

# Radio Communication Test Station

## MT8000A

### Base Station Testing Solution

Base Station Test Suite for NR mmWave

MX800045A

Base Station Test Suite for NR sub-6GHz

MX800046A



# For 5G BTS

## MT8000A MX800045A/MX800046A

All-in-one Tx power, Frequency error, EVM, ACLR, OBUE, and Rx sensitivity tests for manufacturing both Sub-6 GHz and mmWave base stations

### All-in-One

One Main Unit Supports up to 2 slots of RF Modules and Four TRx Ports

The MT8000A incorporates both a signal analyzer (SA) required for Tx tests and a signal generator (SG) for Rx tests in one frame; slots for two RF modules provide four Sub-6 GHz TRx ports as well as support connection of four external mmWave converters for flexible production-line configurations.

Sub-6 GHz(FR1) 6GHz  
– mmWave(FR2) 43.5GHz

All-in-one Base-station Tester for both Sub-6 GHz and mmWave RF Tests

The all-in-one MT8000A supports Sub-6 GHz and mmWave RF tests using installed Sub-6 GHz test modules covering 0.4 GHz to 6 GHz and combination with external mmWave converters covering 4.25 GHz to 43.5 GHz.

# Manufacturing





# MT8000A Base Station Manufacturing Solution Features

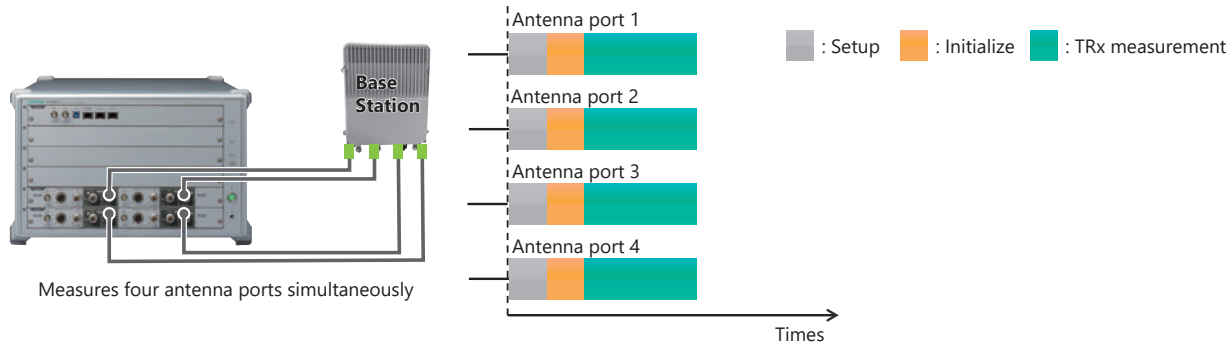
The MT8000A is the ideal non-signaling RF test solution for manufacturing 5G base stations. Combination with the MX800045A and MX800046A software covers all the main Sub-6 GHz (FR1) and mmWave (FR2) frequency bands.

## Up to Four TRx Ports for Efficient Production-Line Testing

Simultaneous and parallel measurement shorten test time and consolidates measuring instruments, contributing to productivity improvement and cost reduction.

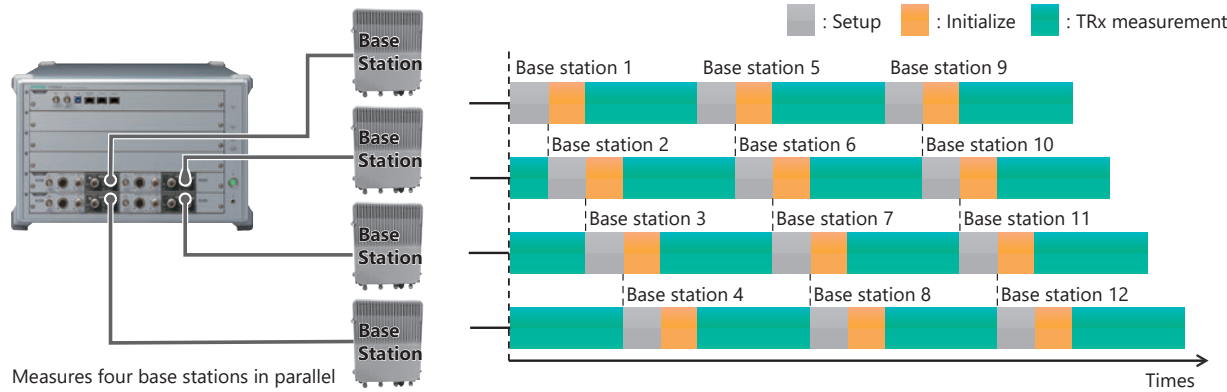
### Simultaneous Measurement

With a maximum of four RF tests running simultaneously, one MT8000A can execute RF tests for up to four antenna ports, cutting test times for base stations with multiple antennas.



### Parallel Measurement

The MT8000A supports independent RF tests at up to four TRx ports and can centralize test equipment to reduce costs. Unlike conventional systems requiring a test instrument for each test system, one MT8000A can handle up to four test systems.



## All-in-one Support for Main Sub-6 GHz (FR1) and mmWave (FR2) Frequency Bands

Connecting the MT8000A and RF Converter (MA80003A) supports mmWave (FR2) measurements. The all-in-one MT8000A covers the main frequency ranges used by both the Sub-6 GHz (FR1) and mmWave (FR2) bands.

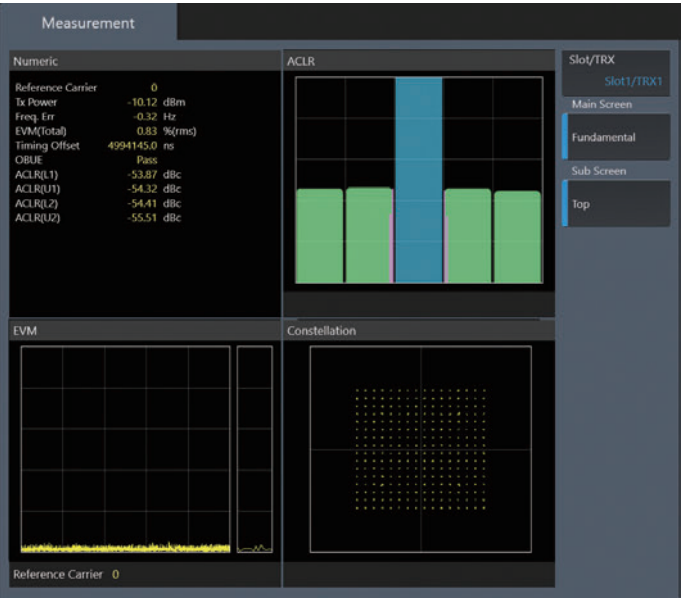


# Features of Base Station Test Suite for NR mmWave MX800045A/ Base Station Test Suite for NR sub-6GHz MX800046A

The Base Station Test Suite for NR mmWave MX800045A/Base Station Test Suite for NR sub-6GHz MX800046A are non-signaling RF test software for production-line testing of 5G NR base stations. They analyze downlink signals and measure RF characteristics for the 5G NR-specified Sub-6 GHz (FR1) and mmWave (FR2) bands.

## All-at-Once Multiple Test Items

The MX800045A/MX800046A software can measure multiple test items in all at once for frequency error, EVM, ACLR, OBUE, etc.



## All-at-Once Multiple Component Carrier Measurement

The MX800045A/MX800046A software helps to cut test time by measuring multiple component carrier(CC)s in all at once, not measuring each CC one by one.

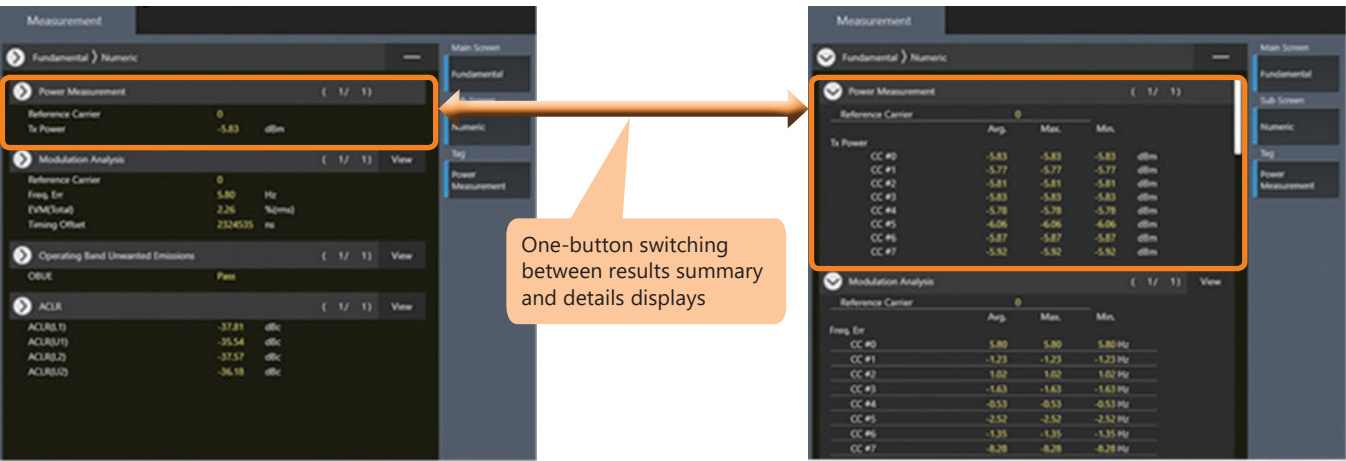
Name/Model	Sub-carrier Spacing	Channel Bandwidth	Maximum Number of Component Carriers
Base Station Test Suite for NR mmWave MX800045A	120 kHz	100 MHz	8
		200 MHz	4
		400 MHz	2
Base Station Test Suite for NR sub-6GHz MX800046A	15 kHz	20 MHz	2
	30 kHz	20, 40, 60, 80, 100 MHz	

# Features of Base Station Test Suite for NR mmWave MX800045A/ Base Station Test Suite for NR sub-6GHz MX800046A

## Easy-to-See GUI for Better Measurement Efficiency

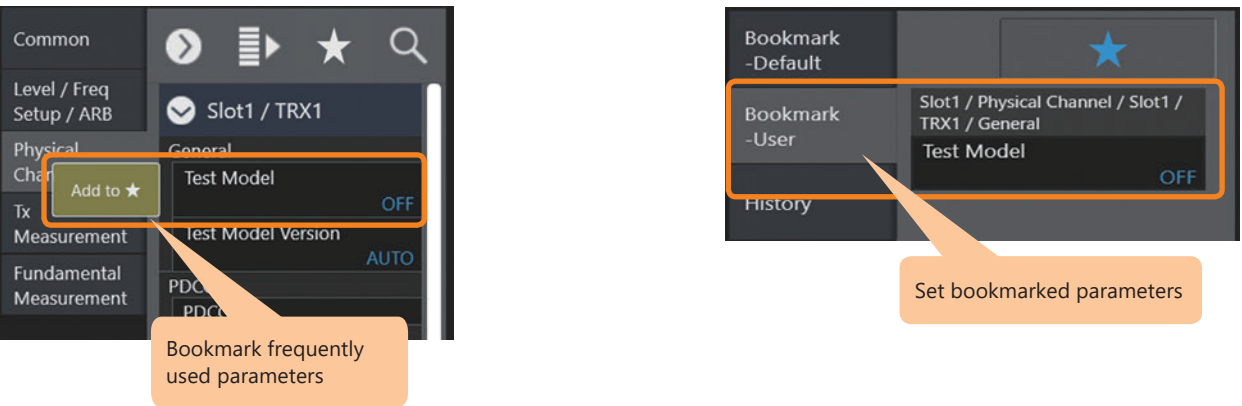
Graphs and tables of measurement results as well as individual measurement result summaries and details can be switched by one-button operation for efficient results confirmation. Other convenient functions, such as parameter bookmarking improve parameter setting efficiency.

### Summary and Details Display Switching



## Bookmarking

Registering frequently used parameters as bookmarked settings cuts parameter setting search times for more efficient measurement.



# Features of Base Station Test Suite for NR mmWave MX800045A/ Base Station Test Suite for NR sub-6GHz MX800046A

## List of Measurement and Signal Generation Functions

Name/Model	Base Station Test Suite for NR mmWave MX800045A	
Supported Standards	3GPP TS 38.141-2 V15.4.0 (2019-12)	
TRX Port Mode	Signal Analyzer	Signal Generator
Frequency Setting Range	MA80003A connected 24.25 GHz to 29.5 GHz 37 GHz to 43.5 GHz	
Supported Measurements	6. Radiated transmitter characteristics - 6.2 Radiated transmit power - 6.3 OTA base station output power - 6.4 OTA output power dynamics - 6.6.2 OTA frequency error - 6.6.3 OTA modulation quality - 6.6.4 OTA time alignment error - 6.7.2 OTA occupied bandwidth - 6.7.3 OTA ACLR - 6.7.4 OTA OBUE	7. Radiated receiver characteristics - 7.3 OTA Reference sensitivity level
Downlink Signal	NR-FR2-TM1.1 NR-FR2-TM2 NR-FR2-TM3.1	
Uplink Signal	—	G-FR2-A1-2 G-FR2-A1-3 G-FR2-A1-5
Supported Physical Channels	PDCCH, PDSCH	PDCCH, PDSCH PUSCH
Supported Modulation Methods	QPSK, 16QAM, 64QAM, 256QAM, Auto	QPSK, 16QAM, 64QAM, 256QAM

Name/Model	Base Station Test Suite for NR sub-6GHz MX800046A	
Supported Standards	3GPP TS 38.141-1 V15.4.0 (2019-12)	
TRX Port Mode	Signal Analyzer	Signal Generator
Frequency Setting Range	400 MHz to 6 GHz	
Supported Measurements	6. Transmitter characteristics - 6.2 BS output power - 6.3.3 Total power dynamic range - 6.5.2 Frequency error - 6.5.3 Modulation quality - 6.5.4 Time alignment error - 6.6.2 Occupied bandwidth - 6.6.3 ACLR - 6.6.4 Operating band unwanted emissions	7. Receiver characteristics - 7.2 Reference sensitivity level
Downlink Signal	NR-FR1-TM1.1 NR-FR1-TM1.2 NR-FR1-TM2 NR-FR1-TM2a NR-FR1-TM3.1 NR-FR1-TM3.1a NR-FR1-TM3.2 NR-FR1-TM3.3	
Uplink Signal	—	G-FR1-A1-1 G-FR1-A1-2 G-FR1-A1-4 G-FR1-A1-5 G-FR1-A1-7 G-FR1-A1-8
Supported Physical Channels	PDCCH, PDSCH	PDCCH, PDSCH PUSCH
Supported Modulation Methods	QPSK, 16QAM, 64QAM, 256QAM, Auto	QPSK, 16QAM, 64QAM, 256QAM

## Numeric Results

Name	Units	Remarks
Tx Power	dBm	Displays Tx power
Freq. Error	Hz/ppm	Displays frequency error
EVM (Total)	% (rms)	Displays EVM rms
Time Offset	ns	Displays Frame header and trigger time difference in ns units When using external Frame trigger, displays measurement results at SA Trigger = On
OBUE	Pass/Fail display	Displays Pass/Fail at Summary display Displays unwanted emission Level (dBm), Mask Margin (dB), Frequency (MHz) at Details display
ACLR	dBc	Displays adjacent channel leakage power ratio

## Graph Displays

Name	Main Screen
ACLR	Fundamental
EVM	
Constellation	
Spectrum Monitor	Spectrum Monitor

# Radio Communication Test Station MT8000A Layout

## MT8000A Front Panel



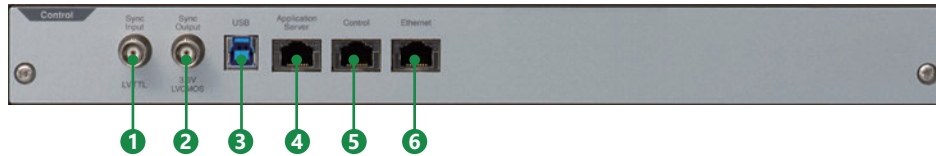
- 1 Ground Terminal**  
Functional ground terminal used as a measure against electrostatic discharge while using the MT8000A.
- 2 Power Switch**  
Switches power-on and standby. When the MT8000A is in the power on status, the LED lights up (green).
- 3 Standby LED**  
When the MT8000A is in the standby status of which the AC power is on, the LED lights (orange).
- 4 Recover LED/Recover Switch**  
Switch to recover MT8000A in case of emergency. Recovery LED lights up (orange) when the recovery function is enabled.
- 5 Caution LED**  
Lights up (orange) when MT8000A detects abnormality.
- 6 Ready LED**  
Lights up (green) when MT8000A startup is completed after power-on.
- 7 Control Module MT8000A-001**  
Controls the entire MT8000A, downloads firmware, and start MT8000A.  
Optical ports are used for connecting multiple MT8000As.
- 8 RF Base Module MT8000A-020 (with MT8000A-021)**  
Converts digital signals into analog signals.  
Functions as RF interface for the external RF Converter or for RF signals in 0.4 GHz to 6 GHz.



# Radio Communication Test Station MT8000A Layout

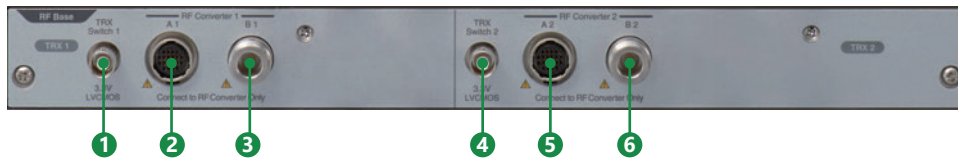
## MT8000A Modules

### Control Module MT8000A-001



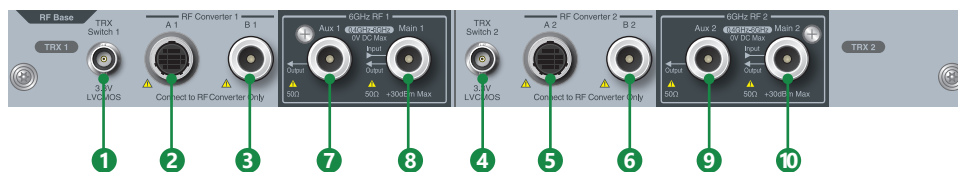
- 1 Sync Input Connector**  
(Not used in MX800045A/MX800046A)  
BNC connector for inputting synchronizing signal.
- 2 Sync Output Connector**  
(Not used in MX800045A/MX800046A)  
BNC connector for outputting synchronizing signal.
- 3 USB Connector (Not used in MX800045A/MX800046A)**  
USB (Type B) connector to connect the external PC.
- 4 Application Server Connector**  
(Not used in MX800045A/MX800046A)  
RJ-45 connector to connect the external PC for Application Server.
- 5 Control Connector**  
RJ-45 connector for connecting the MT8000A and Control PC.
- 6 Ethernet Connector**  
(Not used in MX800045A/MX800046A)  
RJ-45 connector for connecting the external PC, etc.

### RF Base MT8000A-020



- 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.

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

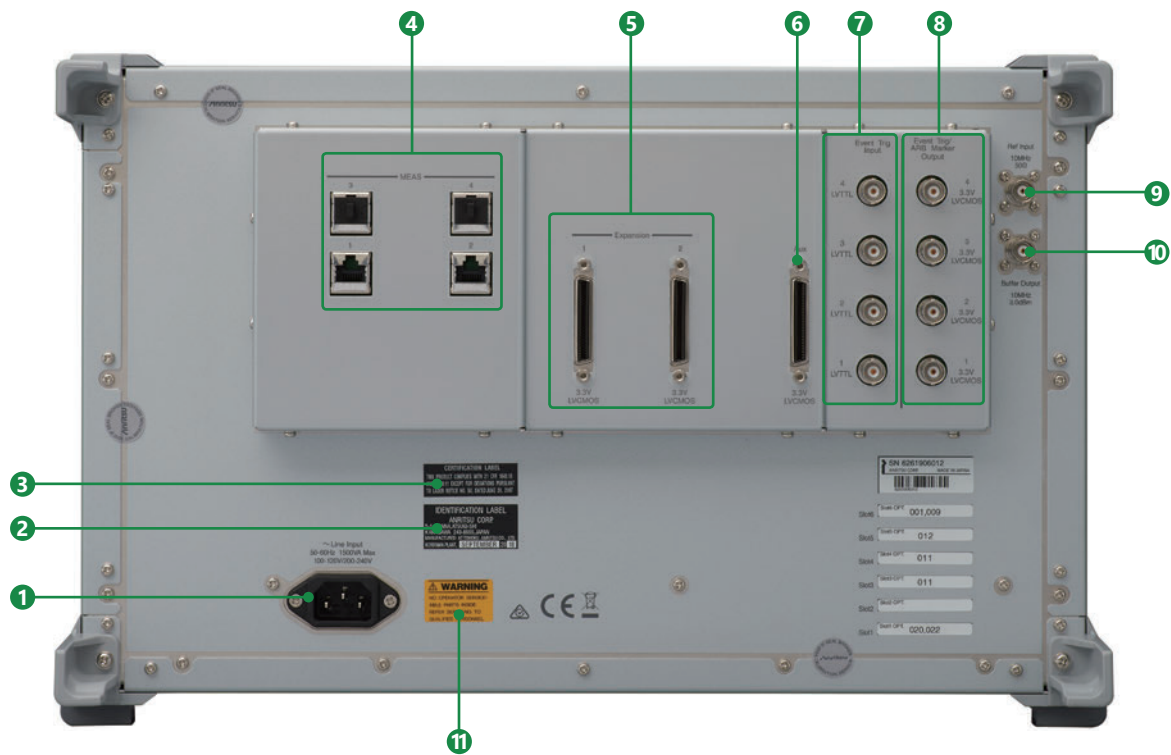


- 1 TRX Switch 1 connector**  
BNC connector that outputs signals to control the external amplifier, etc.
- 2 RF Converter 1 A1 connector**  
Multi-contact connector that controls the external RF Converter.
- 3 RF Converter 1 B1 connector**  
N connector that input/output the external RF Converter and 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 6 GHz RF1 Aux 1 connector**  
RF auxiliary connector (output) when 0.4 GHz-6 GHz RF Sub Module option is installed.
- 8 6 GHz RF1 Main 1 connector**  
RF main connector (input/output) when 0.4 GHz-6 GHz RF Sub Module option is installed.
- 9 6 GHz RF2 Aux 2 connector**  
RF auxiliary connector (output) when 0.4 GHz-6 GHz RF Sub Module option is installed.
- 10 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 Rear Panel



- 1 Power Inlet**  
Power cable connector for 100 VAC to 120 VAC or 200 VAC to 240 VAC (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 (3 and 4 do not use MX800045A/MX800046A)**  
RJ-45 connector for measurement.
- 5 Expansion Connector (Not used in MX800045A/MX800046A)**  
Used for input/output of trigger signals.
- 6 Aux Connector (Not used in MX800045A/MX800046A)**  
Auxiliary connector to output frame timing signals.
- 7 Event Trigger Input Connector (3 and 4 do not use MX800045A/MX800046A)**  
BNC connector to input event triggers from external devices. Can input event trigger signals of 4 systems.
- 8 Event Trigger Output Connector (Not used in MX800045A/MX800046A)**  
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.

## Selection Guide

Model	Name	Sub-6 GHz		mmWave		
		1,2 ports	3, 4 ports	1 port	2 port	4 port
MT8000A	Radio Communication Test Station	✓	✓	✓	✓	✓
MT8000A-001* <sup>1</sup>	Control Module	✓	✓	✓	✓	✓
MT8000A-020* <sup>2</sup>	RF Base Module	✓	✓ ✓	✓	✓	✓ ✓
MT8000A-021* <sup>3</sup>	0.4 GHz-6 GHz RF Sub Module	✓	✓ ✓			
MA80003A	Multiband RF Converter			✓	✓ ✓	✓ ✓ ✓ ✓
MX800045A	Base Station Test Suite for NR mmWave			✓	✓	✓
MX800046A	Base Station Test Suite for NR sub-6GHz	✓	✓			
MX800045A-SS101* <sup>4</sup>	Base Station Test for 5G NR mmWave Support Service (Per Year)			✓	✓	✓
MX800046A-SS101* <sup>5</sup>	Base Station Test for 5G NR sub-6GHz Support Service (Per Year)	✓	✓			

\*1: Required option.

\*2: Two Multiband RF Converter MA80003A units can be connected to one module.

\*3: Requires MT8000A-020 option. One module has two built-in RF TRx ports.

\*4: Recommend ordering at same time as MX800045A.

\*5: Recommend ordering at same time as MX800046A.

# Radio Communication Test Station MT8000A Specifications

## Radio Communication Test Station MT8000A

Reference Oscillator		<p>Reference frequency: 10 MHz</p> <p>Start-up characteristics: <math>\pm 5 \times 10^{-8}</math> (3 min. after power-on. Referenced to frequency 1 hour after power-on)</p> <p>Aging rate: <math>\pm 1 \times 10^{-8}</math>/day (referenced to frequency 48-hour after power-on)</p> <p><math>\pm 1 \times 10^{-7}</math>/year (referenced to frequency 10-day after power-on)</p> <p>Temperature characteristics: <math>\pm 2 \times 10^{-8}</math></p> <p>Frequency adjusted at shipment: <math>\pm 2.2 \times 10^{-8}</math> (+18°C to +28°C, referenced to frequency 1 hour after power-on)</p> <p>10 MHz Buffer Output</p> <p>Frequency: 10 MHz</p> <p>Connector: BNC (f)</p> <p>Impedance: 50Ω (nom.)</p> <p>Output Level: <math>\geq 0</math> dBm (AC coupling)</p> <p>10 MHz Ref Input</p> <p>Frequency: 10 MHz</p> <p>Operating range: <math>\pm 1</math> ppm</p> <p>Connector: BNC (f)</p> <p>Impedance: 50Ω (nom.)</p> <p>Input level: -15 dBm <math>\leq</math> level <math>\leq</math> +20 dBm (AC coupling)</p>
External Interface		<p>MEAS 1 to 4: RJ45, 1000Base-T, for slot 1 to 4</p> <p>Event TRIG Input 1 to 4: BNC (f), LVTTTL</p> <p>Event TRIG/ARB Maker Output 1 to 4: BNC (f), 3.3 V LVCMOS</p> <p>Expansion 1, 2: DX20A (3.3 V LVCMOS)</p> <p>Aux: DX20A (3.3 V LVCMOS)</p>
Power Supply		<p>Rated voltage: 100 VAC to 120 VAC/200 VAC to 240 VAC</p> <p>(Operating voltage is -15%/+10% of rated voltage, however, lower limit is 90 V, upper limit is 250 V)</p> <p>Rated frequency: 50 Hz/60 Hz</p> <p>Power consumption: <math>\leq 1500</math> VA (include all options and modules)</p>
Dimensions and Mass		<p>Dimensions: 426 (W) <math>\times</math> 265 (H) <math>\times</math> 578 (D) mm (excluding projections)</p> <p>Mass: <math>\leq 50</math> kg (including all options)</p>
Environmental Conditions		<p>Operating temperature range: +5°C to +40°C (without condensation)</p> <p>Storage temperature: -20°C to +71°C (without condensation)</p>
CE	EMC	2014/30/EU, EN61326-1, EN61000-3-2
	LVD	2014/35/EU, EN61010-1
	RoHS	2011/65/EU, (EU) 2015/863, EN IEC 63000: 2018
Laser Safety*		<p>IEC 60825-1 Class 1</p> <p>FDA 21CFR1040.10 and 1040.11 Excludes deviations caused by conformance to LASER Notice No.50 dated June 24, 2007</p>

\*: 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.



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	<p>USB: USB (Type-B)</p> <p>Application Server: RJ-45 (1000Base-T)</p> <p>Control: RJ-45 (1000Base-T)</p> <p>Ethernet: RJ-45 (1000Base-T)</p> <p>Sync Input: BNC (f) (LVTTTL)</p> <p>Sync Output: BNC (f) (3.3 V LVCMOS)</p>
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## RF Base Module MT8000A-020

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



# Radio Communication Test Station MT8000A Specifications

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

General	<p>RF input/output connector Main 1, Main 2 Connector: N (f) Impedance: 50Ω (nom.) VSWR At 0.4 GHz ≤ setting frequency &lt; 3 GHz ≤1.5 (0.4 GHz ≤ frequency &lt; 3.1 GHz) At 3 GHz ≤ setting frequency ≤ 6 GHz ≤1.5 (2.9 GHz ≤ frequency ≤ 6.1 GHz)</p> <p>RF output connector Aux 1, Aux 2 Connector: N (f) Impedance: 50Ω (nom.) VSWR At 0.4 GHz ≤ setting frequency &lt; 3 GHz ≤1.6 (0.4 GHz ≤ frequency &lt; 3.1 GHz) At 3 GHz ≤ setting frequency ≤ 4.2 GHz ≤1.9 (2.9 GHz ≤ frequency ≤ 4.3 GHz) At 4.2 GHz &lt; setting frequency ≤ 6 GHz ≤2.0 (4.1 GHz &lt; frequency ≤ 6.1 GHz)</p>
Transmission Characteristics	<p>Frequency Setting range: 0.4 GHz to 6 GHz Setting resolution: 1 Hz Accuracy: Depend on accuracy of reference oscillator</p> <p>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 &lt; 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 &lt; 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 &lt; setting frequency ≤ 6 GHz, output level ≥ -100 dBm ±1.5 dB (+18°C to +28°C) ±2.0 dB (+5°C to +40°C)</p> <p>Signal purity Non-harmonic spurious With CW, 0.4 GHz ≤ setting frequency &lt; 0.6 GHz, maximum output level, setting frequency ±10 MHz (exclude &lt;0.4 GHz), exclude setting frequency ±2.5 MHz ≤-40 dBc With CW, 0.6 GHz ≤ setting frequency &lt; 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 &lt; 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 &lt; 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 &lt; 0.6 GHz) 200 MHz (0.6 GHz ≤ setting frequency &lt; 3.3 GHz) 400 MHz (3.3 GHz ≤ setting frequency ≤ 6 GHz)</p>

# Radio Communication Test Station MT8000A Specifications

Receiving Characteristics	<p>Frequency</p> <p>Setting range: 0.4 GHz to 6 GHz</p> <p>Setting resolution: 1 Hz</p> <p>Level</p> <p>Maximum input level: +30 dBm, 0 VDC (0.4 GHz ≤ setting frequency ≤ 6 GHz, with CW)</p> <p>Setting range: -50 to +26 dBm</p> <p>Setting resolution: 0.1 dB</p> <p>Amplitude</p> <p>Measurement resolution: 0.01 dB</p> <p>Measurement accuracy</p> <p>After Cal, with CW, 0.4 GHz ≤ setting frequency &lt; 3 GHz, measurement bandwidth is 100 MHz, at the signal equal to the setting frequency and the setting level</p> <p>±0.5 dB (Setting level ≥ -20 dBm, typical)</p> <p>±0.7 dB (Setting level ≥ -40 dBm, typical)</p> <p>±1.0 dB (Setting level ≥ -40 dBm, +18°C to +28°C)</p> <p>±1.3 dB (Setting level ≥ -50 dBm, +18°C to +28°C)</p> <p>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</p> <p>±1.0 dB (Setting level ≥ -40 dBm, +18°C to +28°C)</p> <p>±1.3 dB (Setting level ≥ -50 dBm, +18°C to +28°C)</p>
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# Radio Communication Test Station MT8000A Specifications

## 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, (EU) 2015/863, EN IEC 63000: 2018

## MX800045A/MX800046A Measurement Examples

The following tables show examples of EVM and ACLR measurements using the signal analyzer and signal generator with the MX800045A and MX800046A software.

Typical (typ.): Performance not warranted. Most products meet typical performance.

Nominal (nom.): Values not warranted. Included to facilitate application of product.

Measured (meas.): Performance not warranted. Data actually measured from randomly selected measuring instruments.

### Base Station Test Suite for NR mmWave MX800045A

#### Error Vector Magnitude (EVM)

- Test Signal

Signal Analyzer:

NR-FR2-TM3.1, 120 kHz Subcarrier Spacing (64QAM),  
Input Level: -10 dBm

Signal Generator:

Uplink, CP-OFDM, 120 kHz Subcarrier Spacing (64QAM),  
Output Level: -10 dBm

Frequency	Channel Bandwidth	EVM (rms) (meas.)	
		Signal Analyzer	Signal Generator
28 GHz	100 MHz	1.56%	1.14%
	200 MHz	1.63%	1.27%
	400 MHz	1.73%	1.48%
39 GHz	100 MHz	2.04%	1.92%
	200 MHz	1.99%	2.16%
	400 MHz	2.08%	2.53%

### Adjacent Channel Leakage Ratio (ACLR)

- Test Signal

Signal Analyzer:

NR-FR2-TM1.1, 120 kHz Subcarrier Spacing (QPSK),  
Input Level: -10 dBm

Signal Generator:

Uplink, CP-OFDM, 120 kHz Subcarrier Spacing (QPSK),  
Output Level: -10 dBm

Frequency	Channel Bandwidth	ACLR (meas.)	
		Signal Analyzer	Signal Generator
28 GHz	100 MHz	-47.17 dBc	-47.9 dBc
	200 MHz	-41.32 dBc	-45.44 dBc
	400 MHz	-40.14 dBc	-41.12 dBc
39 GHz	100 MHz	-47.04 dBc	-47.3 dBc
	200 MHz	-41.58 dBc	-44.8 dBc
	400 MHz	-40.77 dBc	-41.4 dBc

### Base Station Test Suite for NR sub-6GHz MX800046A

#### Error Vector Magnitude (EVM)

- Test Signal

Signal Analyzer:

NR-FR1-TM3.1a, 30 kHz Subcarrier Spacing (256QAM),  
Input Level: -10 dBm

Signal Generator:

Uplink, CP-OFDM, 30 kHz Subcarrier Spacing (256QAM),  
Output Level: -10 dBm (Main)/0 dBm (AUX)

Frequency	Channel Bandwidth	EVM (rms) (%) meas.	
		Signal Analyzer	Signal Generator
3.7 GHz	100 MHz	0.91%	1.00% (Main) 0.95% (AUX)
4.5 GHz	100 MHz	0.96%	1.04% (Main) 1.03% (AUX)
5 GHz	100 MHz	0.95%	1.06% (Main) 1.02% (AUX)

### Adjacent Channel Leakage Ratio (ACLR)

- Test Signal

Signal Analyzer:

NR-FR1-TM1.1, 30 kHz Subcarrier Spacing (QPSK),  
Input Level: -10 dBm

Signal Generator:

Uplink, CP-OFDM, 30 kHz Subcarrier Spacing (QPSK),  
Output Level: -10 dBm (Main)/0 dBm (AUX)

Frequency	Channel Bandwidth	ACLR	
		Signal Analyzer	Signal Generator
3.7 GHz	100 MHz	-50.36 dBc	-46.40 dBc (Main) -47.28 dBc (AUX)
4.5 GHz	100 MHz	-49.62 dBc	-44.94 dBc (Main) -45.54 dBc (AUX)
5 GHz	100 MHz	-49.12 dBc	-45.47 dBc (Main) -45.67 dBc (AUX)



## 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
MT8000A	<b>Main Frame</b> Radio Communication Test Station
J1211 J1440A W3955AE MX800000A	<b>Standard Accessories</b> Power Cord (3.0 m, 100 V, 3 core) : 1 pc LAN Cable : 1 pc MT8000A Operation Manual (DVD) : 1 pc Platform Software
MT8000A-001 MT8000A-020 MT8000A-021	<b>Options</b> Control Module RF Base Module 0.4 GHz-6 GHz RF Sub Module
MA80003A J1771A J1771B J1771C J1772A J1772B J1772C J1806B	<b>Converter</b> Multiband RF Converter Coaxial Cord (N-N, 1.0 m) Coaxial Cord (N-N, 3.0 m) Coaxial Cord (N-N, 5.0 m) Control Cable, 1.0 m Control Cable, 3.0 m Control Cable, 5.0 m VJ-KJ Adapter

Model/Order No.	Name
J0127A J1398A J1440A	<b>Application Parts</b> COAXIAL CORD, 1.0M N-SMA ADAPTOR LAN Cable
MX800045A MX800046A	<b>Software Options</b> Base Station Test Suite for NR mmWave Base Station Test Suite for NR sub-6GHz
MX800045A-SS101 MX800046A-SS101	<b>Support Services</b> Base Station Test for 5G NR mmWave Support Service (Per Year) Base Station Test for 5G NR sub-6GHz Support Service (Per Year)
MT8000A-ES210 MT8000A-ES310 MT8000A-ES510 MA80003A-ES210 MA80003A-ES310 MA80003A-ES510	<b>Warranty Services</b> 2 Years Extended Warranty Service 3 Years Extended Warranty Service 5 Years Extended Warranty Service 2 Years Extended Warranty Service 3 Years Extended Warranty Service 5 Years Extended Warranty Service



Specifications are subject to change without notice.

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