier acceptance tests to protocol conformance tests as well as retrofit upgrades between models allows developers to tailor their hardware investment to current needs with future flexible upgrade options.

The Protocol Conformance Test Toolkit (PCT) with MD8430A and GCF/PTCRB approved TTCN test package provide an optimum environment for LTE protocol conformance testing. Hence, a Single Hardware Platform that extends its usage from Platform development to Conformance Testing and Operator Acceptance Test.

Instant Firmware Switching
Because the MD8430A saves up to ten firmware versions, the right firmware is selected easily at startup. There is no need to install/uninstall firmware when executing a test case that determines the firmware version.

Powerful Automated Testing
The RTD software supporting the UE control interface makes it easy to setup automated test systems. Furthermore, multiple test cases can be executed continuously and test reports generated automatically, and many functions, including repeat testing under different conditions with multiple settings, can be automated, offering carriers, etc., an ideal turnkey solution for acceptance testing.

Easy Test Case Maintenance
Test cases created by the RTD software can be updated easily when new 3GPP standard evolves, reducing the need for re-editing. In addition, guaranteed test case compatibility even when the MD8430A firmware version is changed removes the need to recompile, etc., resulting in greatly reduced costs for maintaining test cases to support regression testing when rolling out new terminals and performing pre-IOT to assure compatibility with network equipment worldwide.
1 Monitor
Connector outputting signal internal data and status to accessory Monitor Board

2 Digital IQ Input
Connector for inputting digital IQ signal

3 Digital IQ Output
Connector for outputting digital IQ signal

4 Clock Input
BNC connector for inputting system clock to operate using external clock

5 Clock Output
BNC Connector for outputting system clock

6 Sync Input
BNC Connector for inputting and operating using external sync signal

7 Sync Output
BNC Connector for outputting sync signal

8 Aux Input
BNC Input connector reserved for adding future functions

9 Ethernet
(1) Ethernet connector for connecting external PC controller
(2) Ethernet connector to control MD8480C, connecting with 'Control PC' connector on MD8480C
(3) Ethernet connector for server
(4) Ethernet connector for connecting MD8480C using ‘10/100BASE-T’ connector

10 Sub (Simplex) Output
N connector for RF output

11 Sub (Simplex) Input
N connector for RF input

12 Main (Duplex) Input/Output
N connector for RF input/output

13 LCD
Screen displaying equipment information such as firmware selection and maintenance software screens
14 **Trigger Input**  
BNC Connector for inputting a trigger signal from external equipment

15 **Trigger Output**  
BNC Connector for outputting event timing to external equipment

16 **10 MHz Reference Input**  
BNC Connector for inputting external reference signal

17 **10 MHz Buffered Output**  
BNC Connector for outputting equipment reference signal

18 **Detector Output**  
BNC Connector for outputting profile signal of RF signal power

19 **Sync Out**  
BNC Connector for outputting sync signal to Fading Simulator

20 **LVDS**  
Connector for connecting Fading Simulator using Digital IQ
# Signalling Tester MD8430A Configurations

## Test Models/Options/Software

### Test Models

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Model Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Test Model (BTM)</td>
<td>MD8430A-025</td>
</tr>
<tr>
<td>M2M Test Model (MTM)</td>
<td>MD8430A-027</td>
</tr>
<tr>
<td>LTE Enhanced Test Model (ETM)</td>
<td>MD8430A-035</td>
</tr>
</tbody>
</table>

Choose one of the above three models.

### Test Model Upgrade

Required option when upgrading to higher order model.

- **Upgrade from Function Test Model (FTM)**
  - LTE FTM to ETM Upgrade Kit: Z1670A
  - LTE FTM to ETM Upgrade Kit (FO): Z1789A

- **Upgrade from Standard Test Model (STM)**
  - LTE STM to ETM Upgrade Kit: Z1671A
  - LTE STM to ETM Upgrade Kit (FO): Z1790A

- **Upgrade from Performance Test Model (STM)**
  - LTE PTM to ETM Upgrade Kit: Z1672A
  - LTE PTM to ETM Upgrade Kit (FO): Z1791A

- **Upgrade from Basic Test Model**
  - LTE BTM to ETM Upgrade Kit: Z1873A
  - LTE BTM to MTM Upgrade Kit: Z1976A

- **Upgrade from M2M Test Model**
  - LTE MTM to ETM Upgrade Kit: Z1977A

### Options

- **Extended Frequency Range to 3.8 GHz MD8430A-002**
  Required software option when extending maximum frequency of MD8430A (Tx/Rx) to 3.8 GHz.

- **Extended Frequency Range to 3.8 GHz Hardware MD8430A-003**
  Required hardware option when extending maximum frequency of MD8430A (Tx/Rx) to 3.8 GHz.

- **Enhanced DL Frequency Bandwidth Option MD8430A-004**
  Required software option when extending downlink frequency bandwidth of MD8430A (Tx) to 60 MHz.

- **Extended Frequency Range to 3.8 GHz Hardware 2 MD8430A-005**
  Required hardware option when extending maximum frequency of MD8430A (Tx/Rx) to 3.8 GHz. (Test Model: BTM, ETM)

- **Extended Frequency Range to 6 GHz MD8430A-006**
  Required software option when extending maximum frequency of MD8430A (Tx/Rx) to 6 GHz.

- **Extended Frequency Range to 6 GHz Hardware MD8430A-007**
  Required hardware option when extending maximum frequency of MD8430A (Tx/Rx) to 6 GHz.

- **LTE DL 6 Carrier Aggregation Option MD8430A-044**
  Option for adding Carrier Aggregation (CA) function supporting transmission of up to six component carriers on downlink.

- **LTE UL 3 Carrier Aggregation Option MD8430A-045**
  Option for adding Carrier Aggregation (CA) function supporting reception of up to three component carriers on uplink.

- **W-CDMA Fading Option MD8430A-052**
  Required software option when W-CDMA fading testing.

- **SCME Fading Option MD8430A-053**
  Required software option when SCME fading testing.

- **LTE 2 × 2 MIMO Fading Option MD8430A-055**
  Required software option when LTE 2 × 2 MIMO fading testing.

- **LTE 4 × 2 MIMO Fading Option MD8430A-056**
  Required software option when LTE 4 × 2 MIMO fading testing.

- **LTE 4 × 4 MIMO Fading Option MD8430A-057**
  Required software option when LTE 4 × 4 MIMO fading testing.

- **LTE 8 × 2 MIMO Fading Option MD8430A-058**
  Required software option when LTE 8 × 2 MIMO fading testing.

- **LTE 8 × 4 MIMO Fading Option MD8430A-059**
  Required software option when LTE 8 × 4 MIMO fading testing.

- **LTE FDD Option MD8430A-060**
  Required option when simulating 3GPP LTE FDD.

- **LTE TDD Option MD8430A-061**
  Required option when simulating TD-LTE.

- **LTE Enhanced MTC Option MD8430A-062**
  Required option when simulating LTE eMTC.

- **Narrow Band IoT Option MD8430A-063**
  Required option when simulating NB-IoT.

- **LTE Anchor For 5G NSA Option MD8430A-064**
  Software option for Protocol tests and IP evaluations using the 5G NSA in coordination with the MT8000A.

- **W-CDMA Option MD8430A-065**
  Required option when simulating W-CDMA.

- **GSM Option MD8430A-066**
  Required option when simulating GSM.

- **RF/Fading Driver Option MD8430A-067**
  Required option when extending RF for MD8430A-025 BTM and executing the fading function (MD8430A-055, 056, 057, 058).

- **HSPA Multi Carrier Option MD8430A-070**
  Required option when HSPA multi carrier testing.

- **W-CDMA/GSM Ciphering Option MD8430A-071**
  Option for adding ciphering function for W-CDMA, GSM and GPRS. Supporting KASUMI and SNOW 3G to W-CDMA. A5/1, A5/2, A5/3 and A5/4 to GSM. GEA1, GEA2, GEA3 and GEA4 to GPRS.

- **LTE Licensed Assisted Access (LAA) Option MD8430A-072**
  Required software option for executing LTE Licensed Assisted Access function.

- **LTE Dual Connectivity Option MD8430A-073**
  Required software option for executing Dual Connectivity function.

- **LTE DL 4 × 4 MIMO Option MD8430A-075**
  Required software option when LTE 4 × 4 MIMO testing.

- **LTE DL 8 × 4 MIMO Option MD8430A-076**
  Required software option when LTE 8 × 4 MIMO testing.

- **LTE Internal Server Option MD8430A-077**
  Required option for IP data communications using the built-in server. IP Data Throughput tests up to 1.6 Gbps are supported.

- **LTE UL 2 × 2 MIMO Option MD8430A-078**
  Required software option when LTE UL 2 × 2 MIMO testing.
Software Maintenance Contract

Service Provided

• Contract for adding/revising software functions in line with 3GPP revisions
• Technical support for troubleshooting user problems

Annual Support Service (1 year)
Option providing 1 year of service support for MD8430A test functions including web downloads of latest software and technical enquiries. Services depend on option configuration.

Software

LTE Control Software MX843010A
Software for simulating L1 and L2 with test cases in C.

LTE Control Software MX843010E
Software for simulating L1 and L2 with test cases in C. (Test Model: ETM)

W-CDMA/GSM Control Software MX843070E
Software for simulating L1 and L2 with test cases in C. (Test Model: W-CDMA/GSM)

Rapid Test Designer (RTD) MX786201A
Software for simulating L1 to L3 with test cases described by GUI for automating testing, analyzing test cases and creating reports.

Software Maintenance Contract

Service Provided

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• Technical support for troubleshooting user problems

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Software for simulating L1 and L2 with test cases in C. (Test Model: ETM)

W-CDMA/GSM Control Software MX843070E
Software for simulating L1 and L2 with test cases in C. (Test Model: W-CDMA/GSM)

Rapid Test Designer (RTD) MX786201A
Software for simulating L1 to L3 with test cases described by GUI for automating testing, analyzing test cases and creating reports.

Software Maintenance Contract

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• Technical support for troubleshooting user problems

Annual Support Service (1 year)
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LTE Control Software MX843010A
Software for simulating L1 and L2 with test cases in C.

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Software for simulating L1 and L2 with test cases in C. (Test Model: ETM)

W-CDMA/GSM Control Software MX843070E
Software for simulating L1 and L2 with test cases in C. (Test Model: W-CDMA/GSM)

Rapid Test Designer (RTD) MX786201A
Software for simulating L1 to L3 with test cases described by GUI for automating testing, analyzing test cases and creating reports.

Software Maintenance Contract

Service Provided

• Contract for adding/revising software functions in line with 3GPP revisions
• Technical support for troubleshooting user problems

Annual Support Service (1 year)
Option providing 1 year of service support for MD8430A test functions including web downloads of latest software and technical enquiries. Services depend on option configuration.

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LTE Control Software MX843010A
Software for simulating L1 and L2 with test cases in C.

LTE Control Software MX843010E
Software for simulating L1 and L2 with test cases in C. (Test Model: ETM)

W-CDMA/GSM Control Software MX843070E
Software for simulating L1 and L2 with test cases in C. (Test Model: W-CDMA/GSM)

Rapid Test Designer (RTD) MX786201A
Software for simulating L1 to L3 with test cases described by GUI for automating testing, analyzing test cases and creating reports.

Software Maintenance Contract

Service Provided

• Contract for adding/revising software functions in line with 3GPP revisions
• Technical support for troubleshooting user problems

Annual Support Service (1 year)
Option providing 1 year of service support for MD8430A test functions including web downloads of latest software and technical enquiries. Services depend on option configuration.

Software

LTE Control Software MX843010A
Software for simulating L1 and L2 with test cases in C.

LTE Control Software MX843010E
Software for simulating L1 and L2 with test cases in C. (Test Model: ETM)

W-CDMA/GSM Control Software MX843070E
Software for simulating L1 and L2 with test cases in C. (Test Model: W-CDMA/GSM)

Rapid Test Designer (RTD) MX786201A
Software for simulating L1 to L3 with test cases described by GUI for automating testing, analyzing test cases and creating reports.
### Reference Oscillator

- **Reference frequency:** 10 MHz
- **Start-up characteristics:**
  - 25°C, referenced to frequency 24-hour after power-on
  - ±5 x 10⁻⁷ (2 min. after power-on)
  - ±5 x 10⁻⁸ (5 min. after power-on)
- **Aging rate:** ±1 x 10⁻⁹/day (referred to frequency 48-hour after power-on)
- **Temperature characteristics:** ±2 x 10⁻⁸ (0°C to 45°C, referenced to frequency at 25°C)
- **Internal reference output**
  - Frequency adjusted at shipment: 10 MHz ±0.02 ppm
  - Output level: ≥0 dBm (50Ω, AC coupling)
  - Connector: BNC-J, 50Ω (nom.)
- **External reference input**
  - Frequency: 10 MHz
  - Operating range: ±1 ppm
  - Input level: –15 dBm ≤ level ≤ +20 dBm (50Ω, AC coupling)
  - Connector: BNC-J, 50Ω (nom.)

### Transmission Signal

- **Frequency**
  - Frequency range:
    - LTE: 350 MHz to 3.0 GHz, 350 MHz to 3.8 GHz (with MD8430A-002), 350 MHz to 6.0 GHz (with MD8430A-006)
    - W-CDMA: 400 MHz to 3.0 GHz, 400 MHz to 3.8 GHz (with MD8430A-002/006)
    - GSM: 400 MHz to 2.0 GHz
  - Setting resolution: 100 kHz
- **Output level**
  - Maximum output level: –40 dBm (Main connector) (Maximum setting level: –20 dBm)
  - 0 dBm (Sub connector)
  - Level accuracy:
    - ±1.5 dB (Frequency Range: ≥350 MHz to ≤3800 MHz)
    - ±2.0 dB (Frequency Range: >3800 MHz to ≤6000 MHz)
    - 18° to 28°C, after Cal, for calibration CW
  - Output level: –113 to –40 dBm, all ports output: ≤ –40 dBm (Main connector)
    - –113 to 0 dBm (Sub connector)
- **Modulation**
  - **Access method**
    - LTE: OFDMA, W-CDMA: CDMA, GSM: TDMA
  - **Modulation method**
    - LTE: QPSK, 16QAM, 64QAM, 256QAM
    - W-CDMA: QPSK, 16QAM, 64QAM
    - GSM: GMSK, 8PSK
  - **Modulation accuracy**
    - LTE: ≤±2%, 18° to 28°C, Sub output: 0 dBm, LTE (OFDM, 64QAM, 20 MHz band)
    - W-CDMA: ≤±3.5%, 18° to 28°C, Sub output: 0 dBm, W-CDMA (transmitting CPICH, ICH)
    - GSM: ≤±1.5 deg., 18° to 28°C, Sub output: 0 dBm, GMSK
    - ≤±3.5%, 18° to 28°C, Sub output: 0 dBm, 8PSK

### Received Signal

- **Frequency**
  - Frequency range:
    - LTE: 350 MHz to 3.0 GHz, 350 MHz to 3.8 GHz (with MD8430A-002), 350 MHz to 6.0 GHz (with MD8430A-006)
    - W-CDMA: 400 MHz to 3.0 GHz, 400 MHz to 3.8 GHz (with MD8430A-002/006)
    - GSM: 400 MHz to 2.0 GHz
  - Setting resolution: 100 kHz
- **Input level**
  - Demodulation range: –28 to +15 dB (QPSK), –21 to +15 dB (16QAM), –15 to +15 dB (64QAM)
  - Reference to reference power setting value
  - Input signal: EVM ≤1%, BER ≤1 x 10⁻¹², 20 MHz band, SC-FDMA
  - Reference Power: –20 to +20 dBm, Input level: –30 to +35 dBm (Main connector)
  - Reference power: –35 to +5 dBm, Input level: –45 to +20 dBm (Sub connector)
- **Level accuracy:** ±3.0 dB
  - 18° to 28°C, after Cal, for calibration CW
  - Input level: –30 to +35 dBm (Main connector)
    - –45 to +20 dBm, Reference power: ±15 dB (Sub connector)
- **Modulation**
  - **Access method**
    - LTE: SC-FDMA, W-CDMA: CDMA, GSM: TDMA
  - **Modulation method**
    - LTE: QPSK, 16QAM, 64QAM, 256QAM
    - W-CDMA: BPSK, 4PAM
    - GSM: GMSK, 8PSK
  - **Synchronization acquirable range**
    - LTE: ±100 μs (PRACH), ±30 μs (PUSCH)
    - W-CDMA: ±100 chips (PRACH), ±100 chips (DPCCH)
    - GSM: 0 to 63 symbols (SACCH)
### RF Connector
- **Main**
  - Connector: N-J, 50Ω (nom.)
  - VSWR: \( \leq 1.3 \) (Frequency Range: \( \geq 350 \text{ MHz} \) to \( \leq 3800 \text{ MHz} \))
  - VSWR: \( \leq 1.4 \) (Frequency Range: \( >3800 \text{ MHz} \) to \( \leq 6000 \text{ MHz} \))
- **Sub (Downlink)**
  - Connector: N-J, 50Ω (nom.)
  - VSWR: \( \leq 1.5 \) (Frequency Range: \( \geq 350 \text{ MHz} \) to \( \leq 3800 \text{ MHz} \))
  - VSWR: \( \leq 1.6 \) (Frequency Range: \( >3800 \text{ MHz} \) to \( \leq 6000 \text{ MHz} \))
- **Sub (Uplink)**
  - Connector: N-J, 50Ω (nom.)
  - VSWR: \( \leq 1.5 \) (Frequency Range: \( \geq 350 \text{ MHz} \) to \( \leq 3800 \text{ MHz} \))
  - VSWR: \( \leq 1.6 \) (Frequency Range: \( >3800 \text{ MHz} \) to \( \leq 6000 \text{ MHz} \))

### Other
- **Digital IQ**: Digital IQ signal
  - Connector: DX20 (50-pin) \( \times 8 \)
  - IQ: 16-bit
- **Monitor**: Connection with the Monitor board (G0091)
  - Connector: DX20 (80-pin)
  - Signal level: 3.3V-CMOS
- **Sync Output**: Internal sync start signal output
  - Connector: BNC
  - Signal level: 3.3V-CMOS
- **Sync Input**: External sync start signal input
  - Connector: BNC
  - Signal level: 3.3V-CMOS
- **Clock Output**: Internal clock signal output
  - Connector: BNC
  - Signal level: 3.3V-CMOS
- **Clock Input**: External clock signal input
  - Connector: BNC
  - Signal level: 3.3V-CMOS
  - Frequency: 10 kHz to 30.72 MHz
- **Fading simulator interface**
  - **Sync Out**: Connection with the fading simulator (Sync start signal)
    - Without MD8430A-008/108/208
      - Connector: BNC \( \times 3 \)
      - Signal level: 3.3V-CMOS
    - With MD8430A-008/108/208
      - Connector: BNC \( \times 2 \)
      - Signal level: 3.3V-CMOS
  - **Port**: Connection with the fading simulator (Digital IQ signal)
    - Without MD8430A-008/108/208
      - Connector: HIB-B16LFYGA \( \times 6 \)
      - Signal level: LVDS
    - With MD8430A-008/108/208
      - Connector: HIB-B16LFYGA \( \times 2 \) (Digital IQ signal: 2 ports/connector)
      - Signal level: LVDS
      - Connector: HIB-B16LFYGA \( \times 4 \) (Digital IQ signal: 8 ports/connector)
      - Signal level: LVDS

### Power Supply
- 100 V (ac) to 120 V (ac)/200 V (ac) to 240 V (ac), 50 Hz/60 Hz
- \( \leq 1200 \text{ VA} \)

### Dimensions and Mass
- 426 (W) \( \times 310 \) (H) \( \times 500 \) (D) mm
- \( \leq 40 \text{ kg} \)

### Environmental Conditions
- **Temperature**
  - Operating: 0° to +45°C, \( \leq 90\% \) RH (no condensation)
  - 0° to +40°C, \( \leq 90\% \) RH (no condensation) (with Enhanced Hardware)
  - Storage: −20° to +60°C, \( \leq 85\% \) RH (no condensation)

### CE
- EN61326-1, EN61000-3-2
- LVD EN61010-1
- RoHS EN50581
## Signalling Tester MD8430A Specifications

**UE category table: 3GPP TS 36.306 V14.5.0 (2017-12)**

### UE Category (DL)

<table>
<thead>
<tr>
<th>UE Category</th>
<th>Maximum number of DL-SCH transport block bits received within a TTI</th>
<th>Maximum number of bits of a DL-SCH transport block received within a TTI</th>
<th>Total number of soft channel bits</th>
<th>Maximum number of supported layers for spatial multiplexing in DL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>10296</td>
<td>10296</td>
<td>250368</td>
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<td>Category 2</td>
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<tr>
<td>Category 4</td>
<td>150752</td>
<td>75376</td>
<td>1827072</td>
<td>2</td>
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<tr>
<td>Category 5</td>
<td>299552</td>
<td>149776</td>
<td>3662700</td>
<td>4</td>
</tr>
<tr>
<td>Category 6</td>
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<tr>
<td>Category 7</td>
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<td>Category 9</td>
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<td>5481216</td>
<td>2 or 4</td>
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<td>149776</td>
<td>5481216</td>
<td>2 or 4</td>
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<tr>
<td>Category 11</td>
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<tr>
<td>Category 12</td>
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<td>7308288</td>
<td>2 or 4</td>
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### UE DL Category

<table>
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<th>Maximum number of DL-SCH transport block bits received within a TTI</th>
<th>Maximum number of bits of a DL-SCH transport block received within a TTI</th>
<th>Total number of soft channel bits</th>
<th>Maximum number of supported layers for spatial multiplexing in DL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL Category M1</td>
<td>1000</td>
<td>1000</td>
<td>25344</td>
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<td>DL Category M2</td>
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<td>73152</td>
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<tr>
<td>DL Category 0</td>
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<td>DL Category 1</td>
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<td>DL Category 4</td>
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<td>DL Category 6</td>
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<tr>
<td>DL Category 15</td>
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<td>DL Category 18</td>
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<td>14616576</td>
<td>2 or 4 [or 8]</td>
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### UE UL Category

<table>
<thead>
<tr>
<th>UE UL Category</th>
<th>Maximum number of UL-SCH transport block bits transmitted within a TTI</th>
<th>Maximum number of bits of an UL-SCH transport block transmitted within a TTI</th>
<th>Support for 64QAM in UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL Category M1</td>
<td>1000 or 2984</td>
<td>1000 or 2984</td>
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<tr>
<td>UL Category M2</td>
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<td>6968</td>
<td>No</td>
</tr>
<tr>
<td>UL Category 0</td>
<td>1000</td>
<td>1000</td>
<td>No</td>
</tr>
<tr>
<td>UL Category 1</td>
<td>51024</td>
<td>51024</td>
<td>No</td>
</tr>
<tr>
<td>UL Category 1a</td>
<td>25456</td>
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<td>No</td>
</tr>
<tr>
<td>UL Category 2</td>
<td>51024</td>
<td>51024</td>
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</tr>
<tr>
<td>UL Category 3</td>
<td>51024</td>
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<tr>
<td>UL Category 4</td>
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<td>UL Category 5</td>
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<td>UL Category 7</td>
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<td>UL Category 12</td>
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### NB-IoT (DL)

<table>
<thead>
<tr>
<th>UE Category</th>
<th>Maximum number of DL-SCH transport block bits received within a TTI</th>
<th>Maximum number of bits of a DL-SCH transport block received within a TTI</th>
<th>Total number of soft channel bits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category NB1</td>
<td>680</td>
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<tr>
<td>Category NB2</td>
<td>2536</td>
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### NB-IoT (UL)

<table>
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<th>UE Category</th>
<th>Maximum number of UL-SCH transport block bits transmitted within a TTI</th>
<th>Maximum number of bits of an UL-SCH transport block transmitted within a TTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category NB1</td>
<td>1000</td>
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</tr>
<tr>
<td>Category NB2</td>
<td>2536</td>
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</table>
## Signalling Tester MD8430A Ordering Information

Please specify the model/order number, name and quantity when ordering. The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

<table>
<thead>
<tr>
<th>Model/Order No.</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD8430A</td>
<td>LTE Basic Test Model</td>
</tr>
<tr>
<td>MD8430A-005</td>
<td>Signalling Tester</td>
</tr>
<tr>
<td>MD8430A-025</td>
<td>Extended Frequency Range to 3.8 GHz Hardware 2</td>
</tr>
<tr>
<td>MD8430A-025</td>
<td>Basic Test Model (BTM)</td>
</tr>
<tr>
<td>MD8430A-005</td>
<td>M2M Test Model</td>
</tr>
<tr>
<td>MD8430A-027</td>
<td>Signalling Tester</td>
</tr>
<tr>
<td>MD8430A-025</td>
<td>Extended Frequency Range to 3.8 GHz Hardware 2</td>
</tr>
<tr>
<td>MD8430A-025</td>
<td>M2M Test Model (MTM)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model/Order No.</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD8430A-002</td>
<td>LTE Enhanced Test Model</td>
</tr>
<tr>
<td>MD8430A-005</td>
<td>Signalling Tester</td>
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<tr>
<td>MD8430A-025</td>
<td>Extended Frequency Range to 3.8 GHz Hardware 2</td>
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<tr>
<td>MD8430A-025</td>
<td>LTE Enhanced Test Model (ETM)</td>
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<table>
<thead>
<tr>
<th>Standard Accessories</th>
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</thead>
<tbody>
<tr>
<td>CD-ROM</td>
</tr>
<tr>
<td>(Operation Manual and Maintenance Software): 1 pc</td>
</tr>
<tr>
<td>J1440A</td>
</tr>
<tr>
<td>LAN Cable: 2 pcs</td>
</tr>
<tr>
<td>J1211</td>
</tr>
<tr>
<td>Power Cord, 3.0 m (15 A): 1 pc</td>
</tr>
<tr>
<td>J0127A</td>
</tr>
<tr>
<td>Coaxial Cord, 1.0 m (BNC-P · RG58A/U · BNC-P): 1 pc</td>
</tr>
<tr>
<td>J0576B</td>
</tr>
<tr>
<td>Coaxial Cord, 1.0 m (N-P · 5D-2W · N-P): 2 pcs</td>
</tr>
<tr>
<td>J1399A</td>
</tr>
<tr>
<td>N-SMA Adaptor: 6 units</td>
</tr>
<tr>
<td>G0091</td>
</tr>
<tr>
<td>Monitor Board: 1 pc</td>
</tr>
<tr>
<td>J1005</td>
</tr>
<tr>
<td>Monitor Cable 80: 1 pc</td>
</tr>
<tr>
<td>J1459A</td>
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<tr>
<td>Digital IQ Cable (50 cm): 1 pc</td>
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<table>
<thead>
<tr>
<th>Options</th>
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<tbody>
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<td>MD8430A-002</td>
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<td>MD8430A-004</td>
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<tr>
<td>MD8430A-089</td>
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| MD8430A-103 | Extended Frequency Range to 3.8 GHz Hardware Retrofit (for Asia, Oceania) |
| MD8430A-107 | Extended Frequency Range 3 GHz to 6 GHz Hardware Retrofit (for Asia, Oceania) |
| MD8430A-117 | Extended Frequency Range 3.8 GHz to 6 GHz Hardware Retrofit (for Asia, Oceania) |
| MD8430A-203 | Extended Frequency Range to 3.8 GHz Hardware Retrofit (FO) |
| MD8430A-207 | Extended Frequency Range 3 GHz to 6 GHz Hardware Retrofit (FO) |
| MD8430A-217 | Extended Frequency Range 3.8 GHz to 6 GHz Hardware Retrofit (FO) |

<table>
<thead>
<tr>
<th>Model/Order No.</th>
<th>Name</th>
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<tbody>
<tr>
<td>MX843010A</td>
<td>Software Options</td>
</tr>
<tr>
<td>MX843010E</td>
<td>Signalling Tester</td>
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<tr>
<td>MX843070E</td>
<td>LTE Control Software</td>
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<tr>
<td>MX843017A</td>
<td>W-CDMA/GSM Control Software</td>
</tr>
<tr>
<td>MX786201A</td>
<td>Rapid Test Designer (RTD)</td>
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<table>
<thead>
<tr>
<th>Mainframe Support Service</th>
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<tbody>
<tr>
<td>MD8430A-SS125</td>
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<thead>
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<th>[W-CDMA/GSM]</th>
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<tr>
<th>Application Products</th>
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<td>J1416A</td>
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<td>J1609A</td>
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**1:** The PC controller for the MD8430A must meet or exceed the following specifications:
- OS: Windows 7 (64 bit) or later
- CPU: Intel Core i5 processor 2.6 GHz or more
- RAM: 4 GB or more
- NIC: 1000 BASE-T

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