Anritsu
envision : ensure

Radio Communication Test Station
MT8000A

All-in-One 5G RF Measurements and Protocol 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, protocol, and use-case 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.

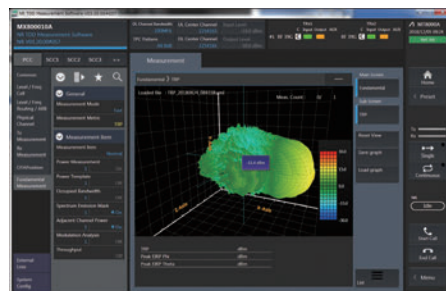## FR1 (to 7.125 GHz) — FR2

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

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) 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.
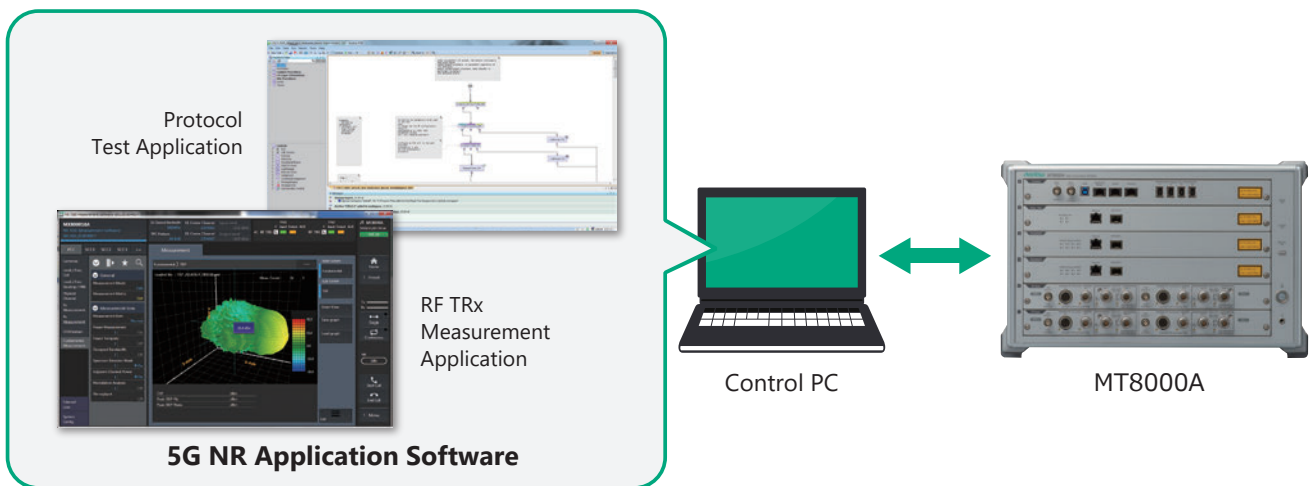
Example of supported band

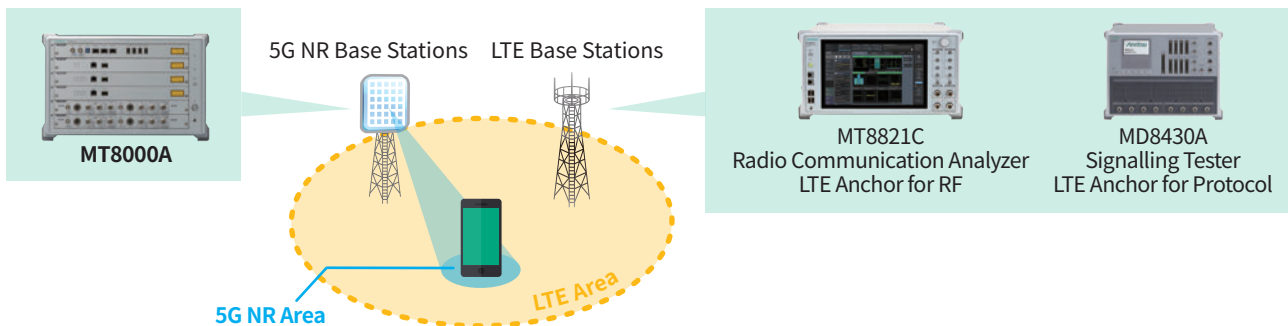| Band	n71 (600 MHz)	n41 (2.5 GHz)	n78-79 (3.5 G/4.5 GHz)	n257 (28 GHz)	n260 (39 GHz)
	✓	✓	✓	✓	✓

∗: Please enquire about other supported bands.

Flexible Platform using Modular Architecture

The leading-edge design with flexibility and scalability using a modular architecture. As well as supporting high-speed broadband communications, this design provides flexible futureproof support for new 5G test requirements, including URLLC (Ultra-Reliable and Low Latency Communications) and mMTC (massive Machine Type Communications).

Protocol Test Application

RF TRx Measurement Application

5G NR Application Software

Control PC

MT8000A

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

MT8821C
Radio Communication Analyzer
LTE Anchor for RF

MD8430A
Signalling Tester
LTE Anchor for Protocol

5G NR Area

LTE Area

# 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.
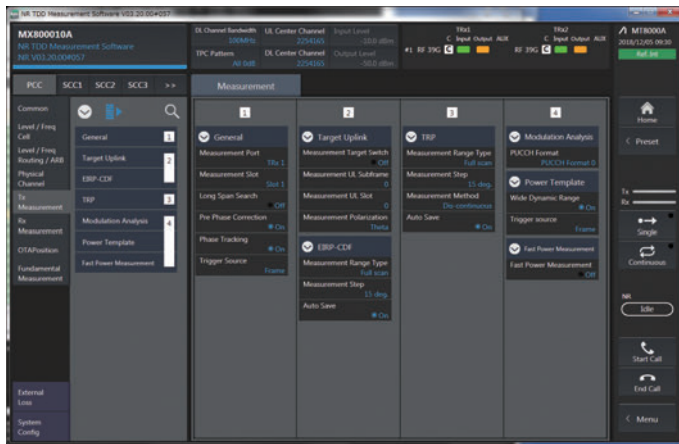

Typical Parameters (5G NR)

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.
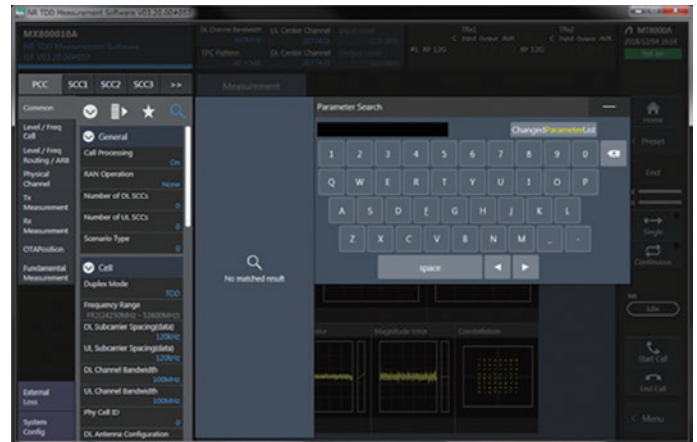
Parameter Search Function

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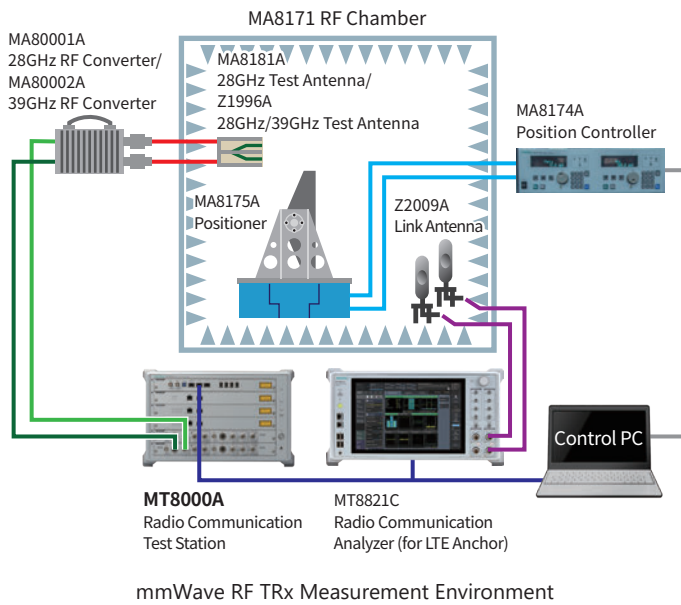
There are two antenna test methods: Total Radiated Power (TRP), and Total Radiated Sensitivity (TRS); various test systems using the MT8000A are available from OTA vendors.

Radiowave Anechoic Chamber

Reverberation Chamber
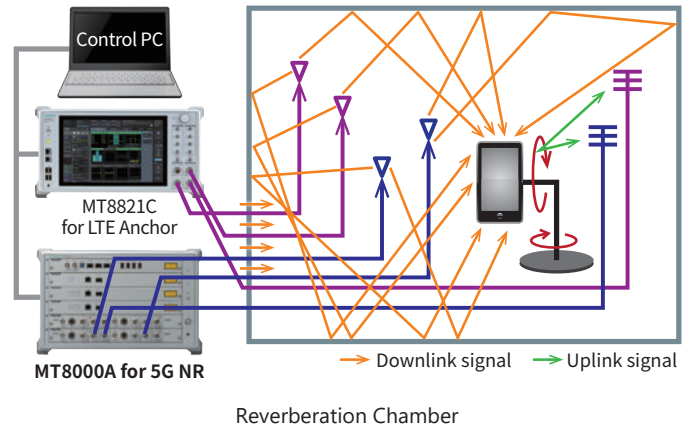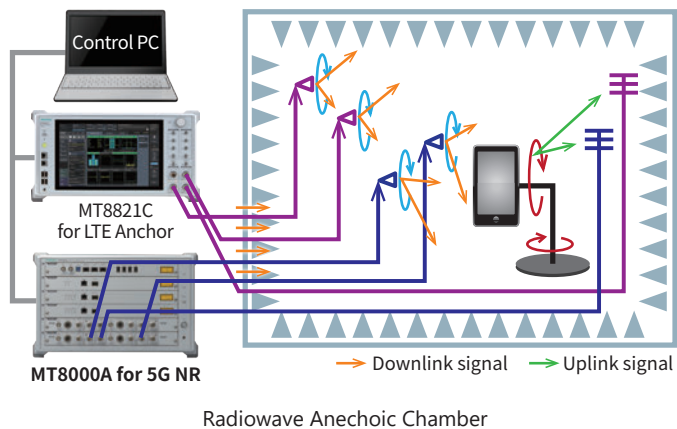
SAR (Specific Absorption Rate) Test

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
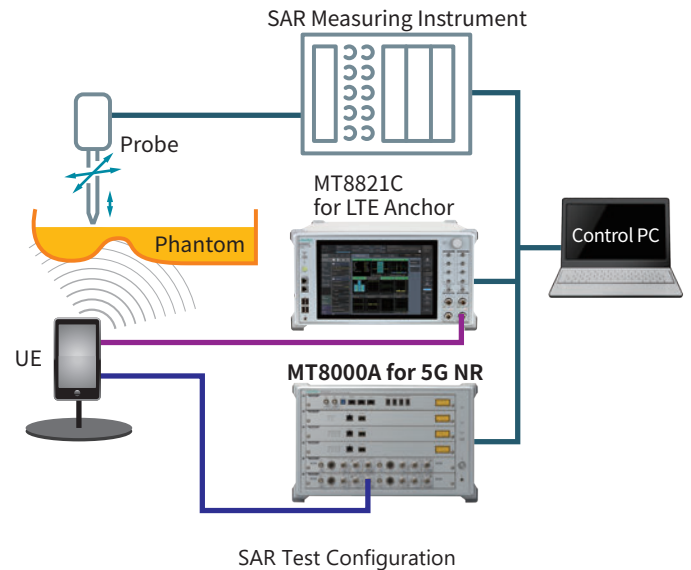
Radio Communication Test Station MT8000A Features

NR Protocol Test Solutions
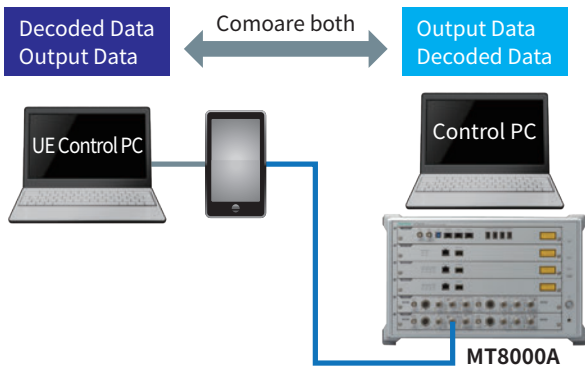
Encoding/Decoding Test

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.
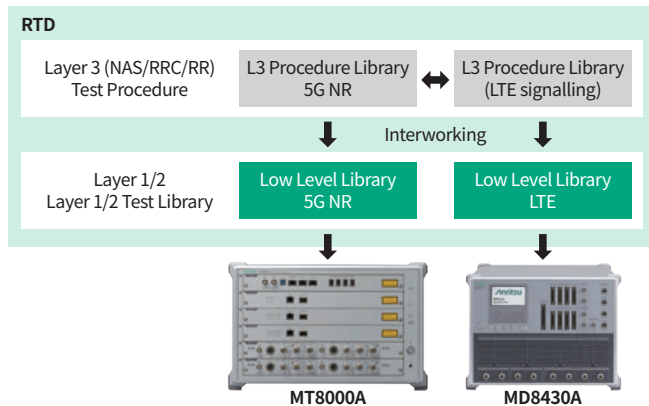
RTD Procedure Block

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.
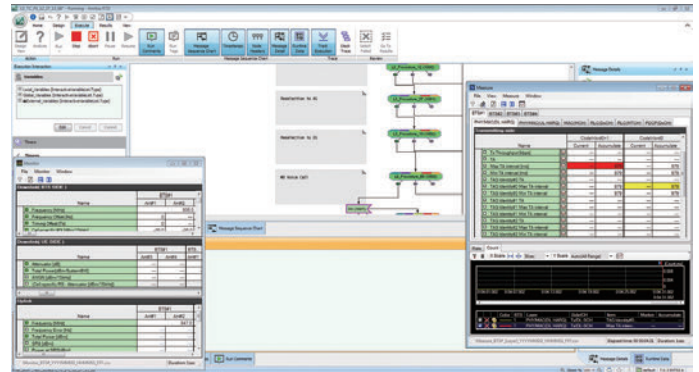
Test Execution Screen (RTD)
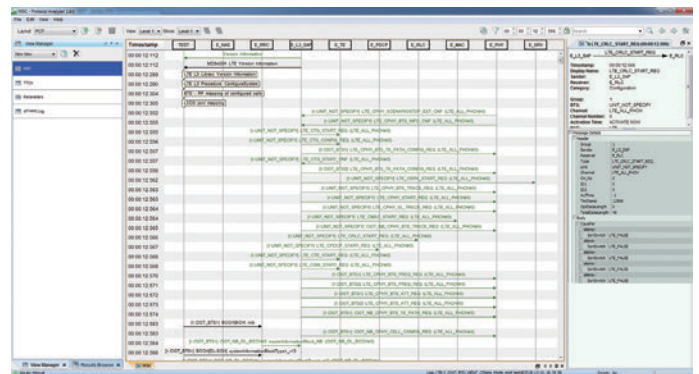
Log Analysis Screen (RTD)

Radio Communication Test Station MT8000A Features

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

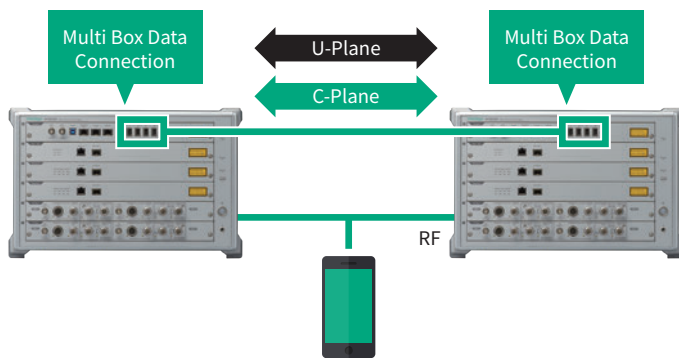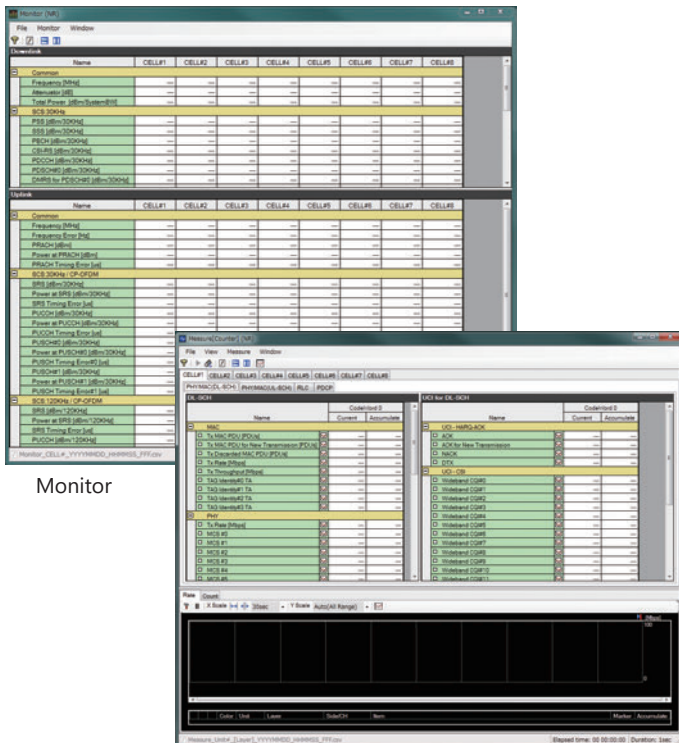To support the development of 5G terminals that process large volumes of low-layer data at very high speeds, the software enhances a full line of versatile power monitoring, throughput monitoring and log analysis functions. The Measure (Counter) functions can monitor Layer 1/2 (L1/L2) throughputs in 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.
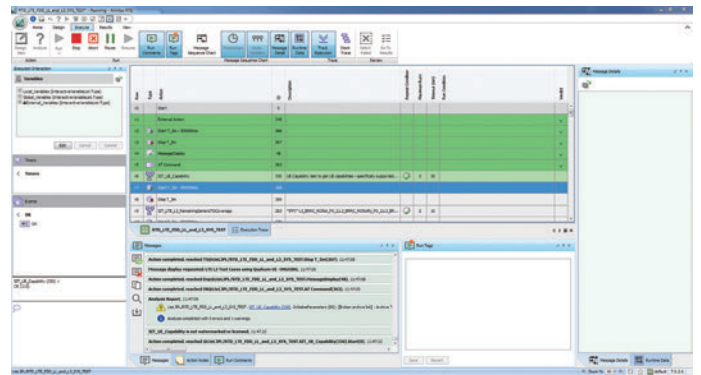
Example of Continuous Test Case Execution

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 Fading Tests

In cooperation with a fading PC, it supports fading tests by imposing fading on downlink signals up to 4CA 2×2 MIMO or 2CA 4×4 MIMO using just one MT8000A. It supports 5G NR Channel Model (TDL) compliant with 3GPP TS 38.521. The channel models can be edited as necessary.

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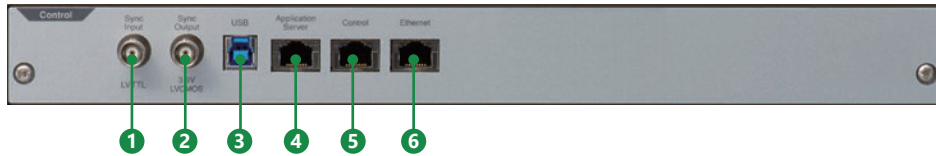
Control Module MT8000A-001 + Multi-box Data Connection MT8000A-009
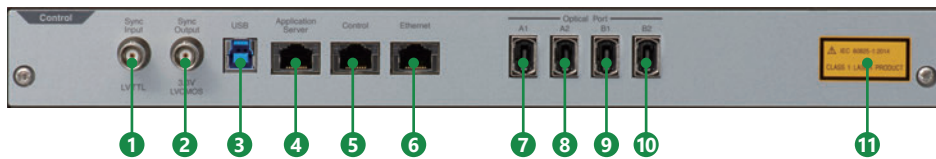
❶ Sync Input Connector
BNC connector for inputting synchronizing signal.

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
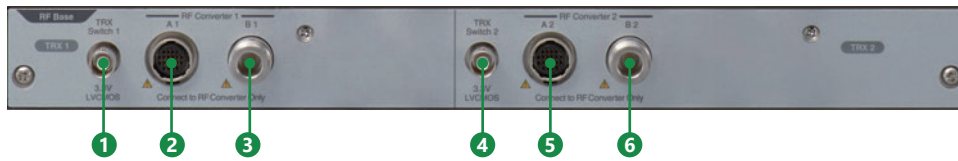
MT8000A-020 + 3 GHz-12 GHz RF Sub Module MT8000A-022
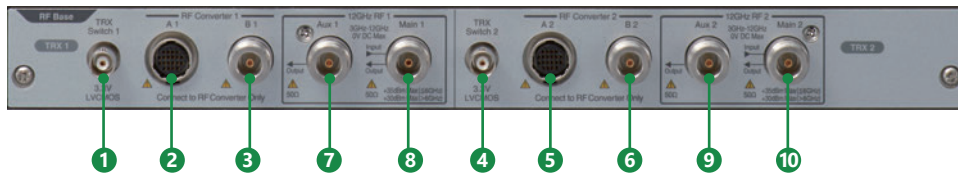
MT8000A-020 + MT8000A-022 + Extend RF 2.4 GHz-3 GHz MT8000A-023
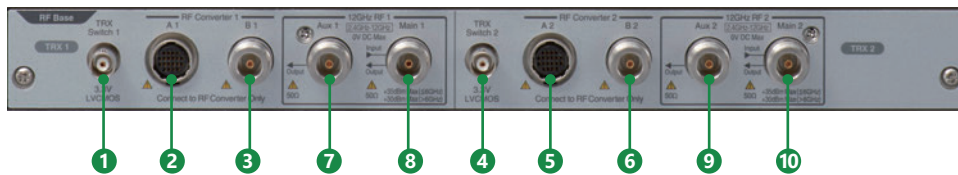
① TRX Switch 1 Connector
BNC connector that outputs signals to control the external amplifier, etc.

② RF Converter 1 A1 Connector
Multi-contact connector that controls the external RF Converter.

③ RF Converter 1 B1 Connector
N connector that input/output the external RF Converter and RF signals.

④ TRX Switch 2 Connector
BNC connector that outputs signals to control the external amplifier, etc.

⑤ RF Converter 2 A2 Connector
Multi-contact connector that controls the external RF Converter.

⑥ RF Converter 2 B2 Connector
N connector that inputs/outputs the RF signals between the external RF Converter and MT8000A.

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

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

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

⑩ 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
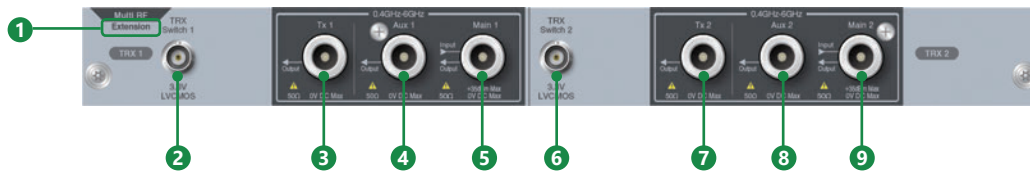
① Extension marking
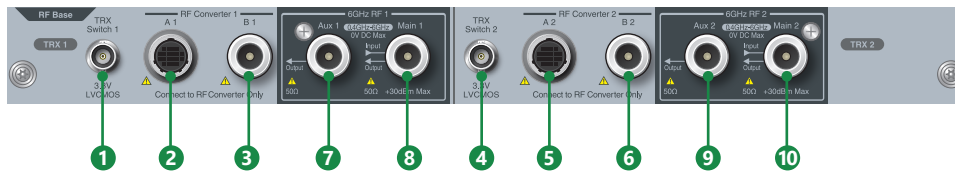Mark for Multi RF Extension MT8000A-032. No mark for Multi RF Module MT8000A-031.

② TRX Switch 1 connector
BNC connector that outputs signals to control the external amplifier, etc.

③ Tx 1 connector
RF transmission connector (output) for 0.4 GHz-6 GHz signal.

④ Aux 1 connector
RF auxiliary connector (output) for 0.4 GHz-6 GHz signal.

⑤ Main 1 connector
RF main connector (input/output) for 0.4 GHz-6 GHz signal.

⑥ TRX Switch 2 connector
BNC connector that outputs signals to control the external amplifier, etc.

⑦ Tx 2 connector
RF transmission connector (output) for 0.4 GHz-6 GHz signal.

⑧ Aux 2 connector
RF auxiliary connector (output) for 0.4 GHz-6 GHz signal.

⑨ Main 2 connector
RF main connector (input/output) for 0.4 GHz-6 GHz signal.

Radio Communication Test Station MT8000A Layout

MT8000A Rear Panel
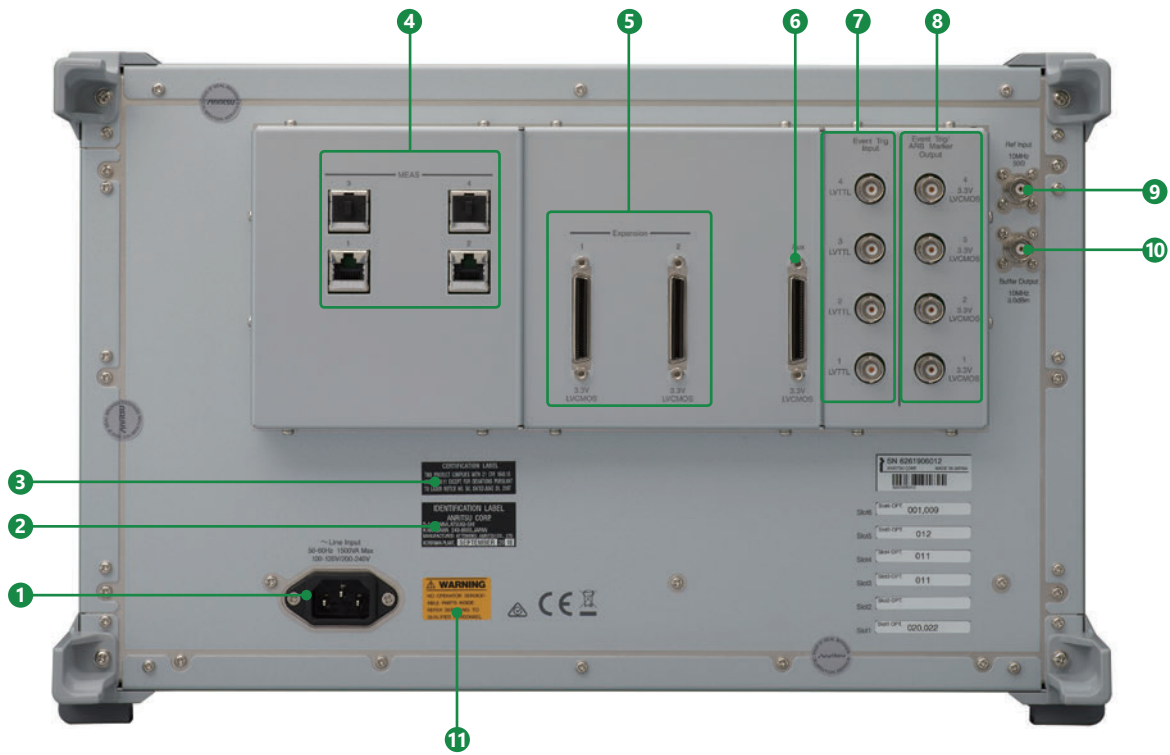
❶ **Power Inlet**
Power cable connector for 100 V(ac) to 120 V(ac) or 200 V(ac) to 240 V(ac) (50 Hz/60 Hz) (auto-switching).
Power consumption: 1500 VA or less.

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

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

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

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

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

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

❽ **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.

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

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

⓫ **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 Start-up characteristics: $\pm5 \times 10^{-8}$ (3 min. after power-on. Referenced to frequency 1 hour after power-on) Aging rate: $\pm1 \times 10^{-8}$/day (referenced to frequency 48-hour after power-on) 　　　　　　$\pm1 \times 10^{-7}$/year (referenced to frequency 10-day after power-on) Temperature characteristics: $\pm2 \times 10^{-8}$ Frequency adjusted at shipment: $\pm2.2 \times 10^{-8}$ (+18°C to +28°C, referenced to frequency 1 hour after power-on) 10 MHz Buffer Output 　Frequency: 10 MHz 　Connector: BNC (f) 　Impedance: 50Ω (nom.) 　Output Level: ≥0 dBm (AC coupling) 10 MHz Ref Input 　Frequency: 10 MHz 　Operating range: ±1 ppm 　Connector: BNC (f) 　Impedance: 50Ω (nom.) 　Input level: −15 dBm ≤ level ≤ +20 dBm (AC coupling)
External Interface	MEAS 1 to 4: RJ45, 1000Base-T, for slot 1 to 4 Event TRIG Input 1 to 4: BNC (f), LVTTL Event TRIG/ARB Maker Output 1 to 4: BNC (f), 3.3 V LVCMOS Expansion 1, 2: DX20A (3.3V LVCMOS) Aux: DX20A (3.3V LVCMOS)
Power Supply	Rated voltage: 100 V(ac) to 120 V(ac)/200 V(ac) to 240 V(ac) 　　　　　(Operating voltage is −15%/+10% of rated voltage, however, lower limit is 90 V, upper limit is 250 V) Rated frequency: 50 Hz/60 Hz Power consumption: ≤1500 VA (include all options and modules)
Dimensions and Mass	Dimensions: 426 (W) × 265 (H) × 578 (D) mm (excluding projections) Mass: ≤50 kg (including all options)
Environmental Conditions	Operating temperature range: +5°C to +40°C (without condensation) 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 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) Application Server: RJ-45 (1000Base-T) Control: RJ-45 (1000Base-T) Ethernet: RJ-45 (1000Base-T) Sync Input: BNC (f) (LVTTL) 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) SFP/SFP+: SFF-8431, SFF-8472 compliant IEEE 802.3ae-2002, IEEE 802.3-2008 compliant

Data Test Module MT8000A-012

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

RF Base Module MT8000A-020

IF Input/Output Connector	RF Converter B1, B2
	  Connector: N (f)
	  Impedance: 50Ω (nom.)

External Interface	RF Converter A1, A2: Round multiway type connector 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
	  Main 1, Main 2
	    Connector: N (f)
	    Impedance: 50Ω (nom.)
	    VSWR
	      At 0.4 GHz ≤ setting frequency < 3 GHz
	        ≤1.5 (0.4 GHz ≤ frequency < 3.1 GHz)
	      At 3 GHz ≤ setting frequency ≤ 6 GHz
	        ≤1.5 (2.9 GHz ≤ frequency ≤ 6.1 GHz)
	RF output connector
	  Aux 1, Aux 2
	    Connector: N (f)
	    Impedance: 50Ω (nom.)
	    VSWR
	      At 0.4 GHz ≤ setting frequency < 3 GHz
	        ≤1.6 (0.4 GHz ≤ frequency < 3.1 GHz)
	      At 3 GHz ≤ setting frequency ≤ 4.2 GHz
	        ≤1.9 (2.9 GHz ≤ frequency ≤ 4.3 GHz)
	      At 4.2 GHz < setting frequency ≤ 6 GHz
	        ≤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 　Setting range: 0.4 GHz to 6 GHz 　Setting resolution: 1 Hz Level 　Maximum input level: +30 dBm, 0 VDC (0.4 GHz ≤ setting frequency ≤ 6 GHz, with CW) 　Setting range: −50 to +26 dBm 　Setting resolution: 0.1 dB Amplitude 　Measurement resolution: 0.01 dB 　Measurement accuracy 　　After Cal, with CW, 0.4 GHz ≤ setting frequency < 3 GHz, measurement bandwidth is 100 MHz, at the signal equal to 　　the setting frequency and the setting level 　　　±0.5 dB (Setting level ≥ −20 dBm, typical) 　　　±0.7 dB (Setting level ≥ −40 dBm, typical) 　　　±1.0 dB (Setting level ≥ −40 dBm, +18°C to +28°C) 　　　±1.3 dB (Setting level ≥ −50 dBm, +18°C to +28°C) 　　After Cal, with CW, 3 GHz ≤ setting frequency ≤ 6 GHz, measurement bandwidth is 100 MHz, at the signal equal to 　　the setting frequency and the setting level 　　　±1.0 dB (Setting level ≥ −40 dBm, +18°C to +28°C) 　　　±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 Main 1, Main 2 　Connector: N (f) 　Impedance: 50Ω (nom.) 　VSWR 　　At 2.4 GHz ≤ setting frequency < 3 GHz, with MT8000A-023 　　　≤1.7 (2.3 GHz ≤ frequency < 3.1 GHz) 　　At 3 GHz ≤ setting frequency ≤ 6 GHz 　　　≤1.5 (2.9 GHz ≤ frequency ≤ 6.1 GHz) 　　At 6 GHz < setting frequency ≤ 7.125 GHz, with MT8000A-024 　　　≤1.7 (5.9 GHz < frequency ≤ 7.225 GHz) RF output connector Aux 1, Aux 2 　Connector: N (f) 　Impedance: 50Ω (nom.) 　VSWR 　　At 2.4 GHz ≤ setting frequency ≤ 4.2 GHz, with MT8000A-023 　　　≤1.8 (2.3 GHz ≤ frequency ≤ 4.3 GHz) 　　At 3 GHz ≤ setting frequency ≤ 4.2 GHz, without MT8000A-023 　　　≤1.8 (2.9 GHz ≤ frequency ≤ 4.3 GHz) 　　At 4.2 GHz < setting frequency ≤ 6 GHz 　　　≤2.0 (4.1 GHz < frequency ≤ 6.1 GHz) 　　At 6 GHz < setting frequency ≤ 7.125 GHz, with MT8000A-024 　　　≤2.2 (5.9 GHz < frequency ≤ 7.225 GHz)

Transmission Characteristics	Frequency
	  Setting range: 2 GHz to 12 GHz
	  Setting resolution: 1 Hz
	  Accuracy: Depend on accuracy of reference oscillator
	Level
	  Setting range
	    Main 1, Main 2
	      −110 to −10 dBm (2 GHz ≤ setting frequency ≤ 6 GHz)
	      −110 to −18 dBm (6 GHz < setting frequency ≤ 12 GHz)
	    Aux 1, Aux 2
	      −110 to 0 dBm (2 GHz ≤ setting frequency ≤ 6 GHz)
	      −110 to −8 dBm (6 GHz < setting frequency ≤ 12 GHz)
	  Setting resolution: 0.1 dB
	  Accuracy
	    Main 1, Main 2
	      After Cal, with CW, 2.4 GHz ≤ setting frequency < 3 GHz, output level ≥ −100 dBm, with MT8000A-023
	        ±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)
	      After Cal, with CW, 6 GHz < setting frequency ≤ 7.125 GHz, output level ≥ −100 dBm, with MT8000A-024
	        ±1.3 dB (+18°C to +28°C)
	        ±1.6 dB (+5°C to +40°C)
	    Aux 1, Aux 2
	      After Cal, with CW, 2.4 GHz ≤ setting frequency < 3 GHz, output level ≥ −100 dBm, with MT8000A-023
	        ±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)
	      After Cal, with CW, 6 GHz < setting frequency ≤ 7.125 GHz, output level ≥ −100 dBm, with MT8000A-024
	        ±1.5 dB (typ.)
	        ±1.8 dB (+18°C to +28°C)
	        ±2.3 dB (+5°C to +40°C)
	Signal purity
	  Non-harmonic spurious
	    With CW, maximum output level, setting frequency ±100 MHz, exclude setting frequency ±2.5 MHz
	      ≤−40 dBc (2.4 GHz ≤ setting frequency ≤ 6 GHz, with MT8000A-023)
	      ≤−40 dBc (3 GHz ≤ setting frequency ≤ 6 GHz, without MT8000A-023)
	      ≤−40 dBc (2.4 GHz ≤ setting frequency ≤ 7.125 GHz, with MT8000A-023 and MT8000A-024)
	      ≤−40 dBc (3 GHz ≤ setting frequency ≤ 7.125 GHz, without MT8000A-023, with MT8000A-024)
	    With CW, maximum output level, exclude setting frequency ±100 MHz
	      ≤−30 dBc (2.4 GHz ≤ setting frequency ≤ 6 GHz, 2.3 GHz ≤ non-harmonic frequency ≤ 6.1 GHz, with MT8000A-023)
	      ≤−30 dBc (3 GHz ≤ setting frequency ≤ 6 GHz, 2.9 GHz ≤ non-harmonic frequency ≤ 6.1 GHz, without MT8000A-023)
	      ≤−30 dBc (2.4 GHz ≤ setting frequency ≤ 7.125 GHz, 2.3 GHz ≤ non-harmonic frequency ≤ 7.225 GHz,
	            with MT8000A-023 and MT8000A-024)
	      ≤−30 dBc (3 GHz ≤ setting frequency ≤ 7.125 GHz, 2.9 GHz ≤ non-harmonic frequency ≤ 7.225 GHz,
	            without MT8000A-023, with MT8000A-024)
	  Maximum modulation bandwidth: 200 MHz (2 GHz ≤ setting frequency ≤ 6 GHz)
	                               1 GHz (6 GHz < setting frequency ≤ 12 GHz)

Receiving Characteristics	Frequency
	  Setting range: 2 GHz to 12 GHz (Center frequency setting range of measurement software)
	  Setting resolution: 1 Hz
	Level
	  Maximum input level: +35 dBm, 0 VDC (2.4 GHz ≤ setting frequency ≤ 6 GHz, with CW, with MT8000A-023)
	                     +35 dBm, 0 VDC (3 GHz ≤ setting frequency ≤ 6 GHz, with CW, without MT8000A-023)
	                     +30 dBm, 0 VDC (6 GHz < setting frequency ≤ 12 GHz, with CW)
	  Setting range: −50 to +26 dBm
	  Setting resolution: 0.1 dB
	Amplitude
	  Measurement resolution: 0.01 dB
	  Measurement accuracy: At the signal equal to the setting frequency and the setting level
	    After Cal, with CW, 2.4 GHz ≤ setting frequency < 3 GHz, measurement bandwidth is 100 MHz, with MT8000A-023
	      ±0.5 dB (Setting level ≥ −20 dBm, typ.)
	      ±0.7 dB (Setting level ≥ −40 dBm, typ.)
	      ±1.0 dB (Setting level ≥ −40 dBm, +18°C to +28°C)
	      ±1.3 dB (Setting level ≥ −50 dBm, +18°C to +28°C)
	    After Cal, with CW, 3 GHz ≤ setting frequency ≤ 6 GHz, measurement bandwidth is 100 MHz
	      ±1.0 dB (Setting level ≥ −40 dBm, +18°C to +28°C)
	      ±1.3 dB (Setting level ≥ −50 dBm, +18°C to +28°C)
	    After Cal, with CW, 6 GHz < setting frequency ≤ 7.125 GHz, measurement bandwidth is 100 MHz, with MT8000A-024
	      ±1.3 dB (Setting level ≥ −40 dBm, +18°C to +28°C)
	      ±1.6 dB (Setting level ≥ −50 dBm, +18°C to +28°C)

Radio Communication Test Station MT8000A Specifications

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
	  Main 1, Main 2
	    Connector: N (f)
	    Impedance: 50Ω (nom.)
	    VSWR: ≤1.5 (0.4 GHz ≤ frequency ≤ 6 GHz)
	RF output connector
	  Aux 1, Aux 2, Tx 1, Tx 2
	    Connector: N (f)
	    Impedance: 50Ω (nom.)
	    VSWR: ≤1.6 (0.4 GHz ≤ frequency ≤ 3.1 GHz)
	         ≤1.9 (3.1 GHz < frequency ≤ 4.3 GHz)
	         ≤2.0 (4.3 GHz < frequency ≤ 6.0 GHz)

Transmission Characteristics	Frequency
	  Setting range: 0.4 GHz to 6.0 GHz (Frequency setting range of measurement software)
	  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, Tx 1, Tx 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, Setting 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, Setting level ≥−100 dBm
	        ±1.0 dB (+18°C to +28°C)
	        ±1.3 dB (+5°C to +40°C)
	    Aux 1, Aux 2, Tx 1, Tx 2
	      After Cal, with CW, 0.4 GHz ≤ setting frequency < 3 GHz, Setting 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, Setting 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, Setting 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, maximum out level
	      ≤−40 dBc (0.4 GHz ≤ setting frequency < 0.6 GHz, non-harmonic spurious within setting frequency ±10 MHz,
	              exclude setting frequency < 0.4 GHz, exclude non-harmonic spurious within setting frequency ±2.5 MHz)
	      ≤−40 dBc (0.6 GHz ≤ setting frequency ≤ 6 GHz, non-harmonic spurious within setting frequency ±100 MHz,
	              exclude non-harmonic spurious within setting frequency ±2.5 MHz)
	      ≤−30 dBc (0.4 GHz ≤ setting frequency < 0.6 GHz, 0.4 GHz ≤ non-harmonic spurious ≤ 6 GHz,
	              exclude non-harmonic spurious within setting frequency ±10 MHz)
	      ≤−30 dBc (0.6 GHz ≤ setting frequency < 3.3 GHz, 0.4 GHz ≤ non-harmonic spurious ≤ 6 GHz,
	              exclude non-harmonic spurious within setting frequency ±100 MHz)
	      ≤−30 dBc (3.3 GHz ≤ setting frequency ≤ 6 GHz, 0.4 GHz ≤ non-harmonic spurious ≤ 6.1 GHz,
	              exclude non-harmonic spurious within setting frequency ±100 MHz)
	    Harmonic spurious: With CW, maximum out level
	      ≤−25 dBc (0.4 GHz ≤ setting frequency ≤ 3 GHz)
	  Maximum modulation bandwidth
	    20 MHz (0.4 GHz ≤ setting frequency < 0.6 GHz)
	    200 MHz (0.6 GHz ≤ setting frequency ≤ 6 GHz)

Receiving Characteristics	Frequency
	  Setting range: 0.4 GHz to 6 GHz (Frequency setting range of measurement software)
	  Setting resolution: 1 Hz
	Level
	  Maximum input level: +35 dBm, 0 VDC (with CW, 0.4 GHz ≤ setting frequency ≤ 6 GHz)
	  Setting range: −50 to +26 dBm
	  Setting resolution: 0.1 dB
	Amplitude
	  Measurement resolution: 0.01 dB
	  Measurement accuracy: After Cal, with CW, at the signal equal to the setting frequency and the setting level
	    0.4 GHz ≤ setting frequency ≤ 0.6 GHz, measurement bandwidth 10 MHz
	      ±0.5 dB (setting level ≥−20 dBm, typ.)
	      ±0.7 dB (setting level ≥−40 dBm, typ.)
	      ±1.0 dB (setting level ≥−40 dBm, +18°C to +28°C)
	      ±1.3 dB (setting level ≥−50 dBm, +18°C to +28°C)
	    0.6 GHz < setting frequency < 3 GHz, measurement bandwidth 100 MHz
	      ±0.5 dB (setting level ≥−20 dBm, typ.)
	      ±0.7 dB (setting level ≥−40 dBm, typ.)
	      ±1.0 dB (setting level ≥−40 dBm, +18°C to +28°C)
	      ±1.3 dB (setting level ≥−50 dBm, +18°C to +28°C)
	    3 GHz ≤ setting frequency ≤ 6 GHz, measurement bandwidth 100 MHz
	      ±1.0 dB (setting level ≥−40 dBm, +18°C to +28°C)
	      ±1.3 dB (setting level ≥−50 dBm, +18°C to +28°C)

Radio Communication Test Station MT8000A Specifications

Peripherals

28 GHz RF Converter MA80001A

RF Input/Output Connector	Port 1, Port 2
	  Connector: K (m)
	  Impedance: 50Ω (nom.)
	  VSWR (when transmitted): ≤2.5 (23.75 GHz ≤ frequency ≤ 30 GHz)
	  VSWR (when received): ≤2.5 (23.45 GHz ≤ frequency ≤ 30.3 GHz)

Transmission Characteristics	Frequency
	  Setting range: 24.25 GHz to 29.5 GHz (Center frequency setting range of measurement software)
	  Setting resolution: 1 Hz
	  Accuracy: Depend on accuracy of MT8000A reference oscillator
	Level
	  Setting range: −90 to +5 dBm
	  Setting resolution: 0.1 dB
	  Accuracy: ±1.5 dB (+18°C to +28°C, after Cal, with CW)
	Signal purity
	  Non-harmonic spurious
	    With CW, maximum output level
	      ≤−40 dBc (non-harmonic on setting frequency ±500 MHz, non-harmonic, exclude setting frequency ±50 MHz)
	      ≤−30 dBc (23.75 GHz ≤ non-harmonic frequency ≤ 30 GHz, exclude setting frequency within ±500 MHz and −4500 MHz)
	Maximum modulation bandwidth: 1 GHz

Receiving Characteristics	Frequency
	  Setting range: 24.25 GHz to 29.5 GHz (Center frequency setting range of measurement software)
	  Setting resolution: 1 Hz
	Level
	  Maximum input level: +20 dBm, 0 VDC (with CW)
	  Setting range: −70 to+5 dBm
	  Setting resolution: 0.1 dB
	Amplitude
	  Measurement resolution: 0.01 dB
	  Measurement accuracy: At the signal equal to the setting frequency and the setting level
	    After Cal, with CW, 24.25 GHz ≤ setting frequency ≤ 29.5 GHz, measurement bandwidth 100 MHz, +18°C to +28°C
	      ±1.5 dB (−50 dBm ≤ setting level ≤ +5 dBm)
	      ±2.5 dB (−70 dBm ≤ setting level < −50 dBm)

IF Input/Output Connector	Connect to MT8000A: B
	  Connector: N (f)
	  Impedance: 50Ω (nom.)

External Control Connector	Round multiway type connector
DC Input Connector	Voltage: 12 VDC Current: ≤3 A
Dimensions and Mass	Dimensions: 92 (W) × 175 (H) × 260 (D) mm (excluding projections) Mass: ≤6 kg
Environmental Conditions	Operating temperature range: +5°C to +40°C (without condensation) 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
	  Connector: K (m)
	  Impedance: 50Ω (nom.)
	  VSWR: ≤2.9 (36.2 GHz ≤ frequency ≤ 40.0 GHz)

Transmission Characteristics	Frequency
	  Setting range: 37.0 GHz to 42.5 GHz (Center frequency setting range of measurement software)
	  Setting resolution: 1 Hz
	  Accuracy: Depend on accuracy of MT8000A reference oscillator
	Level
	  Setting range: −90 to +5 dBm
	  Setting resolution: 0.1 dB
	  Accuracy: ±1.5 dB (typ., after Cal, with CW, 37.0 GHz ≤ setting frequency ≤ 40.0 GHz)
	            ±2.0 dB (+18°C to +28°C, after Cal, with CW, 37.0 GHz ≤ setting frequency ≤ 40.0 GHz)
	Signal purity
	  Non-harmonic spurious
	    With CW, maximum output level, 37.0 GHz ≤ setting frequency ≤ 40.0 GHz
	      ≤−40 dBc (non-harmonic on setting frequency ±500 MHz, exclude non-harmonic frequency >40.0 GHz and setting
	           frequency ±50 MHz)
	      ≤−30 dBc (36.5 GHz ≤ non-harmonic frequency ≤ 40.0 GHz, exclude setting frequency ±500 MHz)
	  Maximum modulation bandwidth: 1 GHz

Receiving Characteristics	Frequency
	  Setting range: 37.0 GHz to 42.5 GHz (Center frequency setting range of measurement software)
	  Setting resolution: 1 Hz
	Level
	  Maximum input level: +17 dBm, 0 VDC (with CW)
	  Setting range: −70 to +5 dBm
	  Setting resolution: 0.1 dB
	Amplitude
	  Measurement resolution: 0.01 dB
	  Measurement accuracy: At the signal equal to the setting frequency and the setting level
	    After Cal, with CW, 37.0 GHz ≤ setting frequency ≤ 40.0 GHz, measurement bandwidth 100 MHz
	      ±1.5 dB (−50 dBm ≤ setting level ≤ +5 dBm, typ.)
	      ±2.0 dB (−70 dBm ≤ setting level < −50 dBm, typ.)
	      ±2.0 dB (−50 dBm ≤ setting level ≤ +5 dBm, +18°C to +28°C)
	      ±2.5 dB (−70 dBm ≤ setting level < −50 dBm, +18°C to +28°C)

IF Input/Output Connector	Connect to MT8000A: B
	  Connector: N (f)
	  Impedance: 50Ω (nom.)

External Control Connector	Round multiway type connector
DC Input Connector	Voltage: 12 VDC Current: ≤4 A
Dimensions and Mass	Dimensions: 92 (W) × 175 (H) × 304 (D) mm (excluding projections) Mass: ≤6 kg
Environmental Conditions	Operating temperature range: +5°C to +40°C (without condensation) 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 Connector: V (m) Impedance: 50Ω (nom.) VSWR: ≤2.5 (22.65 GHz ≤ frequency ≤ 31.1 GHz) 　　　≤2.9 (35.4 GHz ≤ frequency ≤ 43.5 GHz) 　　　≤2.9 (43.5 GHz < frequency ≤ 45.1 GHz, typ.)
Transmission Characteristics	Frequency 　Setting range: 24.25 GHz to 29.5 GHz, 37.0 GHz to 43.5 GHz 　Setting resolution: 1 Hz 　Accuracy: Depend on accuracy of MT8000A reference oscillator Level 　Setting range: −70 to +15 dBm 　Setting resolution: 0.1 dB 　Accuracy: After Cal, with CW, Setting level ≤ ±10 dBm 　　　　　±1.5 dB (24.25 GHz ≤ setting frequency ≤ 29.5 GHz, +18°C to +28°C) 　　　　　±1.5 dB (37.0 GHz ≤ setting frequency ≤ 40.0 GHz, typ.) 　　　　　±2.0 dB (37.0 GHz ≤ setting frequency ≤ 40.0 GHz, +18°C to +28°C) 　　　　　±1.5 dB (40.0 GHz < setting frequency ≤ 43.5 GHz, typ.) 　　　　　±2.0 dB (40.0 GHz < setting frequency ≤ 43.5 GHz, +18°C to +28°C) Signal purity 　Non-harmonic spurious: With CW, Setting level=+10 dBm 　　In-band Specification: 　　　≤−40 dBc (non-harmonic on setting frequency ±500 MHz, exclude setting frequency ±50 MHz and non-harmonic frequency 　　　　　　　< 24.25 GHz, 29.5 GHz < non-harmonic frequency < 37.0 GHz and non-harmonic frequency > 43.5 GHz) 　　Specification for interference signal source: 　　　≤−37 dBc (non-harmonic on setting frequency ±1.5 GHz, exclude setting frequency ±500 MHz and non-harmonic frequency 　　　　　　　< 24.25 GHz, 29.5 GHz < non-harmonic frequency < 37.0 GHz and non-harmonic frequency > 43.5 GHz) 　　Out-of-band Specification: 　　　≤−30 dBc (24.25 GHz ≤ setting frequency ≤ 29.5 GHz, 24.25 GHz ≤ non-harmonic frequency ≤ 29.5 GHz and 37.0 GHz 　　　　　　　≤ non-harmonic frequency ≤ 43.5 GHz, exclude setting frequency ±1.5 GHz, setting frequency - 4.5 GHz 　　　　　　　±10 MHz and setting frequency + 4.5 GHz ±10 MHz) 　　　≤−30 dBc (37.0 GHz ≤ setting frequency ≤ 43.5 GHz, 24.25 GHz ≤ non-harmonic frequency ≤ 29.5 GHz and 　　　　　　　37.0 GHz ≤ non-harmonic frequency ≤ 43.5 GHz, exclude setting frequency ±1.5 GHz) 　Maximum modulation bandwidth: 1 GHz
Receiving Characteristics	Frequency 　Setting range: 24.25 GHz to 29.5 GHz, 37.0 GHz to 43.5 GHz 　Setting resolution: 1 Hz Level 　Maximum input level: +20 dBm, 0 VDC (with CW) 　Setting range: −70 to +10 dBm 　Setting resolution: 0.1 dB Amplitude 　Measurement resolution: 0.01 dB 　Measurement accuracy: After Cal, with CW, measurement bandwidth 100 MHz, at the signal equal to the setting frequency 　　　　　　　and the setting level 　24.25 GHz ≤ setting frequency ≤ 29.5 GHz 　　±1.0 dB (−50 dBm ≤ setting level ≤ +10 dBm, typ.) 　　±2.0 dB (−70 dBm ≤ setting level < −50 dBm, typ.) 　　±1.5 dB (−50 dBm ≤ setting level ≤ +10 dBm, +18°C to +28°C) 　　±2.5 dB (−70 dBm ≤ setting level < −50 dBm, +18°C to +28°C) 　37.0 GHz ≤ setting frequency ≤ 40.0 GHz 　　±1.5 dB (−50 dBm ≤ setting level ≤ +10 dBm, typ.) 　　±2.0 dB (−70 dBm ≤ setting level < −50 dBm, typ.) 　　±2.0 dB (−50 dBm ≤ setting level ≤ +10 dBm, +18°C to +28°C) 　　±2.5 dB (−70 dBm ≤ setting level < −50 dBm, +18°C to +28°C) 　40.0 GHz ≤ setting frequency ≤ 43.5 GHz 　　±1.5 dB (−50 dBm ≤ setting level ≤ +10 dBm, typ.) 　　±2.0 dB (−65 dBm ≤ setting level < −50 dBm, typ.) 　　±2.0 dB (−50 dBm ≤ setting level ≤ +10 dBm, +18°C to +28°C) 　　±2.5 dB (−65 dBm ≤ setting level < −50 dBm, +18°C to +28°C)
IF Input/Output Connector	Connector: N (f) Impedance: 50Ω (nom.)
External Control Connector	Round multiway type connector
DC Input Connector	Voltage: 18 VDC Current: ≤5.5 A
Dimensions and Mass	Dimensions: 83 (W) × 175 (H) × 304 (D) mm (excluding projections) Mass: ≤6 kg
Environmental Conditions	Operating temperature range: +5°C to +45°C (without condensation) 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	
Z1320E	Standard PC for RTD (with monitor)	
MT8000A-AK001	Fading Control PC	
MT8000A-AK002	IP Test Server PC	
Z1591A	USB Dongle (Protocol)	
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

Model/Order No.	Name
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
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
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)
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.

Anritsu

envision : ensure

● **United States**
Anritsu Americas Sales Company
450 Century Parkway, Suite 190, Allen,
TX 75013, U.S.A.
Phone: +1-800-Anritsu (1-800-267-4878)

● **Canada**
Anritsu Electronics Ltd.
700 Silver Seven Road, Suite 120, Kanata,
Ontario K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

● **Brazil**
Anritsu Eletronica Ltda.
Praça Amadeu Amaral, 27 - 1 Andar
01327-010 - Bela Vista - Sao Paulo - SP, Brazil
Phone: +55-11-3283-2511
Fax: +55-11-3288-6940

● **Mexico**
Anritsu Company, S.A. de C.V.
Blvd Miguel de Cervantes Saavedra #169 Piso 1, Col. Granada
Mexico, Ciudad de Mexico, 11520, MEXICO
Phone: +52-55-4169-7104

● **United Kingdom**
Anritsu EMEA Ltd.
200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K.
Phone: +44-1582-433200
Fax: +44-1582-731303

● **France**
Anritsu S.A.
12 avenue du Québec, Bâtiment Iris 1- Silic 612,
91140 VILLEBON SUR YVETTE, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

● **Germany**
Anritsu GmbH
Nemetschek Haus, Konrad-Zuse-Platz 1
81829 München, Germany
Phone: +49-89-442308-0
Fax: +49-89-442308-55

● **Italy**
Anritsu S.r.l.
Via Elio Vittorini 129, 00144 Roma, Italy
Phone: +39-6-509-9711
Fax: +39-6-502-2425

● **Sweden**
Anritsu AB
Isafjordsgatan 32C, 164 40 KISTA, Sweden
Phone: +46-8-534-707-00

● **Finland**
Anritsu AB
Teknobulevardi 3-5, FI-01530 VANTAA, Finland
Phone: +358-20-741-8100
Fax: +358-20-741-8111

● **Denmark**
Anritsu A/S
c/o Regus Fairway, Arne Jacobsens Allé 7, 5th floor
2300 Copenhagen S, Denmark
Phone: +45-7211-2200

● **Russia**
Anritsu EMEA Ltd.
Representation Office in Russia
Tverskaya str. 16/2, bld. 1, 7th floor.
Moscow, 125009, Russia
Phone: +7-495-363-1694
Fax: +7-495-935-8962

● **Spain**
Anritsu EMEA Ltd.
Representation Office in Spain
Paseo de la Castellana, 141. Planta 5, Edificio Cuzco IV
28046, Madrid, Spain
Phone: +34-91-572-6761

● **United Arab Emirates**
Anritsu EMEA Ltd.
Dubai Liaison Office
902, Aurora Tower,
P O Box: 500311- Dubai Internet City
Dubai, United Arab Emirates
Phone: +971-4-3758479
Fax: +971-4-4249036

● **India**
Anritsu India Private Limited
6th Floor, Indiqube ETA, No.38/4, Adjacent to EMC2,
Doddanekundi, Outer Ring Road, Bengaluru – 560048, India
Phone: +91-80-6728-1300
Fax: +91-80-6728-1301

● **Singapore**
Anritsu Pte. Ltd.
11 Chang Charn Road, #04-01, Shriro House
Singapore 159640
Phone: +65-6282-2400
Fax: +65-6282-2533

● **P.R. China (Shanghai)**
Anritsu (China) Co., Ltd.
Room 2701-2705, Tower A,
New Caohejing International Business Center
No. 391 Gui Ping Road Shanghai, 200233, P.R. China
Phone: +86-21-6237-0898
Fax: +86-21-6237-0899

● **P.R. China (Hong Kong)**
Anritsu Company Ltd.
Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza,
No. 1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong, P.R. China
Phone: +852-2301-4980
Fax: +852-2301-3545

● **Japan**
Anritsu Corporation
8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016 Japan
Phone: +81-46-296-6509
Fax: +81-46-225-8352

● **Korea**
Anritsu Corporation, Ltd.
5FL, 235 Pangyoyeok-ro, Bundang-gu, Seongnam-si,
Gyeonggi-do, 13494 Korea
Phone: +82-31-696-7750
Fax: +82-31-696-7751

● **Australia**
Anritsu Pty. Ltd.
Unit 20, 21-35 Ricketts Road,
Mount Waverley, Victoria 3149, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

● **Taiwan**
Anritsu Company Inc.
7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817

1911