**Anritsu** envision : ensure

# Radio Communication Test Station

## MT8000A

## All-in-One
## 5G NR RF Measurements, Protocol Tests and Functional Tests

**5G, Official Start**

Anritsu is releasing its new platform for developing 5G communications terminals, chipsets and devices.

With support for both RF measurements and protocol tests, this all-in-one platform can be configured easily for various tests, including RF measurements, protocol and functional tests matching the module construction.

Anritsu — the leader in 4G testing — is also now taking the lead in 5G.

## Flexibility

### Measurement Module Configurations Matching Test Application

The all-in-one MT8000A supports RF measurements, protocol and function tests with a single unit while its flexible expandability not only meets future wider application needs but also helps cut-back new instrument investment and training costs for more efficient cost-performance.
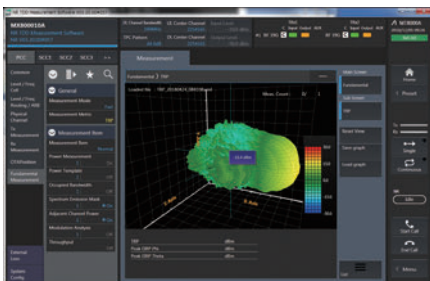
## FR1 (to 7.125 GHz) — FR2

### Comprehensive Test Coverage from mmWave RF Measurements to Beamforming Tests

As well as supporting the FR1 (to 7.125 GHz) used by 5G, combining the MT8000A with OTA chambers also supports the FR2 (mmWave band) RF measurements and beamforming tests.
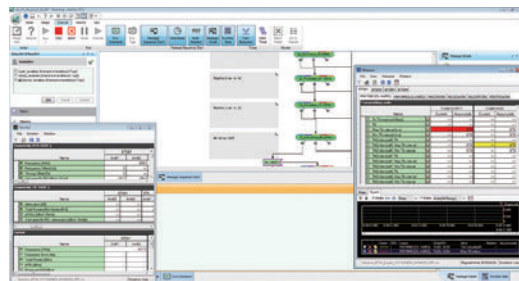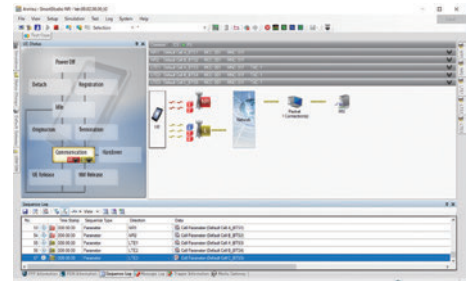
# MT8000A

## Software



RF Measurement Software



RTD for 5G NR



Function and Application Tests Software: SmartStudio NR

∗: The design, explanation and appearance are subject to change without notice.

# The Wireless Communication Test Station for 5G Device Development

## Radio Communication Test Station MT8000A Features

### All-in-One Support for RF Measurements and Protocol Tests in FR1 (to 7.125 GHz) and Millimeter Wave Bands

With a 5G base station emulation function, a single MT8000A test platform supports both the FR1 (to 7.125 GHz) and the FR2 (28 GHz/ 39 GHz/43.5 GHz) bands used by 5G. Combining it with the RF Chamber enables both millimeter wave band RF measurements and beamforming tests using call connections specified by 3GPP.

**Example of Supported Band**

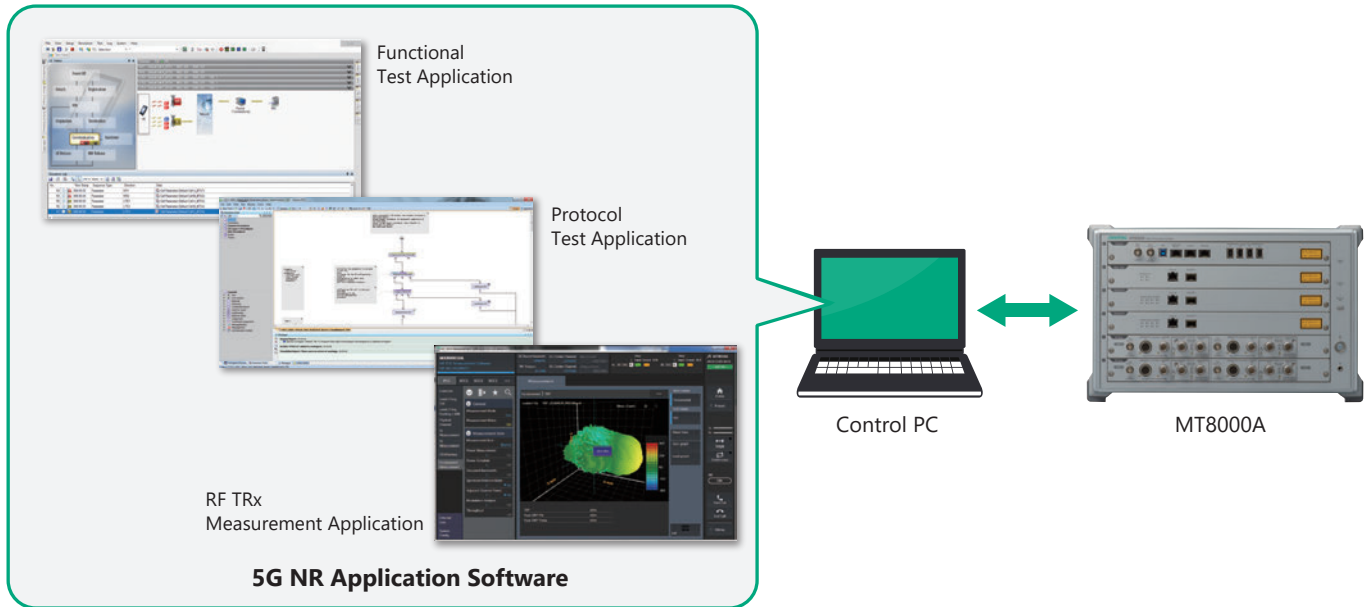| Band | n71 (600 MHz) | n41 (2.5 GHz) | n78-79 (3.5 G/4.5 GHz) | n257 (28 GHz) | n260 (39 GHz) | n259 (43.5 GHz) |
|---|---|---|---|---|---|---|
| | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✳: Please enquire about other supported bands.

### Flexible Platform using Modular Architecture

Both Non-signalling and Signalling RF TRx measurements and protocol tests are supported by switching the test application at the common hardware platform.
In addition to supporting high-order MIMO (4×4 MIMO) and carrier aggregation (8CA) for implementing enhanced Mobile Broadband (eMBB), new 5G test needs, such as Ultra-Reliable and Low Latency Communications (URLLC) and massive Machine Type Communications (mMTC) are supported by the leading-edge design with flexibility and expandability based on the modular architecture.

A futureproof, flexible test environment is provided for a wide application range.



Functional Test Application

Protocol Test Application

RF TRx Measurement Application

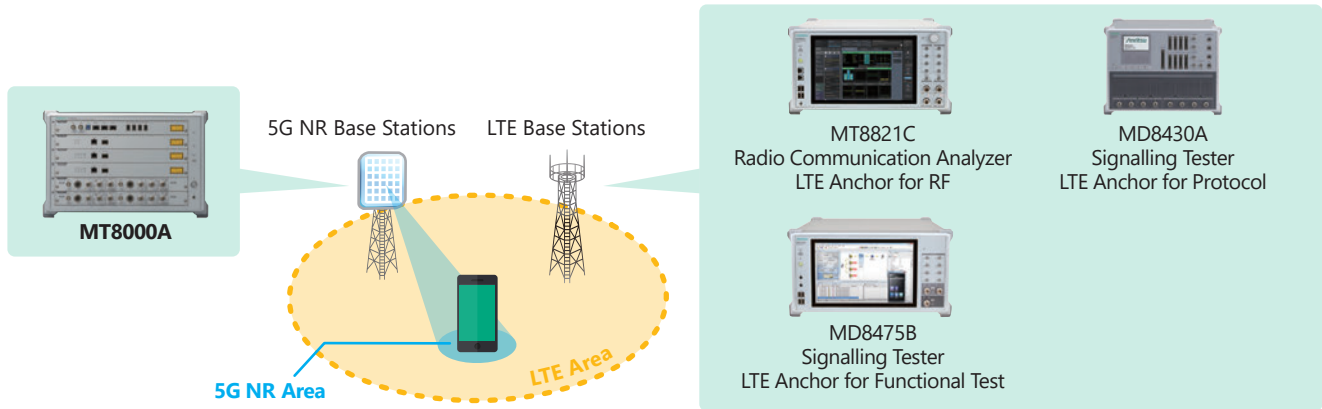**5G NR Application Software**

Control PC

MT8000A

# The Wireless Communication Test Station for 5G Device Development

## Radio Communication Test Station MT8000A Features

### Supports Existing LTE Test Environment

A comprehensive test environment is provided by making use of Anritsu's LTE test platform offering leading-edge functions based on the company's long experience in this market. Easy configuration of a linked environment for simulating 5G NSA (non-standalone) with LTE makes best use of measurement assets, such as the customer's test environment, test scenarios.

**MT8000A**

5G NR Base Stations    LTE Base Stations

**5G NR Area**

LTE Area

**MT8821C**
Radio Communication Analyzer
LTE Anchor for RF

**MD8430A**
Signalling Tester
LTE Anchor for Protocol

**MD8475B**
Signalling Tester
LTE Anchor for Functional Test

# Radio Communication Test Station MT8000A Features

## RF TRX Measurement GUI : MX800010A

### 3GPP RF Tests

Development and testing of mobile terminals and chipsets as well as network operator acceptance inspection tests, etc., are essential for evaluating compliance of the mobile terminal TRx performance with the 3GPP standards. With the increasing complexity of mobile terminal circuitry due to the use of more frequency bands, such as mmWave, the MX800010A software is an ideal solution for testing various aspects in support of 5G NR Mobile terminal RF TRx tests.

### Flexible Parameter Settings

The easy to change MX800010A parameter settings also support RF parametric tests and simplified protocol tests.
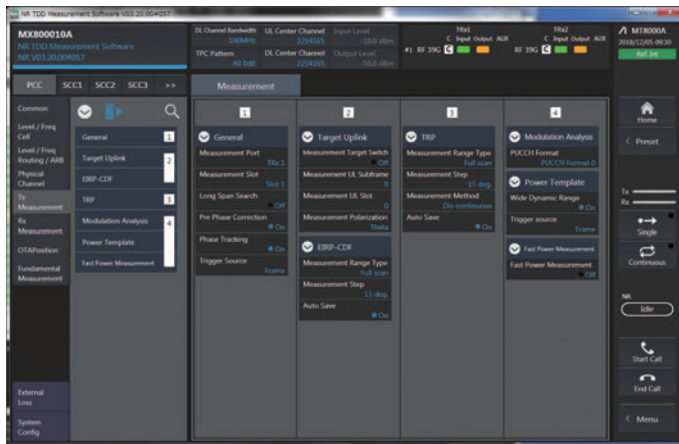


Typical Parameters (5G NR)

### Supports Tests in NSA Mode

The 5G NR non-standalone (NSA) mode is supported and the Radio Communication Analyzer MT8821C can be used as an LTE Anchor in the NSA mode.

### Enhanced GUI for Efficient Operability

The MX800010A has the same easy to use and easy to understand GUI as the MT8821C. In addition to one-touch switching of listed and individual graph displays as well as summary and detailed displays of measurement results, the MX800010A supports convenient parameter setting functions such as, parameter searching and bookmarking for frequently used parameters.
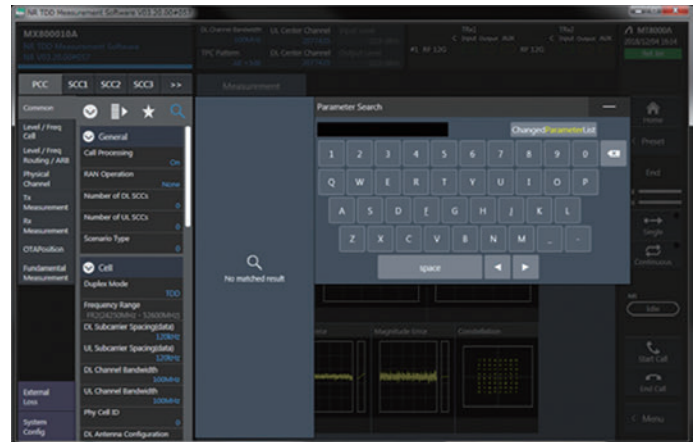


Parameter Search Function



Graph Display

# Radio Communication Test Station MT8000A Features

## RF TRX Measurement GUI : MX800010A

### OTA (Over The Air) Tests

OTA evaluation is required because the TRx performance of mobile terminals is influenced by factors such as the terminal form and antenna characteristics, etc.

There are two main types of 5G NR OTA test as follows:

- mmWave RF TRx Test
- Evaluating Mobile Terminal General TRx Performance Including Antenna

#### <mmWave RF TRx Test>

Since 5G NR uses an antenna array for sending and receiving signals in the mmWave band, evaluation of the RF TRx performance is performed using an OTA connection without an RF cable connection like that for LTE. Anritsu provides a turnkey mmWave RF TRx measurement solution including the RF chamber.
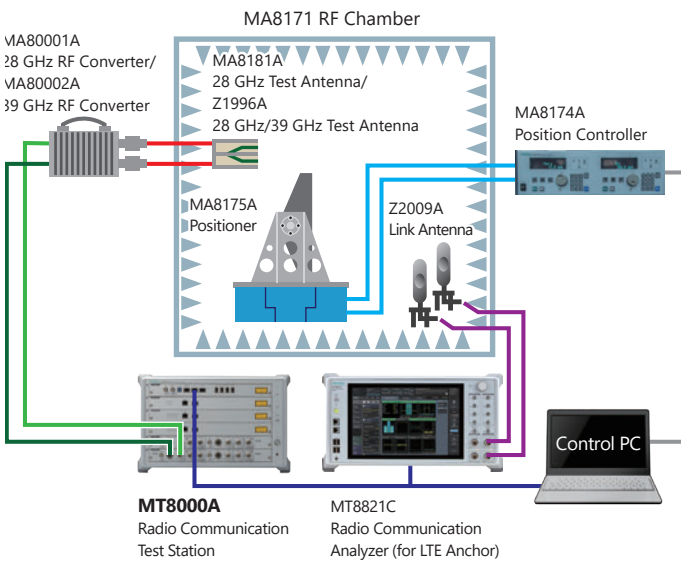


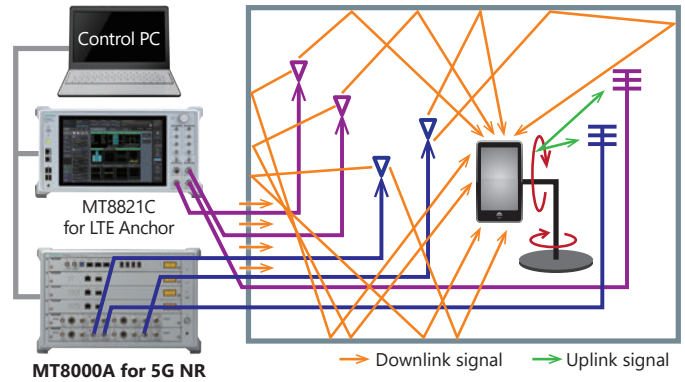mmWave RF TRx Measurement Environment

#### <Evaluating Mobile Terminal General TRx Performance Including Antenna>

There are two antenna test methods: Total Radiated Power (TRP), and Total Radiated Sensitivity (TRS); various test systems using the MT8000A are available from OTA vendors.
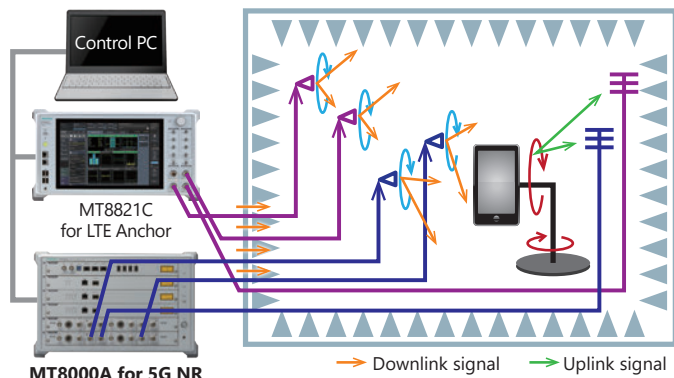


Radiowave Anechoic Chamber



Reverberation Chamber

### SAR (Specific Absorption Rate) Test

The SAR test evaluates the amount of energy in the electromagnetic spectrum radiated from the mobile terminal absorbed by a jig known as a 'phantom', mimicking the human body. The purpose of this test is to help protect handheld users from adverse effects of electromagnetic waves on health. The specified amount of permissible absorbed energy is regulated by national and regional standards. The MT8000A fully supports 5G NR SAR tests.
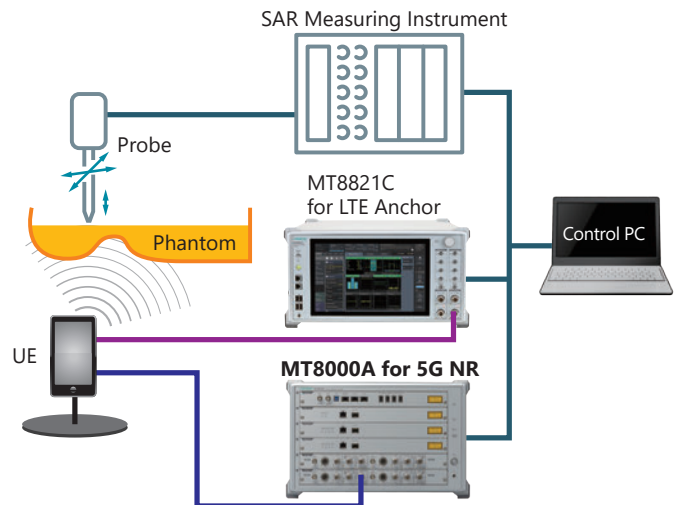


SAR Test Configuration

## NR Protocol Test Solutions

### Encoding/Decoding Test

The 5G NR terminal encoding/decoding test is performed by connecting the equipment as follows using an RF cable.



Encoding/Decoding Test Configuration (RF, Serial Control Test)

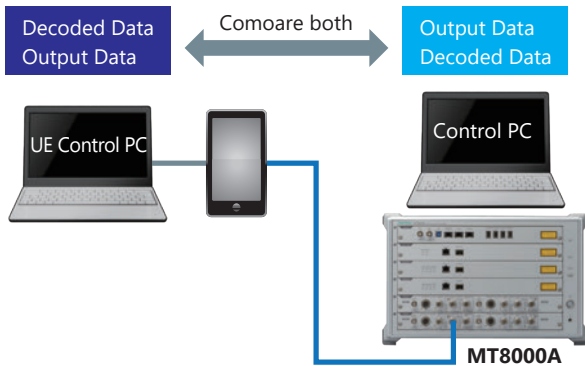The Rapid Test Designer Platform (RTD) MX800050A and the NR Protocol Firmware MX800051A have built-in support for the digital baseband input/output function. Using the function supports high-reproducibility encoding/decoding tests without dependence on the performance of the RF section for stable baseband evaluation of 5G NR chipsets. In addition, 5G NR encoding/decoding tests are performed certainly because the baseband chip is evaluated at a slow clock below the clock frequency.

### Cuts Test Case Developer Training

With a full range of test procedures for Layer 1/2 and Layer 3 tests, the RTD software eliminates the need for specialist knowledge about TTCN code and unique simulator APIs, etc.
Moreover, each procedure automatically sets the Layer 1/2 (L1/L2) connection conditions based on the complex 3GPP standards.
Since the MD8430A can be controlled directly, 5G NR and LTE NSA test environments can be configured easily.
Furthermore, the full range of available reference test samples with confirmed connections supports development of test cases using a library.

### Shortens Test Case Development Time

The RTD GUI makes it easy to create test cases using intuitive operations to connect procedures.
Additionally, each procedure has a screen for setting various parameters, such as network conditions and message information, to increase test case variations using simple operation.
Lastly, an analysis function checks for program mistakes prior to testing, and any code edits or changes are reflected immediately in the executed test.
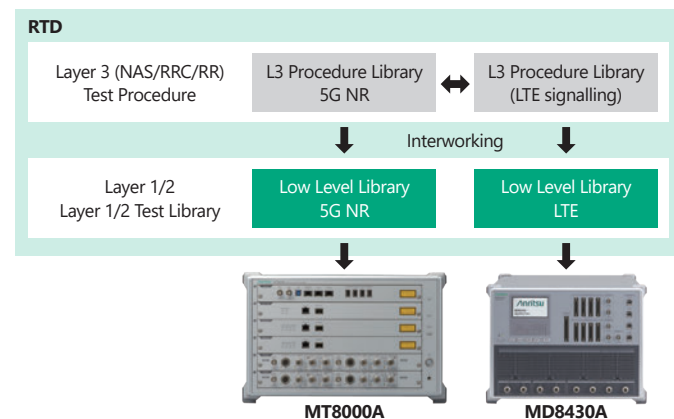


RTD Procedure Block

### Efficient Execution, Evaluation and Analysis

Test sequences can be confirmed in real-time during test execution and completed test results can be confirmed at a glance because Pass/Fail evaluations are defined within the test case. Moreover, detailed analysis is supported by integration of an HTML-based protocol analyzer with the RTD. Additionally, export of logs into HTML enables logs to be opened on any PC in the same manner as the protocol analyzer.
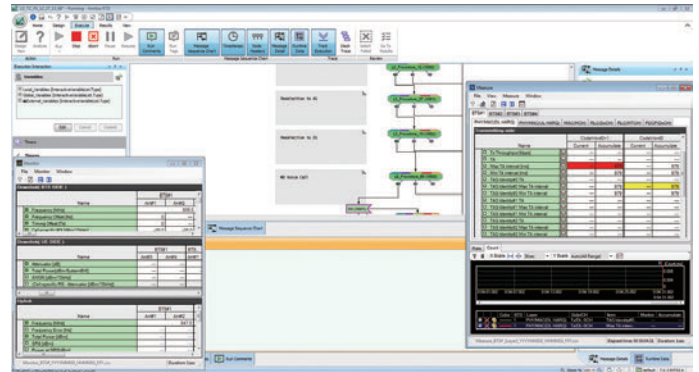


Test Execution Screen (RTD)
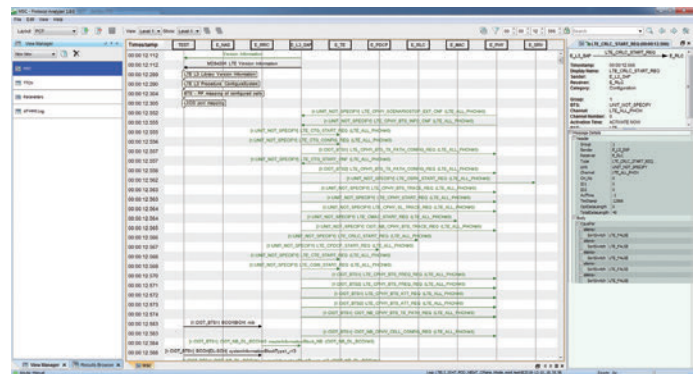


Log Analysis Screen (RTD)

## NR Protocol Test Solutions

### Throughput Tests at Various Conditions

Combining the MX800030A with the Data Test Module MT8000A-012 supports IP throughput tests. Sample scenarios bundled with the software can be used to change parameters, such as bandwidth, scheduling, HARQ, etc., easily for running 5G NR IP throughput tests under various conditions.

### Handover Tests at Various Conditions

With support for up to 8 cells, handover tests between 5G NR 4CA cells are possible using only one MT8000A. Moreover, installing the Multi Box Data Connection MT8000A-009 option in the MT8000A enables up to 8CA 2×2 MIMO handover tests by connecting two MT8000A units.

Lastly, combined use with the Signalling Tester MD8430A supports LTE interworking, helping maximize customers' investment in their existing hardware.



### Fully Versatile L1/L2 Monitoring Functions

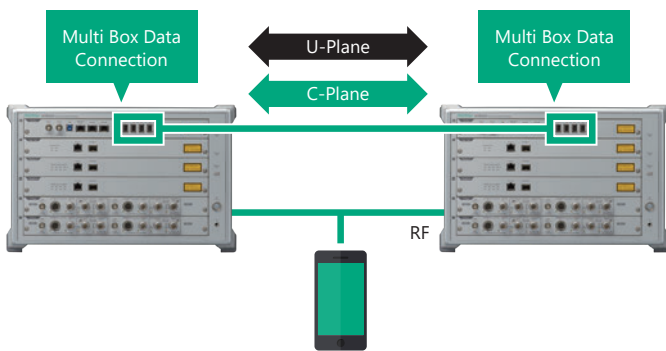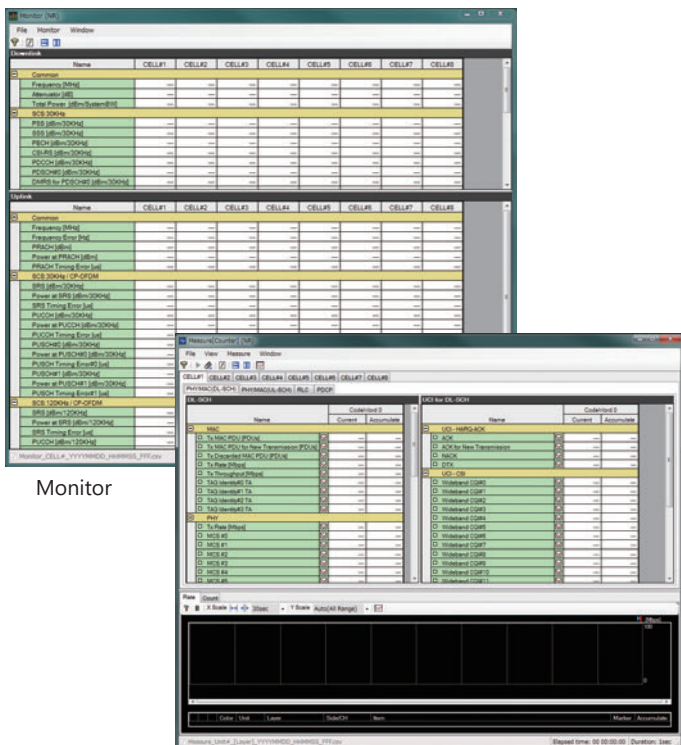To support the development of 5G terminals that process large volumes of low-layer data at very high speeds, the software enhances a full line of versatile power monitoring, throughput monitoring and log analysis functions. The Measure (Counter) functions can monitor Layer 1/2 (L1/L2) throughputs in real time by counting parameter values such as ACK/NACK/DTX/CQI.



Monitor



Measure (Counter, Throughput Monitor)

### Powerful Test Automation

With support for mobile terminal control interfaces, the RTD software simplifies test automation. In addition, continuous multiple test case execution and automatic test report creation as well as various functions including repeat operation for a set number of times provide powerful support for automated testing.
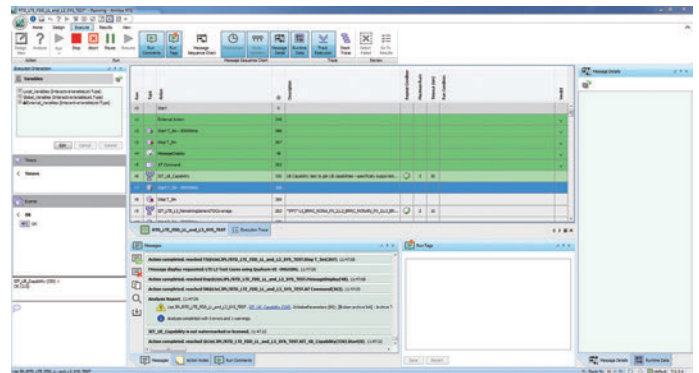


Example of Continuous Test Case Execution

### Easy Test Case Maintenance

Test cases created using the RTD software are easily updated for new 3GPP standard releases, helping cut test-case editing workloads. Moreover, recompiling is unnecessary because test cases maintain compatibility even after firmware updates. Consequently, test-case maintenance costs at commercial release of new mobile terminals are greatly reduced for pre-inspection regression tests and interoperability tests (IOT) with networking equipment.

### 5G NR/4G LTE Fading Tests

In cooperation with a fading PC, one MT8000A supports NR downlink fading tests up to 4CA 2×2 MIMO or 2CA 4×4 MIMO. Using two MT8000A units extends NR fading test support up to 8CA 2×2 MIMO or 4CA 4×4 MIMO.

Furthermore, by adding one MT8000A for LTE BTS, it also supports the EN-DC fading test up to LTE 6CA 8×4 MIMO*.

The fading software includes 3GPP channel models which are compliant with TS38.521 for 5G NR (TDL), TS36.521 for 4G LTE. The channel models can be edited as necessary.

∗: Requires additional PC for LTE fading.

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# Radio Communication Test Station MT8000A Features

## Functional and Regression Tests for 5G devices: SmartStudio NR MX800070A

### 5G Terminal Functional Tests

With an interactive GUI, SmartStudio NR MX800070A supports FR1/FR2 UE call connections, IP throughput tests, and IMS VoLTE testing, as well as Internet connections, live server application tests, and various mobility tests without requiring difficult scenario development. Moreover, user-generated test cases can be executed automatically using the SmartStudio Manager external control tool or an external control interface.

### Interactive GUI

The easy-to-use interactive GUI requires no knowledge of high-level protocols, and the current UE real-time status is displayed on the UE Status screen along with detailed protocol messages and sequences under the Log Display screen. Additionally, PDN settings, creation of test cases, etc., are supported.
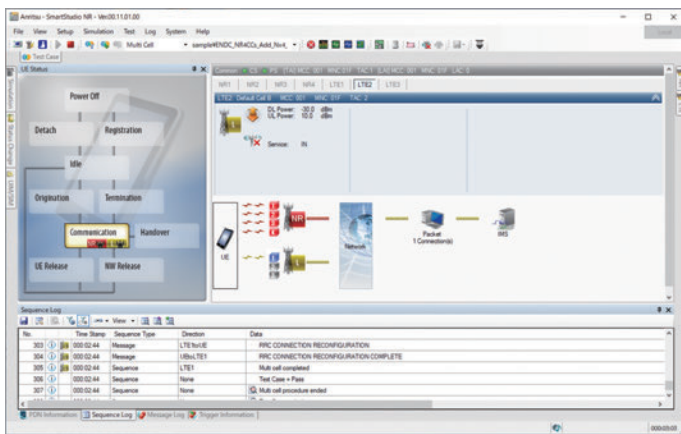


SmartStudio NR Main Screen

### Easy UE Capability Confirmation

UE Capability data are managed automatically and displayed at the UE Capability Information screen for easy confirmation during testing of UE-supported patterns, etc., of combinations of categories, bands, and CAs.
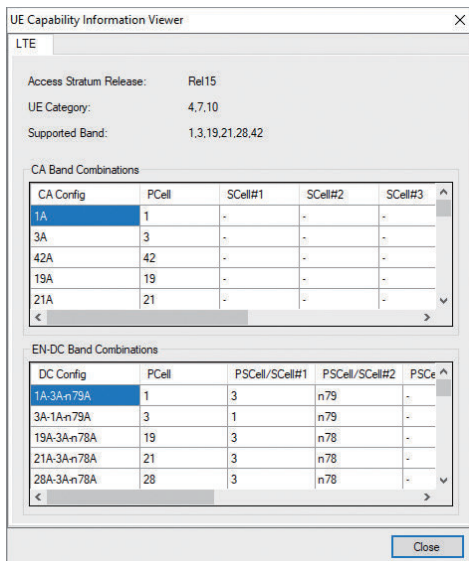


### Test Environment and Base Station Settings

The number of base stations in use, RAT, and antennas are set at the Simulation Parameter screen. In addition, an RF cable setup diagram based on set parameters is displayed, providing strong support for configuring the user's test environment. SIM and other user parameters are also set easily.
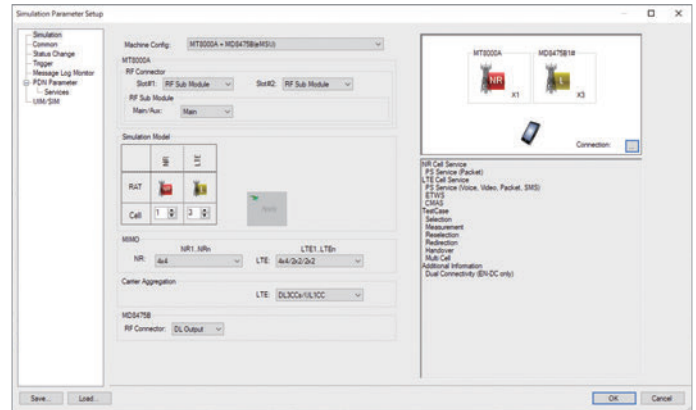


Simulation Parameter Settings Screen

Detailed parameters for each base station in use can be set at the Cell Parameter screen, where settings such as the band, frequency, bandwidth, UL/DL power, QAM, MCS, etc., can be set, saved, and loaded.
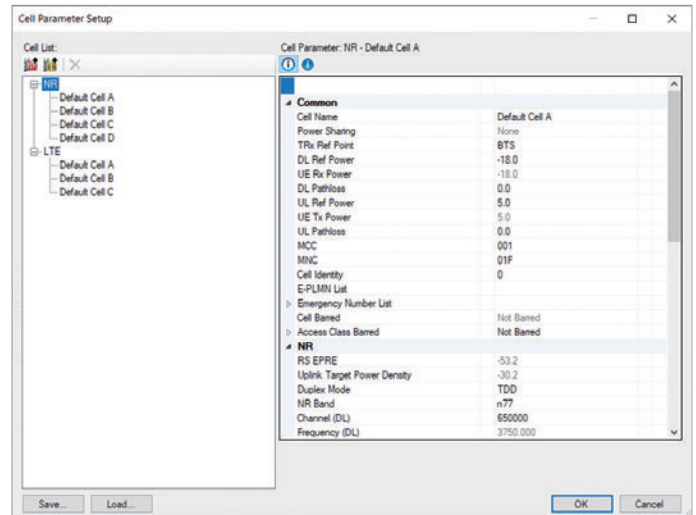


Cell Parameter Settings Screen

The base station TRx power can be changed during the simulation. In addition, base station transmissions can be stopped when executing the out of signal area test, and power can be controlled from the Test Case screen.
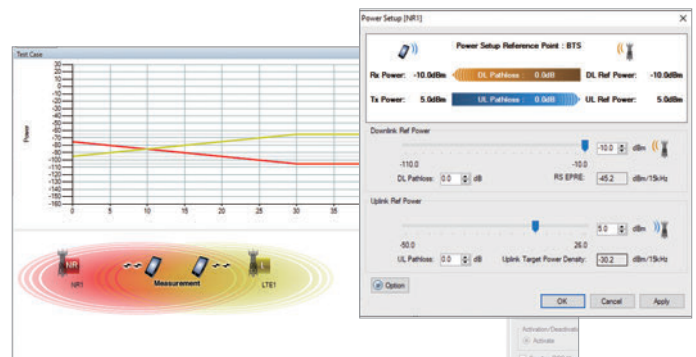
## Functional and Regression Tests for 5G devices: SmartStudio NR MX800070A

### Built-in IMS/PWS Service

With built-in IMS/PWS Service, the SmartStudio NR MX800070A supports VoLTE and SMS tests without requiring users to configure complex environments. Moreover, PWS Service tests, such as ETWS and CMAS, which are difficult to execute on a live network, are implemented easily, and message contents can also be edited.
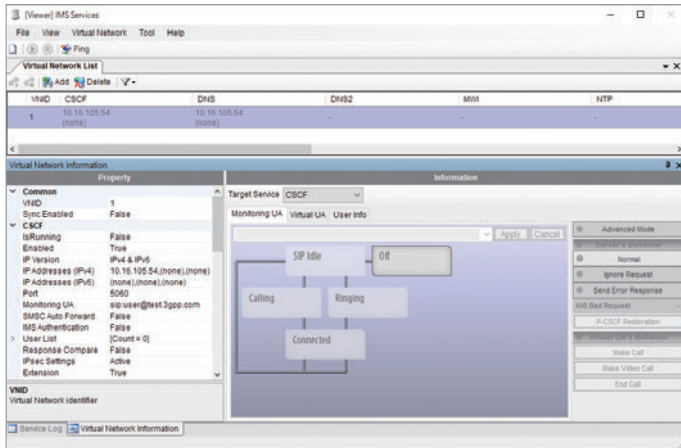


IMS Service Settings Screen
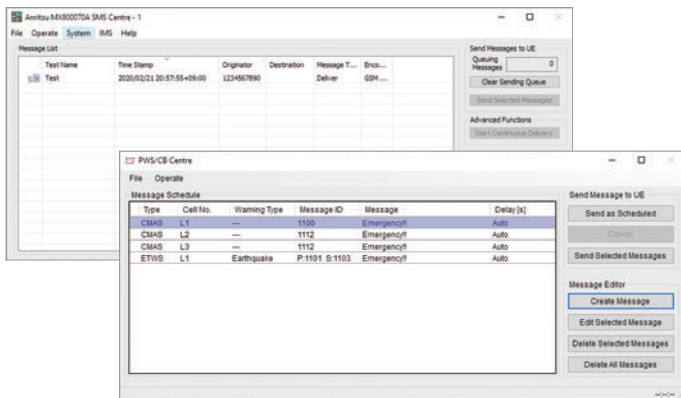


SMS/PWS Service Screen

### Test Automation

Studio NR and the UE can be controlled externally using SmartStudio Manager to configure an automated general test system.
In addition to bundled test cases, users can create their own test cases with easy Pass/Fail confirmation after execution.
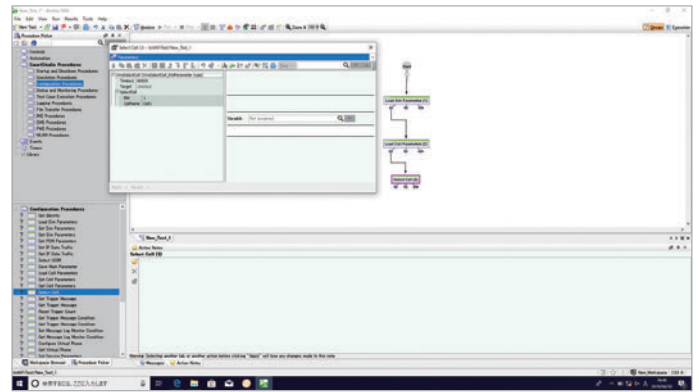


SmartStudio Manager Test Case Creation Screen
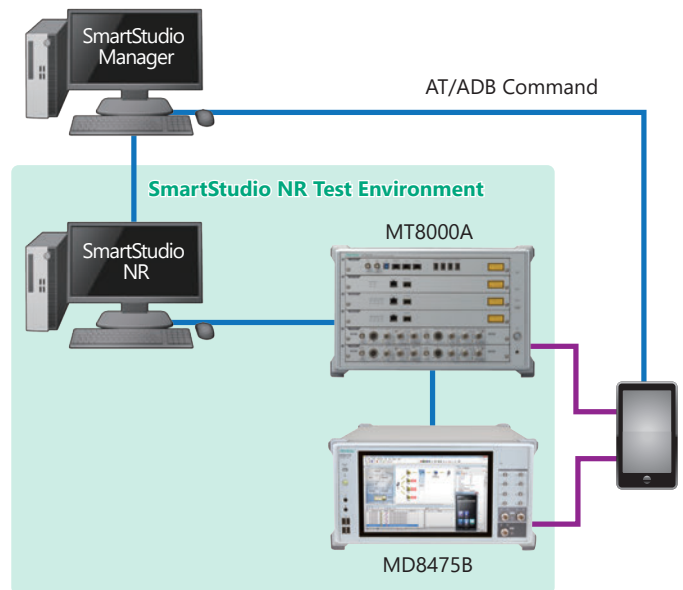


SmartStudio Manager Test Environment Example

# Radio Communication Test Station MT8000A Layout

## MT8000A Front Panel



**❶ Ground Terminal**
Functional ground terminal used as a measure against electrostatic discharge while using the MT8000A.

**❷ Power Switch**
Switches power-on and standby. When the MT8000A is in the power on status, the LED lights up (green).

**❸ Standby LED**
When the MT8000A is in the standby status of which the AC power is on, the LED lights (orange).

**❹ Recover LED/Recover Switch**
Switch to recover MT8000A in case of emergency. Recovery LED lights up (orange) when the recovery function is enabled.

**❺ Caution LED**
Lights up (orange) when MT8000A detects abnormality.

**❻ Ready LED**
Lights up (green) when MT8000A startup is completed after power-on.

**❼ Control Module MT8000A-001 (with Multi-box Data Connection MT8000A-009)**
Controls the entire MT8000A, processes upper layers, downloads firmware, and start MT8000A.
Optical ports are used for connecting multiple MT8000As.

**❽ Data Test Module MT8000A-012**
Performs data transfer for IP throughput test.

**❾ Baseband Module MT8000A-011**
Performs baseband processing (L1/L2) in protocol test.

**❿ RF Base Module MT8000A-020 (with MT8000A-022, MT8000A-023)**
Converts digital signals into analog signals.
Functions as RF interface for the external RF Converter or for RF signals in 2 GHz to 12 GHz.
(in 0.4 GHz to 6 GHz when 0.4 GHz-6 GHz RF Sub Module MT8000A-021 is installed)

# Radio Communication Test Station MT8000A Layout

## MT8000A Modules

### Control Module MT8000A-001
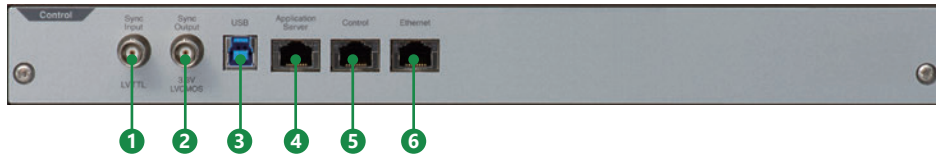
### Control Module MT8000A-001 + Multi-box Data Connection MT8000A-009
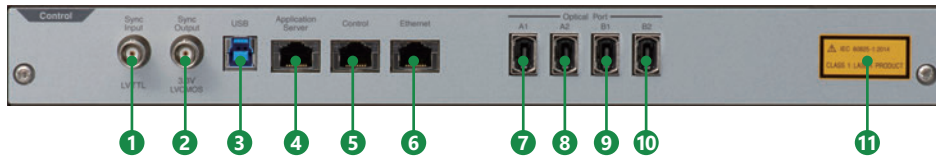
❶ **Sync Input Connector**
BNC connector for inputting synchronizing signal.

❷ **Sync Output Connector**
BNC connector for outputting synchronizing signal.

❸ **USB Connector**
USB (Type B) connector to connect the external PC.

❹ **Application Server Connector**
RJ-45 connector to connect the external PC for Application Server.

❺ **Control Connector**
RJ-45 connector for connecting the MT8000A and Control PC.

❻ **Ethernet Connector**
RJ-45 connector for connecting the external PC, etc.

❼ **Optical Port A1 Connector**
MPO connector A1 for connecting multiple MT8000As when MT8000A-009 Multi-box Data Connection is installed.

❽ **Optical Port A2 Connector**
MPO connector A2 for connecting multiple MT8000As when MT8000A-009 Multi-box Data Connection is installed.

❾ **Optical Port B1 Connector**
MPO connector B1 for connecting multiple MT8000As when MT8000A-009 Multi-box Data Connection is installed.

❿ **Optical Port B2 Connector**
MPO connector B2 for connecting multiple MT8000As when MT8000A-009 Multi-box Data Connection is installed.

⓫ **Explanatory Label**
Indicates that the Optical Port A1, A2, B1, and B2 are Class 1 laser products.

# Radio Communication Test Station MT8000A Layout

## MT8000A Modules

### Data Test Module MT8000A-012



❶ **Data Test Status LED**
Indicates the Data Test status.

❷ **Ethernet Connector for Data Test**
RJ-45 connector for Data Test.

❸ **SFP/SFP+ Connector**
Connector to insert SFP or SFP+ (application parts) into.

❹ **Explanatory Label**
Indicates that the device is a Class 1 laser product when SFP or SFP+ are installed.

### Baseband Module MT8000A-011



❶ **Baseband Status LED**
Indicates the Baseband status.

❷ **Ethernet Connector for Baseband**
RJ-45 connector for Baseband.

❸ **SFP/SFP+ Connector**
Connector to insert SFP or SFP+ (application parts) into.

❹ **Explanatory Label**
Indicates that the device is a Class 1 laser product when SFP or SFP+ are installed.

# Radio Communication Test Station MT8000A Layout

## MT8000A Modules

### RF Base MT8000A-020
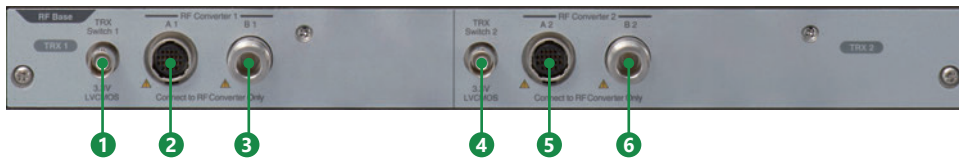


### MT8000A-020 + 3 GHz-12 GHz RF Sub Module MT8000A-022
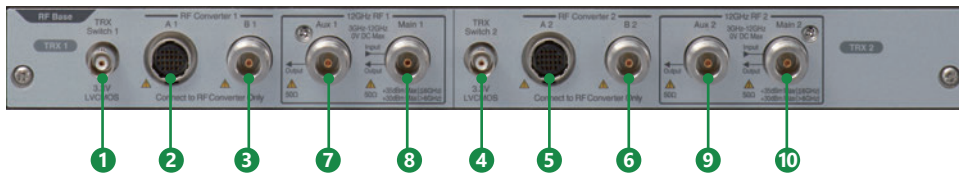


### MT8000A-020 + MT8000A-022 + Extend RF 2.4 GHz-3 GHz MT8000A-023



**❶ TRX Switch 1 Connector**
BNC connector that outputs signals to control the external amplifier, etc.

**❷ RF Converter 1 A1 Connector**
Multi-contact connector that controls the external RF Converter.

**❸ RF Converter 1 B1 Connector**
N connector that input/output the external RF Converter and RF signals.

**❹ TRX Switch 2 Connector**
BNC connector that outputs signals to control the external amplifier, etc.

**❺ RF Converter 2 A2 Connector**
Multi-contact connector that controls the external RF Converter.

**❻ RF Converter 2 B2 Connector**
N connector that inputs/outputs the RF signals between the external RF Converter and MT8000A.

**❼ 12 GHz RF1 Aux 1 Connector**
RF auxiliary connector (output) when 3 GHz-12 GHz RF Sub Module option is installed.

**❽ 12 GHz RF1 Main 1 Connector**
RF main connector (input/output) when 3 GHz-12 GHz RF Sub Module option is installed.

**❾ 12 GHz RF2 Aux 2 Connector**
RF auxiliary connector (output) when 3 GHz-12 GHz RF Sub Module option is installed.

**❿ 12 GHz RF2 Main 2 Connector**
RF main connector (input/output) when 3 GHz-12 GHz RF Sub Module option is installed.

Note: The frequency range indicated on the panel is "2.4 GHz-12 GHz" when MT8000A-023 Extend RF 2.4 GHz-3 GHz is installed.
RF Converter 1 and RF Converter 2 cannot be used simultaneously with 12 GHz RF 1 and 12 GHz RF 2 respectively.

# Radio Communication Test Station MT8000A Layout

## MT8000A Modules

### RF Base Module MT8000A-020 + 0.4 GHz-6 GHz RF Sub Module MT8000A-021



❶ **TRX Switch 1 connector**
BNC connector that outputs signals to control the external amplifier, etc.

❷ **RF Converter 1 A1 connector**
Multi-contact connector that controls the external RF Converter.

❸ **RF Converter 1 B1 connector**
N connector that input/output the external RF Converter and RF signals.

❹ **TRX Switch 2 connector**
BNC connector that outputs signals to control the external amplifier, etc.

❺ **RF Converter 2 A2 connector**
Multi-contact connector that controls the external RF Converter.

❻ **RF Converter 2 B2 connector**
N connector that inputs/outputs the RF signals between the external RF Converter and MT8000A.

❼ **6 GHz RF1 Aux 1 connector**
RF auxiliary connector (output) when 0.4 GHz-6 GHz RF Sub Module option is installed.

❽ **6 GHz RF1 Main 1 connector**
RF main connector (input/output) when 0.4 GHz-6 GHz RF Sub Module option is installed.

❾ **6 GHz RF2 Aux 2 connector**
RF auxiliary connector (output) when 0.4 GHz-6 GHz RF Sub Module option is installed.

❿ **6 GHz RF2 Main 2 connector**
RF main connector (input/output) when 0.4 GHz-6 GHz RF Sub Module option is installed.

Note: The frequency range indicated on the panel is "0.4 GHz-6 GHz" when 0.4 GHz-6 GHz RF Sub Module MT8000A-021 is installed.
RF Converter 1 and RF Converter 2 cannot be used simultaneously with 6 GHz RF 1 and 6 GHz RF 2 respectively.

# Radio Communication Test Station MT8000A Layout

## MT8000A Modules

**Multi RF Module MT8000A-031/Multi RF Extension MT8000A-032**
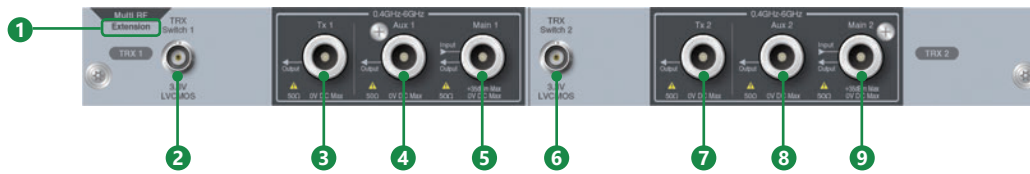


**❶ Extension marking**
Mark for Multi RF Extension MT8000A-032. No mark for Multi RF Module MT8000A-031.

**❷ TRX Switch 1 connector**
BNC connector that outputs signals to control the external amplifier, etc.

**❸ Tx 1 connector**
RF transmission connector (output) for 0.4 GHz-6 GHz signal.

**❹ Aux 1 connector**
RF auxiliary connector (output) for 0.4 GHz-6 GHz signal.

**❺ Main 1 connector**
RF main connector (input/output) for 0.4 GHz-6 GHz signal.

**❻ TRX Switch 2 connector**
BNC connector that outputs signals to control the external amplifier, etc.

**❼ Tx 2 connector**
RF transmission connector (output) for 0.4 GHz-6 GHz signal.

**❽ Aux 2 connector**
RF auxiliary connector (output) for 0.4 GHz-6 GHz signal.

**❾ Main 2 connector**
RF main connector (input/output) for 0.4 GHz-6 GHz signal.

# Radio Communication Test Station MT8000A Layout

## MT8000A Rear Panel
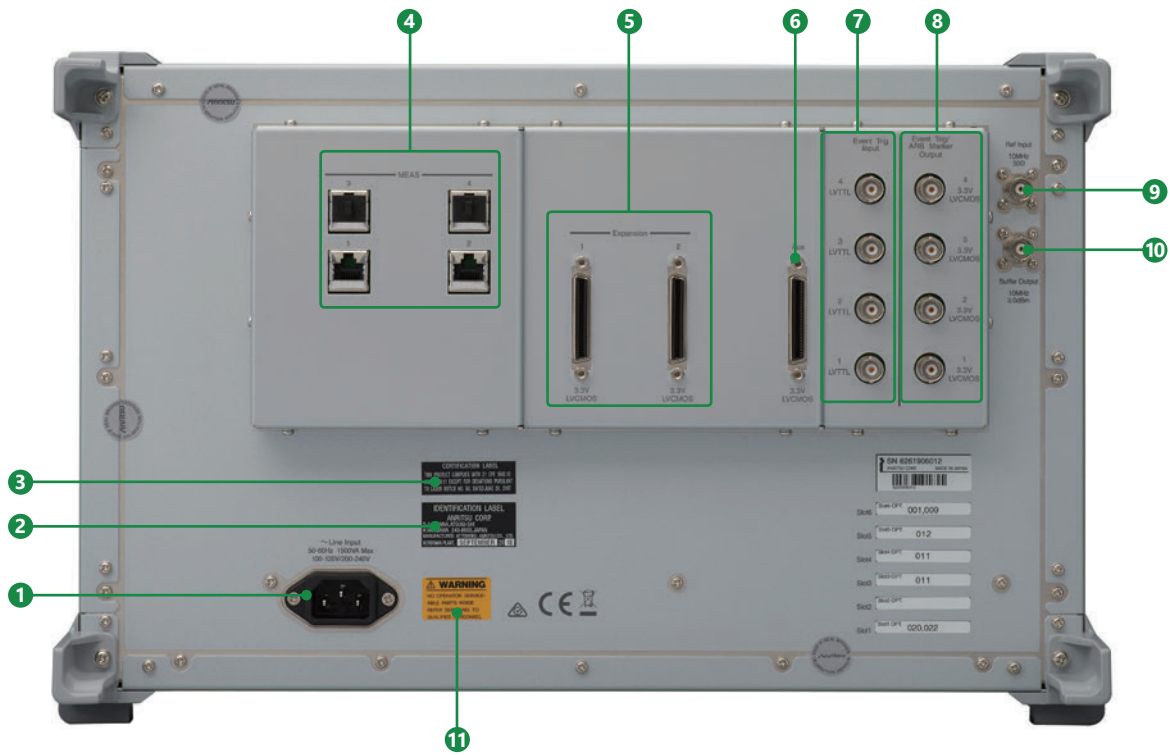


**1 Power Inlet**
Power cable connector for 100 V(ac) to 120 V(ac) or 200 V(ac) to 240 V(ac) (50 Hz/60 Hz) (auto-switching).
Power consumption: 1500 VA or less.

**2 Identification Label**
Identifies the manufacturer of laser products.

**3 Certification Label**
Certifies that the MT8000A conforms to 21 CFR 1040.10 AND 1040.11 except Laser Notice No.50.

**4 Ethernet Connector for Measure**
RJ-45 connector for measurement.

**5 Expansion Connector**
Used for input/output of trigger signals.

**6 Aux Connector**
Auxiliary connector to output frame timing signals.

**7 Event Trigger Input Connector**
BNC connector to input event triggers from external devices. Can input event trigger signals of 4 systems.

**8 Event Trigger Output Connector**
BNC connector to output event triggers to external devices. Can output event trigger signals of 4 systems. Can be used also as output of ARB marker.

**9 Reference signal input connector**
BNC connector to input 10 MHz reference signal from external devices.

**10 Reference Signal Output Connector**
BNC connector to output 10 MHz reference signal built in the MT8000A.

**11 Safety Label**
WARNING label for safe operation of MT8000A. Observe the description on the label.

# Radio Communication Test Station MT8000A Layout

## System Configuration



❶ **Radio Communication Test Station MT8000A**
All-in-one test platform supporting 5G RF measurements and protocol tests.

❷ **28 GHz RF Converter MA80001A/39 GHz RF Converter MA80002A**
Convert frequency of RF signal output from MT8000A to 28 GHz and 39 GHz band.

❸ **RF Chamber MA8171A**
For 5G RF measurements/protocol tests in OTA environment.

❹ **Position Controller MA8174A**
Controls the Positioner MA8175A rotational angle inside the RF Chamber MA8171A.

**Radio Communication Test Station MT8000A**

| | |
|---|---|
| Reference Oscillator | Reference frequency: 10 MHz<br>Start-up characteristics: $\pm 5 \times 10^{-8}$ (3 min. after power-on. Referenced to frequency 1 hour after power-on)<br>Aging rate: $\pm 1 \times 10^{-8}$/day (referenced to frequency 48-hour after power-on)<br>　　　　　　$\pm 1 \times 10^{-7}$/year (referenced to frequency 10-day after power-on)<br>Temperature characteristics: $\pm 2 \times 10^{-8}$<br>Frequency adjusted at shipment: $\pm 2.2 \times 10^{-8}$ (+18°C to +28°C, referenced to frequency 1 hour after power-on)<br>10 MHz Buffer Output<br>　Frequency: 10 MHz<br>　Connector: BNC (f)<br>　Impedance: 50Ω (nom.)<br>　Output Level: ≥0 dBm (AC coupling)<br>10 MHz Ref Input<br>　Frequency: 10 MHz<br>　Operating range: ±1 ppm<br>　Connector: BNC (f)<br>　Impedance: 50Ω (nom.)<br>　Input level: −15 dBm ≤ level ≤ +20 dBm (AC coupling) |
| External Interface | MEAS 1 to 4: RJ45, 1000Base-T, for slot 1 to 4<br>Event TRIG Input 1 to 4: BNC (f), LVTTL<br>Event TRIG/ARB Maker Output 1 to 4: BNC (f), 3.3 V LVCMOS<br>Expansion 1, 2: DX20A (3.3 V LVCMOS)<br>Aux: DX20A (3.3 V LVCMOS) |
| Power Supply | Rated voltage: 100 V(ac) to 120 V(ac)/200 V(ac) to 240 V(ac)<br>　　　　　　(Operating voltage is −15%/+10% of rated voltage, however, lower limit is 90 V, upper limit is 250 V)<br>Rated frequency: 50 Hz/60 Hz<br>Power consumption: ≤1500 VA (include all options and modules) |
| Dimensions and Mass | Dimensions: 426 (W) × 265 (H) × 578 (D) mm (excluding projections)<br>Mass: ≤50 kg (including all options) |
| Environmental Conditions | Operating temperature range: +5°C to +40°C (without condensation)<br>Storage temperature: −20°C to +71°C (without condensation) |

| CE | EMC | 2014/30/EU, EN61326-1, EN61000-3-2 |
|---|---|---|
| | LVD | 2014/35/EU, EN61010-1 |
| | RoHS | 2011/65/EU, EN50581 |
| Laser Safety* | | IEC 60825-1 Class 1<br>FDA 21CFR1040.10 and 1040.11 Excludes deviations caused by conformance to LASER Notice No.50 dated June 24, 2007 |

*: Safety measures for laser products
  This option complies with optical safety standards in IEC 60825-1, 21CFR1040.10 and 1040.11; the following descriptive labels are affixed to the product.



⚠ IEC 60825-1:2014
CLASS 1 LASER PRODUCT

THIS PRODUCT COMPLIES WITH 21 CFR 1040.10
AND 1040.11 EXCEPT FOR DEVIATIONS PURSUANT
TO LASER NOTICE NO. 50, DATED JUNE 24, 2007

**Control Module MT8000A-001**

| | |
|---|---|
| External Interface | USB: USB (Type-B)<br>Application Server: RJ-45 (1000Base-T)<br>Control: RJ-45 (1000Base-T)<br>Ethernet: RJ-45 (1000Base-T)<br>Sync Input: BNC (f) (LVTTL)<br>Sync Output: BNC (f) (3.3 V LVCMOS) |

**Multi-box Data Connection MT8000A-009**

| | |
|---|---|
| External Interface | Optical Port A1, A2, B1, B2: MPO optical adapter (m), 24 cores |

# Radio Communication Test Station MT8000A Specifications

**Baseband Module MT8000A-011**

| External Interface | Ethernet: RJ-45 (1000Base-T)<br>SFP/SFP+: SFF-8431, SFF-8472 compliant<br>　　　　　　　IEEE 802.3ae-2002, IEEE 802.3-2008 compliant |
|---|---|

**Data Test Module MT8000A-012**

| External Interface | Ethernet: RJ-45, 1000Base-T<br>SFP/SFP+: SFF-8431, SFF-8472 compliant<br>　　　　　　　IEEE 802.3ae-2002, IEEE 802.3-2008 compliant |
|---|---|

**RF Base Module MT8000A-020**

| IF Input/Output Connector | RF Converter B1, B2<br>　Connector: N (f)<br>　Impedance: 50Ω (nom.) |
|---|---|
| External Interface | RF Converter A1, A2: Round multiway type connector<br>TRX Switch 1, 2: BNC (f) (3.3 V LVCMOS) |

**0.4 GHz-6 GHz RF Sub Module MT8000A-021**

| General | RF input/output connector<br>　Main 1, Main 2<br>　　Connector: N (f)<br>　　Impedance: 50Ω (nom.)<br>　　VSWR<br>　　　At 0.4 GHz ≤ setting frequency < 3 GHz<br>　　　　≤1.5 (0.4 GHz ≤ frequency < 3.1 GHz)<br>　　　At 3 GHz ≤ setting frequency ≤ 6 GHz<br>　　　　≤1.5 (2.9 GHz ≤ frequency ≤ 6.1 GHz)<br>RF output connector<br>　Aux 1, Aux 2<br>　　Connector: N (f)<br>　　Impedance: 50Ω (nom.)<br>　　VSWR<br>　　　At 0.4 GHz ≤ setting frequency < 3 GHz<br>　　　　≤1.6 (0.4 GHz ≤ frequency < 3.1 GHz)<br>　　　At 3 GHz ≤ setting frequency ≤ 4.2 GHz<br>　　　　≤1.9 (2.9 GHz ≤ frequency ≤ 4.3 GHz)<br>　　　At 4.2 GHz < setting frequency ≤ 6 GHz<br>　　　　≤2.0 (4.1 GHz < frequency ≤ 6.1 GHz) |
|---|---|

| Transmission Characteristics | Frequency |
| --- | --- |
| | Setting range: 0.4 GHz to 6 GHz |
| | Setting resolution: 1 Hz |
| | Accuracy: Depend on accuracy of reference oscillator |
| | Level |
| |   Setting range |
| |     Main 1, Main 2 |
| |       −110 to −10 dBm (0.4 GHz ≤ setting frequency ≤ 6 GHz) |
| |     Aux 1, Aux 2 |
| |       −110 to 0 dBm (0.4 GHz ≤ setting frequency ≤ 6 GHz) |
| |   Setting resolution: 0.1 dB |
| |   Accuracy |
| |     Main 1, Main 2 |
| |       After Cal, with CW, 0.4 GHz ≤ setting frequency < 3 GHz, output level ≥ −100 dBm |
| |         ±0.7 dB (typ.) |
| |         ±1.0 dB (+18°C to +28°C) |
| |         ±1.3 dB (+5°C to +40°C) |
| |       After Cal, with CW, 3 GHz ≤ setting frequency ≤ 6 GHz, output level ≥ −100 dBm |
| |         ±1.0 dB (+18°C to +28°C) |
| |         ±1.3 dB (+5°C to +40°C) |
| |     Aux 1, Aux 2 |
| |       After Cal, with CW, 0.4 GHz ≤ setting frequency < 3 GHz, output level ≥ −100 dBm |
| |         ±0.7 dB (typ.) |
| |         ±1.0 dB (+18°C to +28°C) |
| |         ±1.3 dB (+5°C to +40°C) |
| |       After Cal, with CW, 3 GHz ≤ setting frequency ≤ 4.2 GHz, output level ≥ −100 dBm |
| |         ±1.0 dB (+18°C to +28°C) |
| |         ±1.3 dB (+5°C to +40°C) |
| |       After Cal, with CW, 4.2 GHz < setting frequency ≤ 6 GHz, output level ≥ −100 dBm |
| |         ±1.5 dB (+18°C to +28°C) |
| |         ±2.0 dB (+5°C to +40°C) |
| | Signal purity |
| |   Non-harmonic spurious |
| |     With CW, 0.4 GHz ≤ setting frequency < 0.6 GHz, maximum output level, |
| |     setting frequency ±10 MHz (exclude <0.4 GHz), exclude setting frequency ±2.5 MHz |
| |       ≤−40 dBc |
| |     With CW, 0.6 GHz ≤ setting frequency < 3.3 GHz, maximum output level, non-harmonic on setting frequency ±100 MHz, |
| |     exclude setting frequency ±2.5 MHz |
| |       ≤−40 dBc |
| |     With CW, 3.3 GHz ≤ setting frequency ≤ 6 GHz, maximum output level, non-harmonic on setting frequency ±200 MHz, |
| |     exclude setting frequency ±2.5 MHz |
| |       ≤−40 dBc |
| |     With CW, 0.4 GHz ≤ setting frequency < 0.6 GHz, maximum output level, |
| |     0.4 GHz ≤ non-harmonic frequency ≤ 6 GHz, exclude setting frequency ±10 MHz |
| |       ≤−30 dBc |
| |     With CW, 0.6 GHz ≤ setting frequency < 3.3 GHz, maximum output level, |
| |     0.4 GHz ≤ non-harmonic frequency ≤ 6 GHz, exclude setting frequency ±100 MHz |
| |       ≤−30 dBc |
| |     With CW, 3.3 GHz ≤ setting frequency ≤ 6 GHz, maximum output level, |
| |     0.4 GHz ≤ non-harmonic frequency ≤ 6.2 GHz, exclude setting frequency ±200 MHz |
| |       ≤−30 dBc |
| |   Harmonic spurious |
| |     With CW, 0.4 GHz ≤ setting frequency ≤ 3 GHz, maximum output level |
| |       ≤−25 dBc |
| | Maximum modulation bandwidth |
| |   20 MHz (0.4 GHz ≤ setting frequency < 0.6 GHz) |
| |   200 MHz (0.6 GHz ≤ setting frequency < 3.3 GHz) |
| |   400 MHz (3.3 GHz ≤ setting frequency ≤ 6 GHz) |

| Receiving Characteristics | Frequency<br>  Setting range: 0.4 GHz to 6 GHz<br>  Setting resolution: 1 Hz<br>Level<br>  Maximum input level: +30 dBm, 0 VDC (0.4 GHz ≤ setting frequency ≤ 6 GHz, with CW)<br>  Setting range: −50 to +26 dBm<br>  Setting resolution: 0.1 dB<br>Amplitude<br>  Measurement resolution: 0.01 dB<br>  Measurement accuracy<br>    After Cal, with CW, 0.4 GHz ≤ setting frequency < 3 GHz, measurement bandwidth is 100 MHz, at the signal equal to<br>    the setting frequency and the setting level<br>      ±0.5 dB (Setting level ≥ −20 dBm, typical)<br>      ±0.7 dB (Setting level ≥ −40 dBm, typical)<br>      ±1.0 dB (Setting level ≥ −40 dBm, +18°C to +28°C)<br>      ±1.3 dB (Setting level ≥ −50 dBm, +18°C to +28°C)<br>    After Cal, with CW, 3 GHz ≤ setting frequency ≤ 6 GHz, measurement bandwidth is 100 MHz, at the signal equal to<br>    the setting frequency and the setting level<br>      ±1.0 dB (Setting level ≥ −40 dBm, +18°C to +28°C)<br>      ±1.3 dB (Setting level ≥ −50 dBm, +18°C to +28°C) |
| --- | --- |

**3 GHz-12 GHz RF Sub Module MT8000A-022**
**Extend RF 2.4 GHz-3 GHz MT8000A-023**
**Extend RF 6 GHz-7.125 GHz MT8000A-024**

| General | RF input/output connector<br>  Main 1, Main 2<br>    Connector: N (f)<br>    Impedance: 50Ω (nom.)<br>    VSWR<br>      At 2.4 GHz ≤ setting frequency < 3 GHz, with MT8000A-023<br>        ≤1.7 (2.3 GHz ≤ frequency < 3.1 GHz)<br>      At 3 GHz ≤ setting frequency ≤ 6 GHz<br>        ≤1.5 (2.9 GHz ≤ frequency ≤ 6.1 GHz)<br>      At 6 GHz < setting frequency ≤ 7.125 GHz, with MT8000A-024<br>        ≤1.7 (5.9 GHz < frequency ≤ 7.225 GHz)<br>RF output connector<br>  Aux 1, Aux 2<br>    Connector: N (f)<br>    Impedance: 50Ω (nom.)<br>    VSWR<br>      At 2.4 GHz ≤ setting frequency ≤ 4.2 GHz, with MT8000A-023<br>        ≤1.8 (2.3 GHz ≤ frequency ≤ 4.3 GHz)<br>      At 3 GHz ≤ setting frequency ≤ 4.2 GHz, without MT8000A-023<br>        ≤1.8 (2.9 GHz ≤ frequency ≤ 4.3 GHz)<br>      At 4.2 GHz < setting frequency ≤ 6 GHz<br>        ≤2.0 (4.1 GHz < frequency ≤ 6.1 GHz)<br>      At 6 GHz < setting frequency ≤ 7.125 GHz, with MT8000A-024<br>        ≤2.2 (5.9 GHz < frequency ≤ 7.225 GHz) |
| --- | --- |

| Transmission Characteristics | Frequency<br>  Setting range: 2 GHz to 12 GHz<br>  Setting resolution: 1 Hz<br>  Accuracy: Depend on accuracy of reference oscillator<br>Level<br>  Setting range<br>    Main 1, Main 2<br>      −110 to −10 dBm (2 GHz ≤ setting frequency ≤ 6 GHz)<br>      −110 to −18 dBm (6 GHz < setting frequency ≤ 12 GHz)<br>    Aux 1, Aux 2<br>      −110 to 0 dBm (2 GHz ≤ setting frequency ≤ 6 GHz)<br>      −110 to −8 dBm (6 GHz < setting frequency ≤ 12 GHz)<br>  Setting resolution: 0.1 dB<br>  Accuracy<br>    Main 1, Main 2<br>      After Cal, with CW, 2.4 GHz ≤ setting frequency < 3 GHz, output level ≥ −100 dBm, with MT8000A-023<br>        ±0.7 dB (typ.)<br>        ±1.0 dB (+18°C to +28°C)<br>        ±1.3 dB (+5°C to +40°C)<br>      After Cal, with CW, 3 GHz ≤ setting frequency ≤ 6 GHz, output level ≥ −100 dBm<br>        ±1.0 dB (+18°C to +28°C)<br>        ±1.3 dB (+5°C to +40°C)<br>      After Cal, with CW, 6 GHz < setting frequency ≤ 7.125 GHz, output level ≥ −100 dBm, with MT8000A-024<br>        ±1.3 dB (+18°C to +28°C)<br>        ±1.6 dB (+5°C to +40°C)<br>    Aux 1, Aux 2<br>      After Cal, with CW, 2.4 GHz ≤ setting frequency < 3 GHz, output level ≥ −100 dBm, with MT8000A-023<br>        ±0.7 dB (typ.)<br>        ±1.0 dB (+18°C to +28°C)<br>        ±1.3 dB (+5°C to +40°C)<br>      After Cal, with CW, 3 GHz ≤ setting frequency ≤ 4.2 GHz, output level ≥ −100 dBm<br>        ±1.0 dB (+18°C to +28°C)<br>        ±1.3 dB (+5°C to +40°C)<br>      After Cal, with CW, 4.2 GHz < setting frequency ≤ 6 GHz, output level ≥ −100 dBm<br>        ±1.5 dB (+18°C to +28°C)<br>        ±2.0 dB (+5°C to +40°C)<br>      After Cal, with CW, 6 GHz < setting frequency ≤ 7.125 GHz, output level ≥ −100 dBm, with MT8000A-024<br>        ±1.5 dB (typ.)<br>        ±1.8 dB (+18°C to +28°C)<br>        ±2.3 dB (+5°C to +40°C)<br>  Signal purity<br>    Non-harmonic spurious<br>      With CW, maximum output level, setting frequency ±100 MHz, exclude setting frequency ±2.5 MHz<br>        ≤−40 dBc (2.4 GHz ≤ setting frequency ≤ 6 GHz, with MT8000A-023)<br>        ≤−40 dBc (3 GHz ≤ setting frequency ≤ 6 GHz, without MT8000A-023)<br>        ≤−40 dBc (2.4 GHz ≤ setting frequency ≤ 7.125 GHz, with MT8000A-023 and MT8000A-024)<br>        ≤−40 dBc (3 GHz ≤ setting frequency ≤ 7.125 GHz, without MT8000A-023, with MT8000A-024)<br>      With CW, maximum output level, exclude setting frequency ±100 MHz<br>        ≤−30 dBc (2.4 GHz ≤ setting frequency ≤ 6 GHz, 2.3 GHz ≤ non-harmonic frequency ≤ 6.1 GHz, with MT8000A-023)<br>        ≤−30 dBc (3 GHz ≤ setting frequency ≤ 6 GHz, 2.9 GHz ≤ non-harmonic frequency ≤ 6.1 GHz, without MT8000A-023)<br>        ≤−30 dBc (2.4 GHz ≤ setting frequency ≤ 7.125 GHz, 2.3 GHz ≤ non-harmonic frequency ≤ 7.225 GHz,<br>                with MT8000A-023 and MT8000A-024)<br>        ≤−30 dBc (3 GHz ≤ setting frequency ≤ 7.125 GHz, 2.9 GHz ≤ non-harmonic frequency ≤ 7.225 GHz,<br>                without MT8000A-023, with MT8000A-024)<br>  Maximum modulation bandwidth: 200 MHz (2 GHz ≤ setting frequency ≤ 6 GHz)<br>                1 GHz (6 GHz < setting frequency ≤ 12 GHz) |
|---|---|
| Receiving Characteristics | Frequency<br>  Setting range: 2 GHz to 12 GHz (Center frequency setting range of measurement software)<br>  Setting resolution: 1 Hz<br>Level<br>  Maximum input level: +35 dBm, 0 VDC (2.4 GHz ≤ setting frequency ≤ 6 GHz, with CW, with MT8000A-023)<br>                +35 dBm, 0 VDC (3 GHz ≤ setting frequency ≤ 6 GHz, with CW, without MT8000A-023)<br>                +30 dBm, 0 VDC (6 GHz < setting frequency ≤ 12 GHz, with CW)<br>  Setting range: −50 to +26 dBm<br>  Setting resolution: 0.1 dB<br>Amplitude<br>  Measurement resolution: 0.01 dB<br>  Measurement accuracy: At the signal equal to the setting frequency and the setting level<br>    After Cal, with CW, 2.4 GHz ≤ setting frequency < 3 GHz, measurement bandwidth is 100 MHz, with MT8000A-023<br>      ±0.5 dB (Setting level ≥ −20 dBm, typ.)<br>      ±0.7 dB (Setting level ≥ −40 dBm, typ.)<br>      ±1.0 dB (Setting level ≥ −40 dBm, +18°C to +28°C)<br>      ±1.3 dB (Setting level ≥ −50 dBm, +18°C to +28°C)<br>    After Cal, with CW, 3 GHz ≤ setting frequency ≤ 6 GHz, measurement bandwidth is 100 MHz<br>      ±1.0 dB (Setting level ≥ −40 dBm, +18°C to +28°C)<br>      ±1.3 dB (Setting level ≥ −50 dBm, +18°C to +28°C)<br>    After Cal, with CW, 6 GHz < setting frequency ≤ 7.125 GHz, measurement bandwidth is 100 MHz, with MT8000A-024<br>      ±1.3 dB (Setting level ≥ −40 dBm, +18°C to +28°C)<br>      ±1.6 dB (Setting level ≥ −50 dBm, +18°C to +28°C) |

**0.4 GHz-6 GHz Multi RF Module MT8000A-031, 0.4 GHz-6 GHz Multi RF Extension MT8000A-032**

| | |
|---|---|
| General | RF input/output connector<br>Main 1, Main 2<br>  Connector: N (f)<br>  Impedance: 50Ω (nom.)<br>  VSWR: ≤1.5 (0.4 GHz ≤ frequency ≤ 6 GHz)<br>RF output connector<br>Aux 1, Aux 2, Tx 1, Tx 2<br>  Connector: N (f)<br>  Impedance: 50Ω (nom.)<br>  VSWR: ≤1.6 (0.4 GHz ≤ frequency ≤ 3.1 GHz)<br>        ≤1.9 (3.1 GHz < frequency ≤ 4.3 GHz)<br>        ≤2.0 (4.3 GHz < frequency ≤ 6.0 GHz) |
| Transmission Characteristics | Frequency<br>  Setting range: 0.4 GHz to 6.0 GHz (Frequency setting range of measurement software)<br>  Setting resolution: 1 Hz<br>  Accuracy: Depend on accuracy of reference oscillator<br>Level<br>  Setting range<br>    Main 1, Main 2<br>      −110 to −10 dBm (0.4 GHz ≤ setting frequency ≤ 6 GHz)<br>    Aux 1, Aux 2, Tx 1, Tx 2<br>      −110 to 0 dBm (0.4 GHz ≤ setting frequency ≤ 6 GHz)<br>  Setting resolution: 0.1 dB<br>  Accuracy<br>    Main 1, Main 2<br>      After Cal, with CW, 0.4 GHz ≤ setting frequency < 3 GHz, Setting level ≥−100 dBm<br>        ±0.7 dB (Typ.)<br>        ±1.0 dB (+18°C to +28°C)<br>        ±1.3 dB (+5°C to +40°C)<br>      After Cal, with CW, 3 GHz ≤ setting frequency ≤ 6 GHz, Setting level ≥−100 dBm<br>        ±1.0 dB (+18°C to +28°C)<br>        ±1.3 dB (+5°C to +40°C)<br>    Aux 1, Aux 2, Tx 1, Tx 2<br>      After Cal, with CW, 0.4 GHz ≤ setting frequency < 3 GHz, Setting level ≥−100 dBm<br>        ±0.7 dB (Typ.)<br>        ±1.0 dB (+18°C to +28°C)<br>        ±1.3 dB (+5°C to +40°C)<br>      After Cal, with CW, 3 GHz ≤ setting frequency ≤ 4.2 GHz, Setting level ≥−100 dBm<br>        ±1.0 dB (+18°C to +28°C)<br>        ±1.3 dB (+5°C to +40°C)<br>      After Cal, with CW, 4.2 GHz < setting frequency ≤ 6 GHz, Setting level ≥−100 dBm<br>        ±1.5 dB (+18°C to +28°C)<br>        ±2.0 dB (+5°C to +40°C)<br>  Signal purity<br>    Non-harmonic spurious: With CW, maximum out level<br>      ≤−40 dBc (0.4 GHz ≤ setting frequency < 0.6 GHz, non-harmonic spurious within setting frequency ±10 MHz,<br>            exclude setting frequency < 0.4 GHz, exclude non-harmonic spurious within setting frequency ±2.5 MHz)<br>      ≤−40 dBc (0.6 GHz ≤ setting frequency ≤ 6 GHz, non-harmonic spurious within setting frequency ±100 MHz,<br>            exclude non-harmonic spurious within setting frequency ±2.5 MHz)<br>      ≤−30 dBc (0.4 GHz ≤ setting frequency < 0.6 GHz, 0.4 GHz ≤ non-harmonic spurious ≤ 6 GHz,<br>            exclude non-harmonic spurious within setting frequency ±10 MHz)<br>      ≤−30 dBc (0.6 GHz ≤ setting frequency < 3.3 GHz, 0.4 GHz ≤ non-harmonic spurious ≤ 6 GHz,<br>            exclude non-harmonic spurious within setting frequency ±100 MHz)<br>      ≤−30 dBc (3.3 GHz ≤ setting frequency ≤ 6 GHz, 0.4 GHz ≤ non-harmonic spurious ≤ 6.1 GHz,<br>            exclude non-harmonic spurious within setting frequency ±100 MHz)<br>    Harmonic spurious: With CW, maximum out level<br>      ≤−25 dBc (0.4 GHz ≤ setting frequency ≤ 3 GHz)<br>  Maximum modulation bandwidth<br>    20 MHz (0.4 GHz ≤ setting frequency < 0.6 GHz)<br>    200 MHz (0.6 GHz ≤ setting frequency ≤ 6 GHz) |
| Receiving Characteristics | Frequency<br>  Setting range: 0.4 GHz to 6 GHz (Frequency setting range of measurement software)<br>  Setting resolution: 1 Hz<br>Level<br>  Maximum input level: +35 dBm, 0 VDC (with CW, 0.4 GHz ≤ setting frequency ≤ 6 GHz)<br>  Setting range: −50 to +26 dBm<br>  Setting resolution: 0.1 dB<br>Amplitude<br>  Measurement resolution: 0.01 dB<br>  Measurement accuracy: After Cal, with CW, at the signal equal to the setting frequency and the setting level<br>    0.4 GHz ≤ setting frequency ≤ 0.6 GHz, measurement bandwidth 10 MHz<br>      ±0.5 dB (setting level ≥−20 dBm, typ.)<br>      ±0.7 dB (setting level ≥−40 dBm, typ.)<br>      ±1.0 dB (setting level ≥−40 dBm, +18°C to +28°C)<br>      ±1.3 dB (setting level ≥−50 dBm, +18°C to +28°C)<br>    0.6 GHz < setting frequency < 3 GHz, measurement bandwidth 100 MHz<br>      ±0.5 dB (setting level ≥−20 dBm, typ.)<br>      ±0.7 dB (setting level ≥−40 dBm, typ.)<br>      ±1.0 dB (setting level ≥−40 dBm, +18°C to +28°C)<br>      ±1.3 dB (setting level ≥−50 dBm, +18°C to +28°C)<br>    3 GHz ≤ setting frequency ≤ 6 GHz, measurement bandwidth 100 MHz<br>      ±1.0 dB (setting level ≥−40 dBm, +18°C to +28°C)<br>      ±1.3 dB (setting level ≥−50 dBm, +18°C to +28°C) |

## Peripherals

### 28 GHz RF Converter MA80001A

| | |
|---|---|
| RF Input/Output Connector | Port 1, Port 2<br>  Connector: K (m)<br>  Impedance: 50Ω (nom.)<br>  VSWR (when transmitted): ≤2.5 (23.75 GHz ≤ frequency ≤ 30 GHz)<br>  VSWR (when received): ≤2.5 (23.45 GHz ≤ frequency ≤ 30.3 GHz) |
| Transmission Characteristics | Frequency<br>  Setting range: 24.25 GHz to 29.5 GHz (Center frequency setting range of measurement software)<br>  Setting resolution: 1 Hz<br>  Accuracy: Depend on accuracy of MT8000A reference oscillator<br>Level<br>  Setting range: –90 to +5 dBm<br>  Setting resolution: 0.1 dB<br>  Accuracy: ±1.5 dB (+18°C to +28°C, after Cal, with CW)<br>Signal purity<br>  Non-harmonic spurious<br>    With CW, maximum output level<br>      ≤–40 dBc (non-harmonic on setting frequency ±500 MHz, non-harmonic, exclude setting frequency ±50 MHz)<br>      ≤–30 dBc (23.75 GHz ≤ non-harmonic frequency ≤ 30 GHz, exclude setting frequency within ±500 MHz and –4500 MHz)<br>Maximum modulation bandwidth: 1 GHz |
| Receiving Characteristics | Frequency<br>  Setting range: 24.25 GHz to 29.5 GHz (Center frequency setting range of measurement software)<br>  Setting resolution: 1 Hz<br>Level<br>  Maximum input level: +20 dBm, 0 VDC (with CW)<br>  Setting range: –70 to+5 dBm<br>  Setting resolution: 0.1 dB<br>Amplitude<br>  Measurement resolution: 0.01 dB<br>  Measurement accuracy: At the signal equal to the setting frequency and the setting level<br>    After Cal, with CW, 24.25 GHz ≤ setting frequency ≤ 29.5 GHz, measurement bandwidth 100 MHz, +18°C to +28°C<br>      ±1.5 dB (–50 dBm ≤ setting level ≤ +5 dBm)<br>      ±2.5 dB (–70 dBm ≤ setting level < –50 dBm) |
| IF Input/Output Connector | Connect to MT8000A: B<br>  Connector: N (f)<br>  Impedance: 50Ω (nom.) |
| External Control Connector | Round multiway type connector |
| DC Input Connector | Voltage: 12 VDC<br>Current: ≤3 A |
| Dimensions and Mass | Dimensions: 92 (W) × 175 (H) × 260 (D) mm (excluding projections)<br>Mass: ≤6 kg |
| Environmental Conditions | Operating temperature range: +5°C to +40°C (without condensation)<br>Storage temperature range: –20°C to +71°C (without condensation) |

| CE | EMC | 2014/30/EU, EN61326-1, EN61000-3-2 |
|---|---|---|
| | LVD | 2014/35/EU, EN61010-1 |
| | RoHS | 2011/65/EU, EN50581 |

## Peripherals

### 39 GHz RF Converter MA80002A

| | |
|---|---|
| RF Input/Output Connector | Port 1, Port 2<br>  Connector: K (m)<br>  Impedance: 50Ω (nom.)<br>  VSWR: ≤2.9 (36.2 GHz ≤ frequency ≤ 40.0 GHz) |
| Transmission Characteristics | Frequency<br>  Setting range: 37.0 GHz to 42.5 GHz (Center frequency setting range of measurement software)<br>  Setting resolution: 1 Hz<br>  Accuracy: Depend on accuracy of MT8000A reference oscillator<br>Level<br>  Setting range: −90 to +5 dBm<br>  Setting resolution: 0.1 dB<br>  Accuracy: ±1.5 dB (typ., after Cal, with CW, 37.0 GHz ≤ setting frequency ≤ 40.0 GHz)<br>  　　　　　±2.0 dB (+18°C to +28°C, after Cal, with CW, 37.0 GHz ≤ setting frequency ≤ 40.0 GHz)<br>Signal purity<br>  Non-harmonic spurious<br>    With CW, maximum output level, 37.0 GHz ≤ setting frequency ≤ 40.0 GHz<br>      ≤−40 dBc (non-harmonic on setting frequency ±500 MHz, exclude non-harmonic frequency >40.0 GHz and setting<br>      　　　frequency ±50 MHz)<br>      ≤−30 dBc (36.5 GHz ≤ non-harmonic frequency ≤ 40.0 GHz, exclude setting frequency ±500 MHz)<br>  Maximum modulation bandwidth: 1 GHz |
| Receiving Characteristics | Frequency<br>  Setting range: 37.0 GHz to 42.5 GHz (Center frequency setting range of measurement software)<br>  Setting resolution: 1 Hz<br>Level<br>  Maximum input level: +17 dBm, 0 VDC (with CW)<br>  Setting range: −70 to +5 dBm<br>  Setting resolution: 0.1 dB<br>Amplitude<br>  Measurement resolution: 0.01 dB<br>  Measurement accuracy: At the signal equal to the setting frequency and the setting level<br>    After Cal, with CW, 37.0 GHz ≤ setting frequency ≤ 40.0 GHz, measurement bandwidth 100 MHz<br>      ±1.5 dB (−50 dBm ≤ setting level ≤ +5 dBm, typ.)<br>      ±2.0 dB (−70 dBm ≤ setting level < −50 dBm, typ.)<br>      ±2.0 dB (−50 dBm ≤ setting level ≤ +5 dBm, +18°C to +28°C)<br>      ±2.5 dB (−70 dBm ≤ setting level < −50 dBm, +18°C to +28°C) |
| IF Input/Output Connector | Connect to MT8000A: B<br>  Connector: N (f)<br>  Impedance: 50Ω (nom.) |
| External Control Connector | Round multiway type connector |
| DC Input Connector | Voltage: 12 VDC<br>Current: ≤4 A |
| Dimensions and Mass | Dimensions: 92 (W) × 175 (H) × 304 (D) mm (excluding projections)<br>Mass: ≤6 kg |
| Environmental Conditions | Operating temperature range: +5°C to +40°C (without condensation)<br>Storage temperature: −20°C to +71°C (without condensation) |

| CE | EMC | 2014/30/EU, EN61326-1, EN61000-3-2 |
|---|---|---|
| | LVD | 2014/35/EU, EN61010-1 |
| | RoHS | 2011/65/EU, EN50581 |

## Peripherals

### Multiband RF Converter MA80003A

| | |
|---|---|
| RF Input/Output Connector | Port 1, Port 2<br>Connector: V (m)<br>Impedance: 50Ω (nom.)<br>VSWR: ≤2.5 (22.65 GHz ≤ frequency ≤ 31.1 GHz)<br>　　　≤2.9 (35.4 GHz ≤ frequency ≤ 43.5 GHz)<br>　　　≤2.9 (43.5 GHz < frequency ≤ 45.1 GHz, typ.) |
| Transmission Characteristics | Frequency<br>　Setting range: 24.25 GHz to 29.5 GHz, 37.0 GHz to 43.5 GHz<br>　Setting resolution: 1 Hz<br>　Accuracy: Depend on accuracy of MT8000A reference oscillator<br>Level<br>　Setting range: −70 to +15 dBm<br>　Setting resolution: 0.1 dB<br>　Accuracy: After Cal, with CW, Setting level ≤ ±10 dBm<br>　　　　　　±1.5 dB (24.25 GHz ≤ setting frequency ≤ 29.5 GHz, +18°C to +28°C)<br>　　　　　　±1.5 dB (37.0 GHz ≤ setting frequency ≤ 40.0 GHz, typ.)<br>　　　　　　±2.0 dB (37.0 GHz ≤ setting frequency ≤ 40.0 GHz, +18°C to +28°C)<br>　　　　　　±1.5 dB (40.0 GHz < setting frequency ≤ 43.5 GHz, typ.)<br>　　　　　　±2.0 dB (40.0 GHz < setting frequency ≤ 43.5 GHz, +18°C to +28°C)<br>Signal purity<br>　Non-harmonic spurious: With CW, Setting level=+10 dBm<br>　　In-band Specification:<br>　　　≤−40 dBc (non-harmonic on setting frequency ±500 MHz, exclude setting frequency ±50 MHz and non-harmonic frequency<br>　　　　　　< 24.25 GHz, 29.5 GHz < non-harmonic frequency < 37.0 GHz and non-harmonic frequency > 43.5 GHz)<br>　　Specification for interference signal source:<br>　　　≤−37 dBc (non-harmonic on setting frequency ±1.5 GHz, exclude setting frequency ±500 MHz and non-harmonic frequency<br>　　　　　　< 24.25 GHz, 29.5 GHz < non-harmonic frequency < 37.0 GHz and non-harmonic frequency > 43.5 GHz)<br>　　Out-of-band Specification:<br>　　　≤−30 dBc (24.25 GHz ≤ setting frequency ≤ 29.5 GHz, 24.25 GHz ≤ non-harmonic frequency ≤ 29.5 GHz and 37.0 GHz<br>　　　　　　≤ non-harmonic frequency ≤ 43.5 GHz, exclude setting frequency ±1.5 GHz, setting frequency - 4.5 GHz<br>　　　　　　±10 MHz and setting frequency + 4.5 GHz ±10 MHz)<br>　　　≤−30 dBc (37.0 GHz ≤ setting frequency ≤ 43.5 GHz, 24.25 GHz ≤ non-harmonic frequency ≤ 29.5 GHz and<br>　　　　　　37.0 GHz ≤ non-harmonic frequency ≤ 43.5 GHz, exclude setting frequency ±1.5 GHz)<br>　Maximum modulation bandwidth: 1 GHz |
| Receiving Characteristics | Frequency<br>　Setting range: 24.25 GHz to 29.5 GHz, 37.0 GHz to 43.5 GHz<br>　Setting resolution: 1 Hz<br>Level<br>　Maximum input level: +20 dBm, 0 VDC (with CW)<br>　Setting range: −70 to +10 dBm<br>　Setting resolution: 0.1 dB<br>Amplitude<br>　Measurement resolution: 0.01 dB<br>　Measurement accuracy: After Cal, with CW, measurement bandwidth 100 MHz, at the signal equal to the setting frequency<br>　　　　　　　　and the setting level<br>　　24.25 GHz ≤ setting frequency ≤ 29.5 GHz<br>　　　±1.0 dB (−50 dBm ≤ setting level ≤ +10 dBm, typ.)<br>　　　±2.0 dB (−70 dBm ≤ setting level < −50 dBm, typ.)<br>　　　±1.5 dB (−50 dBm ≤ setting level ≤ +10 dBm, +18°C to +28°C)<br>　　　±2.5 dB (−70 dBm ≤ setting level < −50 dBm, +18°C to +28°C)<br>　　37.0 GHz ≤ setting frequency ≤ 40.0 GHz<br>　　　±1.5 dB (−50 dBm ≤ setting level ≤ +10 dBm, typ.)<br>　　　±2.0 dB (−70 dBm ≤ setting level < −50 dBm, typ.)<br>　　　±2.0 dB (−50 dBm ≤ setting level ≤ +10 dBm, +18°C to +28°C)<br>　　　±2.5 dB (−70 dBm ≤ setting level < −50 dBm, +18°C to +28°C)<br>　　40.0 GHz ≤ setting frequency ≤ 43.5 GHz<br>　　　±1.5 dB (−50 dBm ≤ setting level ≤ +10 dBm, typ.)<br>　　　±2.0 dB (−65 dBm ≤ setting level < −50 dBm, typ.)<br>　　　±2.0 dB (−50 dBm ≤ setting level ≤ +10 dBm, +18°C to +28°C)<br>　　　±2.5 dB (−65 dBm ≤ setting level < −50 dBm, +18°C to +28°C) |
| IF Input/Output Connector | Connector: N (f)<br>Impedance: 50Ω (nom.) |
| External Control Connector | Round multiway type connector |
| DC Input Connector | Voltage: 18 VDC<br>Current: ≤5.5 A |
| Dimensions and Mass | Dimensions: 83 (W) × 175 (H) × 304 (D) mm (excluding projections)<br>Mass: ≤6 kg |
| Environmental Conditions | Operating temperature range: +5°C to +45°C (without condensation)<br>Storage temperature range: −20°C to +71°C (without condensation) |

| CE | EMC | 2014/30/EU, EN61326-1, EN61000-3-2 |
|---|---|---|
| | LVD | 2014/35/EU, EN61010-1 |
| | RoHS | 2011/65/EU, EN50581 |

See **OTA Product Catalog** for detailed information of Shield Box MA8161A, RF Chamber MA8171A and CATR Anechoic chamber MA8172A.

# Radio Communication Test Station MT8000A 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.

| Model/Order No. | Name | |
|---|---|---|
| | **Main Frame** | |
| MT8000A | Radio Communication Test Station | |
| | **Standard Accessories** | |
| J1211 | Power Cord (3.0 m, 100 V, 3 core) : | 1 pc |
| J1440A | LAN Cable : | 1 pc |
| W3955AE | MT8000A Operation Manual (DVD) : | 1 pc |
| MX800000A | Platform Software | |
| | **Options** | |
| MT8000A-001 | Control Module | |
| MT8000A-009 | Multi-box Data Connection | |
| MT8000A-011 | Baseband Module | |
| MT8000A-012 | Data Test Module | |
| MT8000A-020 | RF Base Module | |
| MT8000A-021 | 0.4 GHz-6 GHz RF Sub Module | |
| MT8000A-022 | 3 GHz-12 GHz RF Sub Module | |
| MT8000A-023 | Extend RF 2.4 GHz-3 GHz | |
| MT8000A-024 | Extend RF 6 GHz-7.125 GHz | |
| MT8000A-031 | 0.4 GHz-6 GHz Multi RF Module | |
| MT8000A-032 | 0.4 GHz-6 GHz Multi RF Extension | |
| | **Converter** | |
| MA80001A | 28 GHz RF Converter | |
| MA80002A | 39 GHz RF Converter | |
| MA80003A | Multiband RF Converter | |
| J1771A | Coaxial Cord (N-N, 1.0 m) | |
| J1771B | Coaxial Cord (N-N, 3.0 m) | |
| J1772A | Control Cable, 1.0 m | |
| J1772B | Control Cable, 3.0 m | |
| | **Correction Equipments for OTA Measurement** | |
| ML2437A | Power Meter | |
| MA2444D | Power Sensor | |
| MA2445D | Power Sensor | |
| 41KC-10 | 10 dB Attenuator | |
| J0004 | COAXIAL ADAPTOR | |
| J0008 | GPIB CABLE, 2.0M | |
| K222B | Adaptor | |
| Z1974A | Reference Antenna | |
| | **Measurement Hardware for NSA** | |
| MT8821C | Radio Communication Analyzer | |
| MT8821C-008 | LTE Measurement Hardware | |
| MX882112C | LTE FDD Measurement Software | |
| MX882112C-010 | LTE FDD NSA for 5G Anchor | |
| MX882113C | LTE TDD Measurement Software | |
| MX882113C-010 | LTE TDD NSA for 5G Anchor | |
| J1802A | Sync Cable | |
| MD8430A | Signalling Tester | |
| MD8430A-005 | Extended Frequency Range to 3.8 GHz Hardware2 | |
| MD8430A-035 | LTE Enhanced Test Mode I(ETM) | |
| MD8430A-060 | LTE FDD Option | |
| MD8430A-061 | LTE TDD Option | |
| MD8430A-064 | LTE Anchor For 5G NSA Option | |
| MD8430A-086 | Ciphering Option | |
| MD8430A-SS135 | 1 Year Support Service for LTE FDD (ETM) | |
| MD8430A-SS136 | 1 Year Support Service for LTE TDD (ETM) | |
| | **Application Parts** | |
| Z2017B | Standard PC | |
| Z2035A | Standard PC for SSNR (with monitor) | |
| Z1320E | Standard PC for RTD (with monitor) | |
| MT8000A-AK001 | Fading Control PC | |
| MT8000A-AK002 | IP Test Server PC | |
| Z1591A | USB Dongle (Protocol) | |
| Z2023A | USB Dongle (SmartStudio NR) | |
| G0408A | 10 Gig Ethernet SR 850 nm SFP+ | |
| J1581A | Optical cable MM LC/PC to LC/PC 3 meter | |
| Z1993A | Optical Connector Cleaner (MPO) | |
| J0127A | COAXIAL CORD, 1.0M | |
| J1398A | N-SMA ADAPTOR | |
| J1440A | LAN Cable | |
| J1773A | AUX Conversion Adapter | |
| J1798A | GPIB-USB-HS+ | |
| Z2032A | Reference Antenna | |

| Model/Order No. | Name |
|---|---|
| | **Software Options** |
| MX800010A | NR TDD Measurement Software |
| MX800010A-001 | NR TDD SA Call Processing Software |
| MX800010A-002 | NR TDD OTA Measurement Software |
| MX800010A-003 | NR IP Data Transfer |
| MX800010A-007 | NR TDD Sub-6 GHz Measurement |
| MX800010A-008 | NR TDD mmWave Measurement |
| MX800010A-009 | NR FDD Measurement |
| MX800010A-024 | NR BW 200 MHz Per Cell |
| MX800010A-031 | NR TDD DL 2×2 MIMO Up To Total BW 100 MHz |
| MX800010A-032 | NR TDD DL 2×2 MIMO Up To Total BW 200 MHz |
| MX800010A-033 | NR TDD DL 2×2 MIMO Up To Total BW 400 MHz |
| MX800010A-034 | NR TDD DL 2×2 MIMO Up To Total BW 600 MHz |
| MX800010A-035 | NR TDD DL 2×2 MIMO Up To Total BW 800 MHz |
| MX800010A-036 | NR TDD DL 4×4 MIMO Up To Total BW 100 MHz |
| MX800010A-037 | NR TDD DL 4×4 MIMO Up To Total BW 200 MHz |
| MX800010A-041 | NR TDD DL 2CA For Rx Measurement |
| MX800010A-042 | NR TDD DL 3CA For Rx Measurement |
| MX800010A-043 | NR TDD DL 4CA For Rx Measurement |
| MX800010A-044 | NR TDD DL 5CA For Rx Measurement |
| MX800010A-045 | NR TDD DL 6CA For Rx Measurement |
| MX800010A-046 | NR TDD DL 7CA For Rx Measurement |
| MX800010A-047 | NR TDD DL 8CA For Rx Measurement |
| MX800010A-051 | NR TDD UL 2×2 MIMO Up To Total BW 100 MHz |
| MX800010A-061 | NR TDD UL 2CA For Tx Measurement |
| MX800010A-062 | NR TDD UL 3CA For Tx Measurement |
| MX800010A-063 | NR TDD UL 4CA For Tx Measurement |
| MX800030A | NR Protocol Platform Software |
| MX800030A-001 | NR TDD Platform |
| MX800030A-002 | NR FDD Platform |
| MX800030A-003 | Ciphering |
| MX800030A-005 | 5G SA Protocol |
| MX800030A-006 | NR SDAP |
| MX800030A-007 | NR FDD/TDD Joint CA |
| MX800030A-010 | RF/Fading Driver For Multiple box |
| MX800030A-031 | NR DL 2×2 MIMO BW 50 MHz Per Cell |
| MX800030A-032 | NR DL 2×2 MIMO BW 100 MHz Per Cell |
| MX800030A-033 | NR DL 2×2 MIMO BW 200 MHz Per Cell |
| MX800030A-035 | NR DL 4×4 MIMO BW 50 MHz Per Cell |
| MX800030A-036 | NR DL 4×4 MIMO BW 100 MHz Per Cell |
| MX800030A-041 | NR UL 2×2 MIMO BW 50 MHz Per Cell |
| MX800030A-042 | NR UL 2×2 MIMO BW 100 MHz Per Cell |
| MX800030A-051 | NR DL 2CA For Protocol |
| MX800030A-052 | NR DL 3CA For Protocol |
| MX800030A-053 | NR DL 4CA For Protocol |
| MX800030A-054 | NR DL 5CA For Protocol |
| MX800030A-055 | NR DL 6CA For Protocol |
| MX800030A-056 | NR DL 7CA For Protocol |
| MX800030A-057 | NR DL 8CA For Protocol |
| MX800030A-061 | NR UL 2CA For Protocol |
| MX800030A-062 | NR UL 3CA For Protocol |
| MX800030A-063 | NR UL 4CA For Protocol |
| MX800030A-071 | Digital IQ Basic For Protocol |
| MX800031A | NR Fading Basic |
| MX800031A-001 | NR Fading 2×2 MIMO |
| MX800031A-002 | NR Fading 4×2/4×4 MIMO |
| MX800031A-003 | NR Fading 2CA-4CA |
| MX800031A-004 | NR Fading 5CA-8CA |
| MX800032A | LTE Protocol Platform Software |
| MX800032A-001 | LTE Anchor For Protocol |
| MX800032A-002 | LTE Advance Features |
| MX800032A-010 | LTE RF/Fading Driver For Multiple box |
| MX800033A | LTE Fading Basic |
| MX800050A | Rapid Test Designer Platform (RTD) |
| MX800050A-001 | 5G NSA Framework For RTD |
| MX800050A-002 | RTD LL/L3 Procedure Libraries (5G) |
| MX800050A-003 | Core LTE Framework For RTD |
| MX800050A-004 | UTRAN/GERAN Framework For RTD |
| MX800050A-005 | IMS Framework For RTD |
| MX800050A-006 | IoT Framework For RTD |
| MX800050A-007 | LTE-A Framework For RTD |
| MX800050A-008 | LTE-A Pro Framework For RTD |
| MX800050A-009 | LTE MIMO Framework For RTD |

| Model/Order No. | Name |
|---|---|
| MX800050A-010 | LTE Unlicensed Framework For RTD |
| MX800050A-011 | LTE/UTRAN/GERAN Fading Library For RTD |
| MX800050A-012 | 5G Fading Library |
| MX800050A-013 | 5G SA Framework For RTD |
| MX800050A-014 | eMBMS Framework For RTD |
| MX800050A-040 | RTD Test Creation and Editing Tools |
| MX800050A-041 | RTD Test Execution Tools |
| MX800050A-042 | RTD Protocol Analyzer |
| MX800050A-051 | RTD Floating (Server Based) License |
| MX800060A | Control Software |
| MX800060A-001 | NSA Framework For L1/L2 Testing |
| MX800060A-013 | SA Framework For L1/L2 Testing |
| MX800070A | SmartStudio NR |
| MX800070A-001 | 5G NSA Option |
| MX800070A-003 | LTE Core Option |
| MX800070A-011 | NR TDD Option |
| MX800070A-012 | NR FDD Option |
| MX800070A-030 | NR DL 2×2 MIMO BW 100 MHz Per Cell |
| MX800070A-035 | NR DL 4×4 MIMO BW 100 MHz Per Cell |
| MX800070A-050 | NR DL 2CA Option |
| MX800070A-051 | NR DL 3CA Option |
| MX800070A-052 | NR DL 4CA Option |
| MX800070A-080 | IMS Server Option |
| MX800070A-082 | RTP Control Option |
| MX800079A | NR Platform Software for SmartStudio |
| | **Support Services** |
| MX800010A-SS101 | 5G NR RF Measurement Support Service (Per Year) |
| MX800010A-SS102 | 5G NR RF OTA Measurement Support Service (Per Year) |
| MX800050A-SS100 | RTD Support Service (Per Year) |
| MX800050A-SS101 | 5G NSA Support Service (Per Year) |
| MX800050A-SS103 | LTE Support Service (Per Year) |
| MX800050A-SS104 | UTRAN/GERAN Support Service (Per Year) |
| MX800050A-SS105 | IMS Support Service (Per Year) |
| MX800050A-SS106 | IoT Support Service (Per Year) |
| MX800050A-SS107 | LTE-A Support Service (Per Year) |
| MX800050A-SS108 | LTE-A Pro Support Service (Per Year) |
| MX800050A-SS109 | MIMO Support Service (Per Year) |
| MX800050A-SS110 | LTE Unlicensed Support Service (Per Year) |
| MX800050A-SS111 | LTE/UTRAN/GERAN Fading Support Service (Per Year) |
| MX800050A-SS112 | 5G Fading Support Service |
| MX800050A-SS113 | 5G SA Support Service (Per Year) |
| MX800050A-SS114 | eMBMS Support Service (Per Year) |
| MX800060A-SS100 | Control Software Support Service (Per Year) |
| MX800060A-SS101 | NSA Framework Support Service (Per Year) |
| MX800060A-SS113 | SA Framework Support Service (Per Year) |
| MX800070A-SS110 | SmartStudio Support Service (Per Year) |
| | **Warranty Services** |
| MT8000A-ES210 | 2 Years Extended Warranty Service |
| MT8000A-ES310 | 3 Years Extended Warranty Service |
| MT8000A-ES510 | 5 Years Extended Warranty Service |
| MA80001A-ES210 | 2 Years Extended Warranty Service |
| MA80001A-ES310 | 3 Years Extended Warranty Service |
| MA80001A-ES510 | 5 Years Extended Warranty Service |
| MA80002A-ES210 | 2 Years Extended Warranty Service |
| MA80002A-ES310 | 3 Years Extended Warranty Service |
| MA80002A-ES510 | 5 Years Extended Warranty Service |
| MA80003A-ES210 | 2 Years Extended Warranty Service |
| MA80003A-ES310 | 3 Years Extended Warranty Service |
| MA80003A-ES510 | 5 Years Extended Warranty Service |

## Related Products

Radio Communication Analyzer
MT8821C

Signalling Tester
MD8430A

Shield Box
MA8161A

RF Chamber
MA8171A

CATR Anechoic Chamber
MA8172A

Typical (typ.): Performance not warranted. Must products meet typical performance.
Nominal (nom.): Values not warranted. Included to facilitate application of product.

**Note**

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