

Making creative and unique products
is our motto.

MICRONIX Products

DIGEST



Spectrum analyzer
Signal analyzer

EMC test system

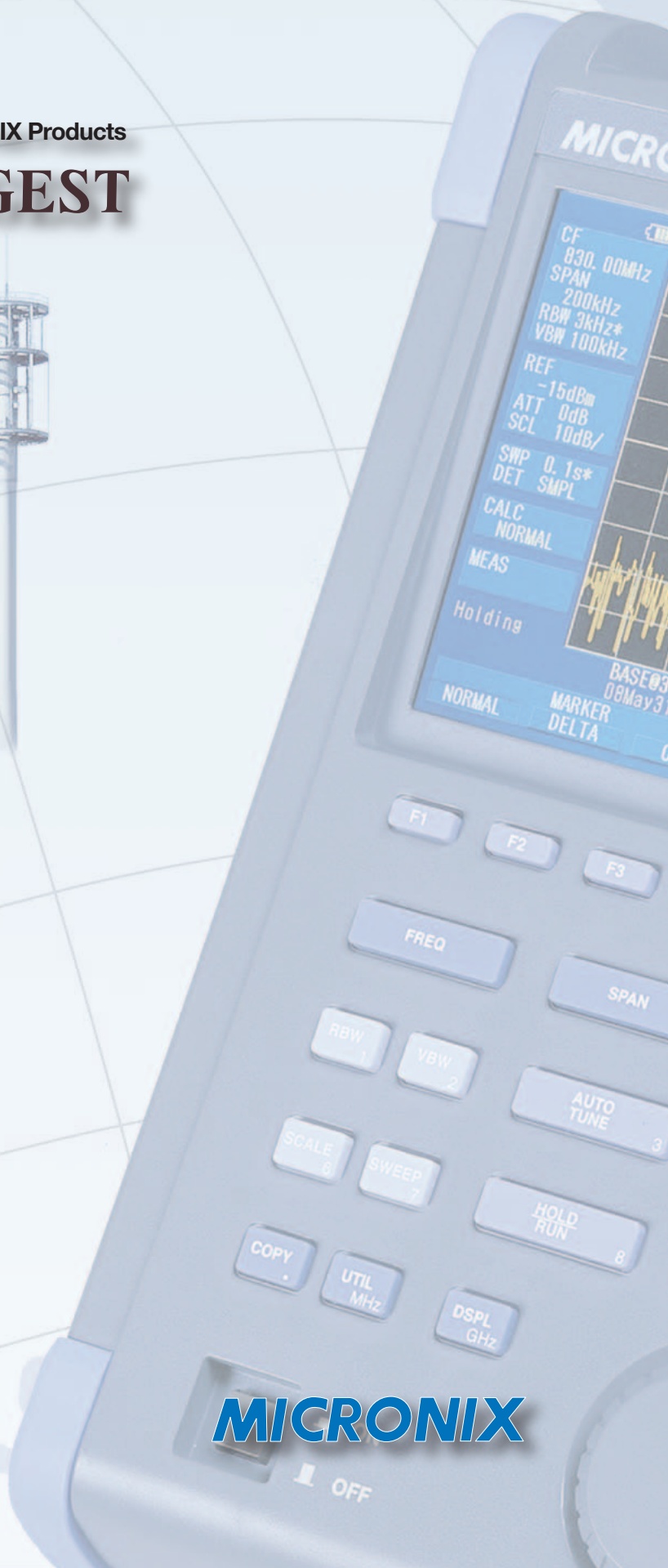
Electromagnetic
anechoic box/Shield box

Variable attenuator

Signal generator

ETC/DSRC
inspection system

Test accessories



MICRONIX

Spectrum analyzer/Signal analyzer

MSA300 series spectrum analyzer

Realized the world's first and inexpensive handheld type.



- Compact 162(W)×70(H)×260(D)mm and lightweight 1.8kg
- 150 minutes battery operation
- Abundant functions comparable to a bench type
 - Marker measurement and peak search function
 - Measuring functions: Channel power, Adjacent channel power, Occupied bandwidth, Electric field strength and Magnetic field strength measurement
 - Calculation functions: Max hold, Min hold, Averaging, OverWrite
- Electric field strength measurement from 300MHz to 6.2GHz
- AUTO tuning
- Abundant options
- Hard copy with an optional printer

3.3GHz band MSA338



Frequency range: 50kHz to 3.3GHz

The most popular and inexpensive model.

Center frequency accuracy: $\pm 82\text{kHz}$
@sweep 100ms, span 10MHz, RBW 3kHz
RBW: 3kHz to 3MHz (1-3 step)
SSB phase noise: -90dBc/Hz @100kHz offset
Reference level: +10 to -60dBm (1dB step)
Average noise level: -117dBm @1GHz
Sweep time: 10ms to 30s

8.5GHz band MSA358



Frequency range: 50kHz to 8.5GHz

Broadband model with same functions as MSA338.

Center frequency accuracy: $\pm 82\text{kHz}$
@sweep 100ms, span 10MHz, RBW 3kHz
RBW: 3kHz to 3MHz (1-3 step)
SSB phase noise: -90dBc/Hz @100kHz offset
Reference level: +10 to -60dBm (1dB step)
Average noise level: -117dBm @1GHz
Sweep time: 10ms to 30s

3.3GHz band with TG MSA338TG



Frequency range: 50kHz to 3.3GHz

〈Tracking generator〉

Output frequency range: 5MHz to 3.3GHz
Output level: -10dBm

- A spectrum analyzer being equipped with a tracking generator and keeping the functions of MSA338.
Enables the measurement of the amplitude frequency characteristics of electronic component and circuit.
- By connecting VSWR bridge MVS300B, the return loss can be measured.

3.3GHz band for EMI MSA338E



Frequency range: 50kHz to 3.3GHz

〈EMI measurement〉

Detection mode: PK, QP and AV detections
Resolution bandwidth: 9kHz/120kHz @6dB

There are mainly three applications.

- Radiated emission measurement by connecting antenna
- Conducted emission measurement by connecting LISN MPW201B
- Noise measurement on PCB by connecting magnetic field probe CP-2S < applied to all models >

MSA400 series spectrum analyzer

Upgrading MSA300 series further

Comparison between MSA300 and MSA400

Item	MSA300 series	MSA400 series
LCD	mono 4.7inch QVGA(320×240)	color 5.7inch VGA(640×480)
Battery operation	2.5 hour	4 hour
Battery remainder display	Not displayed	Displayed
Communication	RS-232C	USB
External memory	No	USB memory
Average noise level	-117dBm	-127dBm
Waveform data points	251(H)×201(V)	501(H)×381(V)
Display dynamic range	8div/80dB	10div/100dB
Display scale	10,2dB/div	10,5,2dB/div
Freq. setting resolution	100kHz	20kHz
External trigger	No	Yes
RF input connector	SMA(J)	N(J)
Protection bumper	No	Yes

※The dimensions and weight are almost same.

3.3GHz band MSA438

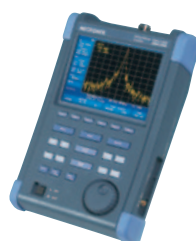


Frequency range: 50kHz to 3.3GHz

Upgrade model of MSA338.

Center frequency accuracy: $\pm 52\text{kHz}$
 @sweep 100ms, span 10MHz, RBW 3kHz
 RBW: 3kHz to 3MHz (1-3 step)
 SSB phase noise: -90dBc/Hz @100kHz offset
 Reference level: $+10$ to -60dBm (1dB step)
 Average noise level: -127dBm @1GHz
 Sweep time: 10ms to 30s

8.5GHz band MSA458

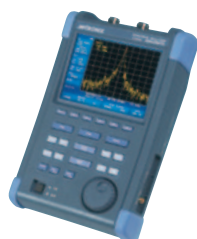


Frequency range: 50kHz to 8.5GHz

Upgrade model of MSA358.

Center frequency accuracy: $\pm 52\text{kHz}$
 @sweep 100ms, span 10MHz, RBW 3kHz
 RBW: 3kHz to 3MHz (1-3 step)
 SSB phase noise: -90dBc/Hz @100kHz offset
 Reference level: $+10$ to -60dBm (1dB step)
 Average noise level: -123dBm @1GHz
 Sweep time: 10ms to 30s

3.3GHz band with TG MSA438TG



Frequency range: 50kHz to 3.3GHz

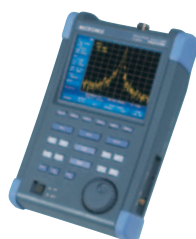
〈Tracking generator〉

Output frequency range: 5MHz to 3.3GHz
 Output level: -10dBm

Upgrade model of MSA338TG.

- The desired characteristics data is obtained because frequency setting resolution is improved to 20kHz and 5dB/div is added to the display scale.
- By connecting VSWR bridge MVS300B, the return loss can be measured.
- By connecting DTF adapter MA430, the distance to discontinuity point of cable can be measured.

3.3GHz band for EMI MSA438E



Frequency range: 50kHz to 3.3GHz

〈EMI measurement〉

Detection mode: PK, QP and AV detections
 Resolution bandwidth: 9kHz/120kHz @6dB

Upgrade model of MSA338E.

Provides a wider dynamic range and enables a lower noise measurement, because average noise level is improved 10dB.

- Radiated emission measurement by connecting antenna
- Conducted emission measurement by connecting LISN MPW201B
- Noise measurement on PCB by connecting magnetic field probe CP-2S < applied to all models >

Spectrum analyzer/Signal analyzer

MSA500 series signal analyzer

The world's first signal analyzer
with real time plus sweep system.

For offering both the real time system based on Fast Fourier Transform (FFT) and the conventional sweep system, each strong points of both systems are effectively usable.

By real time system, unsteady signal can be measured, and time domain analysis and modulation analysis can be performed. By sweep system, the wide frequency range can be observed at a glance.

3.3GHz band MSA538

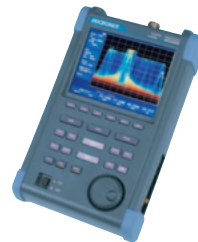


Frequency range: 20kHz to 3.3GHz

The most popular model of MSA500 series.

- Real time mode
 - 8 types of analysis functions
[Spectrum, Spectrogram, OverWrite,
Time domain (5 types)]
 - 20MHz maximum span
 - Fast OverWrite analysis
 - Large memory of 16K frames and high speed
USB communication of 19ms/frame
- Sweep mode: 300Hz minimum RBW
- Average noise level: -162dBm/Hz
- Four hour battery operation

8.5GHz band MSA558

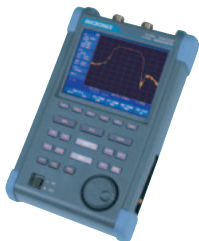


Frequency range: 20kHz to 8.5GHz

Covering almost all applications of wireless communication systems because of 8.5GHz band.

- The specifications are almost same as MSA538 excepting frequency range.
- Since the frequency range is wider, 5GHz band wireless LAN and 5.8GHz band DSRC can be measured. Moreover, three times more spurious signal of 2.4GHz band equipment.
- Real time processing up to 8.5 GHz
- Average noise level: -157dBm/Hz
- Four hour battery operation

3.3GHz band with TG MSA538TG



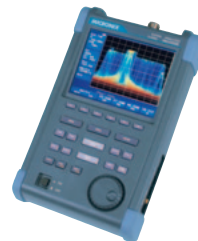
Frequency range: 20kHz to 3.3GHz

〈Tracking generator〉
Output frequency range: 5MHz to 3.3GHz
Output level: -10dBm

By being equipped with a tracking generator and keeping the functions of MSA538, it is possible to perform the measurement and evaluation of the amplitude frequency characteristics of filter, amplifier, electronic component and circuit. Moreover, the following options are available.

- DTF adapter MA430
Enables to measure the distance to discontinuity point of cable and the length of normal cable.
- VSWR bridge MVS300B
Enables to measure the return loss of electronic component and circuit. The measuring frequency range is 5MHz to 3GHz.

8.5GHz band for EMI MSA558E



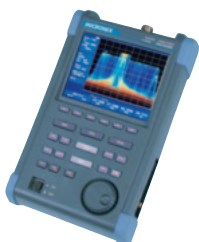
Frequency range: 20kHz to 8.5GHz

〈EMI measurement〉
Detection mode: PK, QP and AV detections
Resolution bandwidth(6dB): 9kHz, 120kHz, 1MHz

A model being equipped with EMI measurement function and keeping the functions of MSA558. Capable of EMI measurement up to 8.5 GHz.

- Radiated emission measurement by connecting antenna
- Conducted emission measurement by connecting LISN MPW201B
- Noise measurement on PCB by connecting magnetic field probe CP-2S < applied to all models >

3.3GHz band for EMI MSA538E



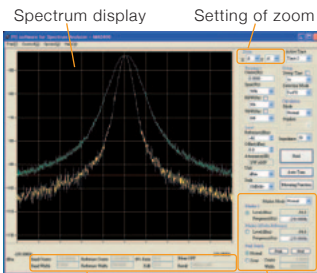
Frequency range: 20kHz to 3.3GHz

〈EMI measurement〉
Detection mode: PK, QP and AV detections
Resolution bandwidth(6dB): 9kHz, 120kHz, 1MHz
A model being equipped with EMI measurement function and keeping the functions of MSA538.

- Radiated emission measurement by connecting antenna
- Conducted emission measurement by connecting LISN MPW201B
- Noise measurement on PCB by connecting magnetic field probe CP-2S < applied to all models >

Spectrum analyzer/Signal analyzer Option

■ PC software MAS300/400/500



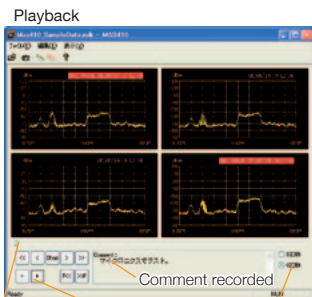
Spectrum display Setting of zoom

Setting of measuring function Setting of marker

This is a software that controls the spectrum analyzer or signal analyzer by the PC and displays the spectrum waveform on PC screen.

MAS300: for MSA300 series
MAS400: for MSA400 series
MAS500: for MSA500 series

■ Logging software MAS310/410/510



Playback

Track bar Operation button Number of screens

This is a PC software that collects the measurement data by uninhabited. Optimum for watching an abnormal signal at night and recording the data by uninhabited for a long time.

MAS310: for MSA300 series
MAS410: for MSA400 series
MAS510: for MSA500 series

■ DTF adapter MA430



Option: 50Ω measurement kit
75Ω measurement kit

Enables to measure the distance to discontinuity point of cable and the length of normal cable.

Distance range: 0.3 to 1000m @50Ω cable
1 to 400m @75Ω cable

Cable characteristics list:

111types of cables @50Ω cable
11types of cables @75Ω cable

Applied models: MSA438TG/538TG

■ VSWR bridge MVS300B



Enables to measure the return loss of electronic component and circuit.

Frequency range: 5 to 3000MHz

Directivity: more than 40dB @50 to 3000MHz
more than 25dB @5 to 50MHz

Insertion loss: less than 7dB @SOURCE to DUT
less than 8dB @DUT to REFLECTED

Applied models: MSA338TG/438TG/538TG

■ Dipole antenna



M301 M302 M303 M304 M305 M306 M307

M401 M402 M403 M404 M405 M406 M407

Antenna for electric field strength measurement

Model	Freq. range
M301/401	0.8 to 1GHz
M302/402	1.25 to 1.65GHz
M303/403	1.7 to 2.2GHz
M304/404	2.25 to 2.65GHz
M305/405	300 to 500MHz
M306/406	4.8 to 6.2GHz
M307/407	470 to 770MHz

Connector: SMA(P) @M300, N(P) @M400

Applied models: M301 to M307: MSA300 series
M401 to M407: MSA400/500 series

■ Magnetic field probe CP-2S



Measures the magnetic field strength at pattern on PCB and terminals of device. The probe is calibrated in the instrument.

Frequency range: 10MHz to 3GHz

Space resolution: approx. 0.25mm
(depending on objects)

Applied models: MSA300/400/500 series

■ Wideband passive probe MP300



A passive probe with low input capacitance and wide frequency band.

Frequency range: DC to 6GHz

Attenuation ratio: 10:1, ±2%

Input resistance: 500kΩ±2%

Input capacitance: 0.25pF(typ)

Applied models: MSA300/400/500 series

■ Printer



(With AC adapter
and one rollpaper)

※Option: Rollpaper (10 rolls)

Enables a hard copy of the screen.

Interface: RS-232C @MSA300 series
USB @MSA400/500 series

Printing method: Thermal line dot method

Paper: 80mm width thermal paper

Power source: internal: AA-sized alkaline battery(4pcs)
external: 7.5VDC/3A(dedicated AC adapter)

Applied models: MSA300/400/500 series

■ Frequency counter (factory option)

Item	Specifications
Frequency range	1MHz to 3.3GHz @excepting MSA358/458 1MHz to 8.5GHz @MSA358/458
Measured level	+10 to -70dBm @1MHz to 2GHz, RBW100kHz +10 to -60dBm @2 to 8.5GHz, RBW100kHz
Measurement resolution	100Hz
Display digits	8 digits max
Reference X'tal	Accuracy: ±2ppm @23°C Temp. characteristics: ±5ppm @0 to 40°C
Applied models	MSA300/400 series

■ Battery

Ni-MH battery MB300



4.8V/4200mAh
Applied models: MSA300 series

Lithium-ion battery MB400



7.4V/5000mAh
Applied models: MSA400/500 series

■ Charger MBC300



A charger for battery MB300 used in MSA300 series.

Input voltage: DC5V±0.25V(using AC adapter MA300)

Input current: 4A max

Charging time: roughly two hours

Applied models: MSA300 series

■ Interface cable

RS-232C cable MI180



Connector: D-sub 9pins
Length: 1.5m
Applied models: MSA300 series

USB cable MI400



Connector: A plug/B plug
Length: 1m
Applied models: MSA400/500 series

■ RS-232C/GP-IB converter ZS-6144TM



(with AC adapter and 25p/9p
conversion connector)

RS-232C interface of MSA300 series is converted to GP-IB.

Buffer memory: 8K bytes (both of input/output)

Dimensions: 130(W)×40(H)×200(D)mm

Applied models: MSA300 series

■ Option compatibility table

Option	MSA300 series	MSA400 series	MSA500 series
PC software	MAS300	MAS400	MAS500
Logging software	MAS310	MAS410	MAS510
DTF adapter MA430	×	○	○
VSWR bridge MVS300B	○	○	○
Dipole antenna	M300 series	M400 series	M400 series
Magnetic field probe CP-2S	○	○	○
Wideband passive probe MP300	○	○	○
Printer	RS-232C printer	USB printer	USB printer
Frequency counter	○	○	×
Battery	MB300	MB400	MB400
Charger MBC300	○	×	×
Interface cable	MI180	MI400	MI400
RS-232C/GP-IB converter ZS-6144TM	○	×	×

※Other options are listed in Test accessories.

EMC test system

EMI test system MR2300



MR2300 is a first EMI total test system in the world for “Precompliance” that measures the radiated and conducted emission noise. The miniaturization of the system is realized by small and broadband antenna MAN101/102 developed by ourselves. The whole system is calibrated. In addition, four types of anechoic boxes MY5310/5310S/5310SU/5410 are available according to the EUT.

EMS test system MR2350



A precompliance EMS test system with which the radiation immunity test (IEC/EN61000-4-3) can be done. Electric field strength: 1, 3, 10V/m. The malfunction of the EUT can be observed on the PC screen through the EUT camera monitor MEC235 put in the anechoic box. In addition, three types of anechoic boxes MY5310/5310S/5410 are available according to the EUT.

LISN (Line impedance stabilization network) MPW201B



LISN is used to make constant the power source impedance observed from EUT and to measure noise with reproducibility when the conducted emission discharged through the power supply line is measured.

Frequency range: 150kHz to 30MHz

Circuit type:

50Ω/50μH and V type based on CISPR16-1

Rated current: 15A

Power supply: single phase, 50/60Hz, 250VACmax

Power amplifier MAP202



Frequency range: 30 to 1000MHz

Gain: 46dB typ @30 to 600MHz

44.5dB typ @600 to 1000MHz

1dB compression level:

42.5dBm typ @30 to 600MHz

41dBm typ @600 to 1000MHz

Modulation output:

1kHz/2Vp-p square wave

Low noise amplifier MAP301/302



MAP301 is optimum for emission noise measurement of CISPR25 in combination with loop antenna MAN120.

MAP302 is optimum for emission noise measurements of both horizontal and vertical polarizations in combination with biconical antenna MAN150.

Item	MAP301	MAP302
Frequency range	100kHz to 500MHz	20MHz to 3GHz
Gain	50dB	20dB
Noise figure	3.5dB	3.5dB

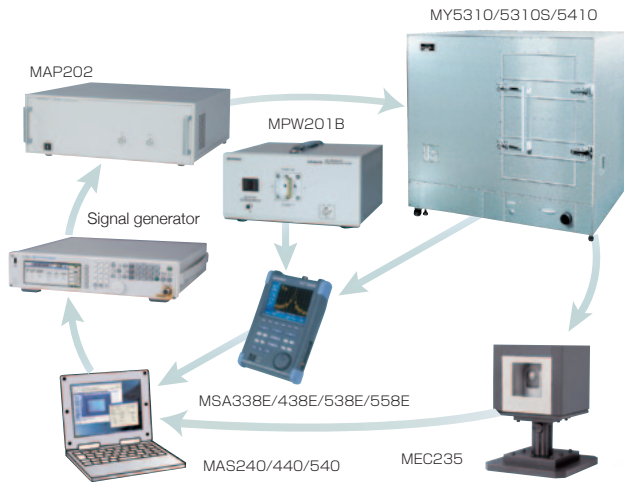
EUT camera monitor MEC235



Since the main body of camera is covered with the radio wave absorber and the pedestal is made of plastic, the unnecessary reflection by the camera is suppressed.

The camera can be zoomed up to 42 times, and the view range can be controlled within ±29° on the right and left, up to 23° upward and up to 35° downward. This control can be done with PC, and the image is displayed on the PC screen.

EMI+EMS test system MR2400



A system combining the EMI test system MR2300 and the EMS test system MR2350. PC software is MAS240/440/540. The price of MR2400 becomes much lower than purchasing MR2300 and MR2350 separately because the anechoic box and the broadband antenna are common to two systems.

In addition, three types of anechoic boxes MY5310/5310S/5410 are available according to the EUT.

Electric turntable (factory option) MT106

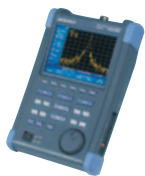


An electric turntable of 220mm in diameter and 15kg in load. This is controlled by the PC and can be installed only in the anechoic box MY5310/5310S.

Control software (option):

Manual control software MAS20T
Automatic control software MAS240T

Spectrum analyzer for EMI test MSA338E/438E/538E/558E



- Used in MR2300 system for the radiated emission test and the conducted emission test.
- Measures the conducted emission by using with LISN MPW201B and PC software MAS230/430/530.
- Measures the noise on PCB by connecting a magnetic field probe CP-2S.

Magnetic field probe CP-2S



Frequency range: 10MHz to 3GHz
A probe to measure the magnetic field strength of the noise on PCB. This is used connecting to spectrum analyzer or signal analyzer of MSA300/400/500 series. The measured value is calibrated in the instrument.

Electromagnetic anechoic box lineup

The following four types of anechoic boxes MY5310/5310S/5310SU/5410 are selectable according to the EUT.

MY5310



An anechoic box for a small EUT and of the lowest price.

The maximum size of EUT will be approx. 220mm cube.

Outside dimensions: 1340(W)×1210(H)×1030(D)mm

Inside dimensions: 1230(W)×920(H)×920(D)mm

Weight: approx. 460kg

Manual turntable: 220mmφ/load 10kg

Antenna: MAN101, fixed in an anechoic box

MY5310S/SU



A separation type of MY5310.

It is easy to carry it with a small elevator and to install in the narrow space because divided into two.

Outside dimensions: 1350(W)×1220(H)×1080(D)mm

Inside dimensions: 1230(W)×920(H)×920(D)mm

Weight: approx. 460kg

Manual turntable: 220mmφ/load 10kg

Antenna: MAN101, fixed in an anechoic box

MY5310SU is a type inserting a spacer unit of 610mm width between two parts of MY5310S divided.

MY5410



An anechoic box for large EUT and of the biggest size.

The maximum size of EUT will be approx. 756mm cube.

Outside dimensions: 2310(W)×1790(H)×1390(D)mm

Inside dimensions: 2140(W)×1450(H)×1220(D)mm

Weight: approx. 1000kg

Manual turntable: 756mmφ/load 100kg

Antenna: MAN102, movable up and down up to 90cm in 10cm step by hand.

Broadband antenna

MAN101/102



Compact, broadband and high power antenna.

Frequency range: 30MHz to 3GHz

Polarization: Linear

Ground plate size:

700(W)×900(D)mm @MAN101

800(W)×950(D)mm @MAN102

Loop antenna MAN120



A small antenna suitable for low frequency measurement. Optimum for the radiated emission measurement at low frequency.

Frequency range: 50kHz to 33MHz

Connector: N(P)

Impedance: 50Ω

Dimensions:

420φ(outside)×320φ(inside)×13mm(thickness)

Weight: 1.2kg

Biconical antenna MAN150



Broadband, compact and lightweight antenna.

Frequency range: 20MHz to 3GHz

Gain: -45 to +1dBi (nominal)

Antenna factor: 20 to 51dB/m

Dimensions: 350(L)×160(W)×140(D)mm

Weight: approx. 350g

Electromagnetic anechoic box/Shield box

Taurus series

MY1510/1510N

Small size



Outside dimensions: 380(W)×165(H)×380(D)mm
Inside dimensions: 315(W)×100(H)×315(D)mm
(N) Inside dimensions: 375(W)×160(H)×375(D)mm
Shielding effectiveness: 70dB typ @2.4GHz
(N) Shielding effectiveness: 60dB typ @2.4GHz
Reflection loss: ≥ 20 dB @ ≥ 2.4 GHz, urethane①
MY1510N has no absorber.
Connector: SMA(2 pcs) @back
I/F module: 1 module max @back
Weight: approx. 3.5kg @excluding I/F module
(N) Weight: approx. 1.9kg @excluding I/F module

MY1515

With ventilation fan



Outside dimensions: 465(W)×214(H)×465(D)mm
Inside dimensions: 400(W)×150(H)×400(D)mm
Shielding effectiveness: 70dB typ @2.4GHz
Reflection loss: ≥ 20 dB @ ≥ 2.4 GHz, urethane①
Connector: SMA(8 pcs) @back
I/F module: 1 module max @back
Fan: 0.56 cubic m/min(max flow rate) @back
Intake @left side
Weight: approx. 10kg @excluding I/F module

MY1520/1520N

Medium size



Outside dimensions: 520(W)×520(H)×520(D)mm
Inside dimensions: 460(W)×460(H)×460(D)mm
(N) Inside dimensions: 515(W)×515(H)×515(D)mm
Shielding effectiveness: 70dB typ @2.4GHz
(N) Shielding effectiveness: 60dB typ @2.4GHz
Reflection loss: ≥ 20 dB @ ≥ 2.4 GHz, urethane①
MY1520N has no absorber.
Connector: SMA(2 pcs) @back
I/F module: 2 modules max @back
Weight: approx. 15kg @excluding I/F module
(N) Weight: approx. 12.3kg @excluding I/F module
Option •Wooden table MT104

MY1525

With ventilation fan & 90dB shielding



Outside dimensions: 460(W)×570(H)×582(D)mm
Inside dimensions: 340(W)×340(H)×400(D)mm
Shielding effectiveness: 90dB typ @2.4GHz
Reflection loss: ≥ 20 dB @ ≥ 1.2 GHz, urethane②
Connector: SMA(2 pcs) @back
I/F module: 1 module max @floor
Dedicated I/F module (IFM10, IFM11)
Fan: 0.56 cubic m/min(max flow rate) @back
Intake @right side
Weight: approx. 17kg @excluding I/F module

MY1530/1530N

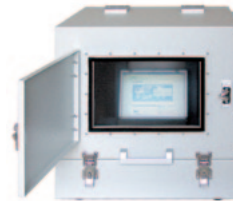
Large size



Outside dimensions: 1120(W)×705(H)×620(D)mm
Inside dimensions: 1000(W)×500(H)×500(D)mm
(N) Inside dimensions: 1115(W)×615(H)×615(D)mm
Shielding effectiveness: 70dB typ @2.4GHz
(N) Shielding effectiveness: 60dB typ @2.4GHz
Reflection loss: ≥ 20 dB @ ≥ 1.2 GHz, urethane②
MY1530N has no absorber.
Connector: SMA(4 pcs) @back(2 pcs) and both sides
I/F module: 4 modules max @back
Weight: approx. 56kg @excluding I/F module
(N) Weight: approx. 42kg @excluding I/F module
Option •Wooden table MT105

MY1520SW

With shield window for monitoring the inside



(Ex) Monitoring PC put inside

Outside dimensions: 520(W)×520(H)×520(D)mm
Inside dimensions: 460(W)×460(H)×460(D)mm
Shielding effectiveness: 70dB typ @2.4GHz
Reflection loss: ≥ 20 dB @ ≥ 2.4 GHz, urethane①
Connector: SMA(2 pcs) @back
I/F module: 2 modules max @back
Shield window: 300(W)×200(H)mm @front
Weight: approx. 15kg @excluding I/F module

Taurus series Option

I/F module IFM1 to IFM6



A module equipped with AC power supply, DC power supply, LAN, USB, SMA, BNC, N, Triaxial, D-sub connectors and Through pipe.
Six types of modules are available in the combination of these connectors.
Ex. IFM2: AC(1), LAN(2), USB(2), D-sub9pin(1)

Turntable unit MT103



Turntable unit for MY1530/1530N

〈Table specifications〉

Diameter: 200mmφ
Withstand load: 10kg
Material: Acrylic resin
Rotation angle: 360°

Small / Medium type

ME8662E



Outside dimensions: 360(W)×166(H)×340(D)mm
Inside dimensions: 293(W)×98.5(H)×273(D)mm
Shielding effectiveness: 60dB typ @2.4GHz
Reflection loss: Absorber urethane①
approx. -11dB @1GHz
approx. -18dB @2GHz
approx. -24dB @5GHz
approx. ≤-24dB @>5GHz
Connector: SMA(2pcs), D-sub9pin @back
Weight: approx. 7.5kg

ME8662N



Outside dimensions: 360(W)×166(H)×340(D)mm
Inside dimensions: 354(W)×129(H)×334(D)mm
Shielding effectiveness: 55dB typ @2.4GHz
Connector: SMA(2pcs), D-sub9pin @back
Weight: approx. 6.7kg

MY5220



Outside dimensions: 456(W)×416(H)×416(D)mm
Inside dimensions: 390(W)×340(H)×340(D)mm
Shielding effectiveness: 75dB typ @2.4GHz
Reflection loss: ≥20dB @≥2.4GHz, urethane①
Connector: SMA(3pcs) @back(2pcs)
and right side
Weight: approx. 25kg
Option: Connector box @back

ME8661A



Outside dimensions: 830(W)×608(H)×503(D)mm
Inside dimensions: 700(W)×380(H)×380(D)mm
Acrylic resin table: 200×200mm
Shielding effectiveness: 65dB typ @2.4GHz
Reflection loss: ≥20dB @≥1.2GHz, urethane②
Connector:
SMA(3pcs) @left side(2pcs) and right side
D-sub25pin @right side
Weight: approx. 38kg
Option: Manual turntable MT101

Large type

ME8661B



Outside dimensions: 1500(W)×1100(H)×900(D)mm
Inside dimensions: 1200(W)×600(H)×600(D)mm
Shielding effectiveness: 65dB typ @2.4GHz
Reflection loss: ≥20dB @≥600MHz, urethane③
Connector:
SMA(3pcs) @left side(2pcs) and right side
D-sub25pin @right side
Weight: approx. 230kg
Option: Manual turntable MT102

MY5310



Outside dimensions: 1340(W)×1210(H)×1030(D)mm
Inside dimensions: 1230(W)×920(H)×920(D)mm
Manual turntable: 220mmφ/load 10kg
Shielding effectiveness: 70dB typ @2.2GHz
Reflection loss: ≥20dB @35MHz to 2.2GHz, ferrite②
Connector:
N(J) (2pcs) @front and right side
D-sub25pin, LAN, Three pin power plug @front
Weight: approx. 460kg
Option: Antenna MAN101
Electric turntable MT106

MY5310S/5310SU



Outside dimensions: 1350(W)×1220(H)×1080(D)mm
※ 1960(W) @MY5310SU
Inside dimensions: 1230(W)×920(H)×920(D)mm
※ 1840(W) @MY5310SU
Manual turntable: 220mmφ/load 10kg
Shielding effectiveness: 70dB typ @2.2GHz
Reflection loss: ≥20dB @35MHz to 2.2GHz, ferrite②
Connector:
N(J) (2pcs) @front and right side
D-sub25pin, LAN, Three pin power plug @front
Weight: approx. 460kg @MY5310S
approx. 650kg @MY5310SU
Option: Antenna MAN101
Electric turntable MT106

MY5410



Outside dimensions: 2310(W)×1790(H)×1390(D)mm
Inside dimensions: 2140(W)×1450(H)×1220(D)mm
Manual turntable: 756mmφ/load 100kg
Shielding effectiveness: 55dB typ @2.2GHz
Reflection loss: ≥20dB @35MHz to 2.2GHz, ferrite②
Connector:
N(J) (2pcs) @both sides
LAN, Three pin power plug @front
Weight: approx. 1000kg
Option: Antenna MAN102

Electromagnetic anechoic box/Shield box

Special type

With automatic conveyer ME8668



Outside dimensions: 922(W)×731(H)×731(D)mm
 Inside dimensions: 790(W)×605(H)×605(D)mm
 Automatic conveyer
 Dimensions: 634(W)×436(H)×260(D)mm
 Test device: 110(W)×150(H)×150(D)mm
 Shielding effectiveness: 70dB typ @2.4GHz
 Reflection loss:
 $\geq 20\text{dB}$ @ $\geq 1.2\text{GHz}$, urethane②
 Connector: SMA(2pcs) @front and back
 Weight: approx. 94kg

For low frequency ME8669



Outside dimensions: 915(W)×580(H)×585(D)mm
 Inside dimensions: 810(W)×506(H)×506(D)mm
 Shielding effectiveness: 70dB typ @300MHz
 Reflection loss:
 $\geq 20\text{dB}$ @50 to 800MHz, ferrite①
 Connector: SMA(2pcs) @both sides
 D-sub25pin @right side
 Weight: approx. 205kg

For low frequency MY5305



Outside dimensions: 1150(W)×765(H)×635(D)mm
 Inside dimensions: 1000(W)×500(H)×500(D)mm
 Shielding effectiveness: 75dB typ @300MHz
 Reflection loss:
 $\geq 20\text{dB}$ @35MHz to 2.2GHz, ferrite②
 Connector: N(I) (2pcs) @front and right side
 D-sub25pin, LAN, Three pin power plug @front
 Weight: approx. 195kg

Option

Electric turntable

MT106



An electric turntable of 220mm in diameter and 15kg in load.

This is controlled by the PC and can be installed in anechoic box MY5310/5310S.

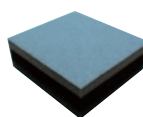
Control software:

Manual control software MAS20T

Automatic control software MAS240T

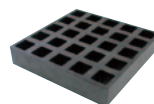
Radio wave absorber

■ Urethane foam ① to ③



Item	Urethane ①	Urethane ②	Urethane ③
Thickness	29mm	57mm	114mm
Reflection loss	10dB	1GHz	350MHz
	15dB	1.9GHz	700MHz
	20dB	2.5GHz	1.2GHz
	24dB	$\geq 5.6\text{GHz}$	$\geq 2.5\text{GHz}$

■ Ferrite ①



Item	Specifications
Thickness	19mm
Reflection loss	20dB @30MHz
	30dB @150MHz
	40dB @260MHz
	30dB @430MHz
	20dB @930MHz

■ Ferrite ②



Item	Specifications
Thickness	28mm
Reflection loss	17dB @30MHz
	$\geq 20\text{dB}$ @35MHz to 2.2GHz
	$\geq 10\text{dB}$ @2.2 to 2.7GHz

Antenna

■ Dipole antenna M301 to M307



The seven kinds of antennas cover the frequency band from 300MHz to 6.2GHz. Connector is SMA(P).

■ Spiral antenna M212/212R



A right circular polarization antenna with frequency band from 2 to 18GHz.

The reference antenna M212R is mounted on the acrylic resin stand, and is with an antenna gain & VSWR data and a semi-rigid cable.

■ Log periodic antenna M213/213R



A linear polarization antenna with frequency band from 750MHz to 2GHz.

The reference antenna M213R is with an antenna gain & VSWR data.

■ Biconical antenna MAN150



Broadband, compact and lightweight antenna.

Frequency range: 20MHz to 3GHz

Gain: -45 to +1dBi (nominal)

Antenna factor: 20 to 51dB/m

Dimensions: 350(L)×160(W)×140(D)mm

Variable attenuator

High-speed programmable attenuator MAT800



By reading out the attenuation data stored in the built-in memory of 128k words, it is possible to generate the arbitrary attenuation pattern. That is, the amplitude curve of a microwave signal can be generated freely. The readout speed is 2μs/word maximum, and the spike won't be generated at the moment of switching the attenuation.

The attenuation pattern is transferred to the program memory in the MAT800 after made using a standard accessory "Software for making attenuation program MAS800" on the PC.

Suitable for the air simulation of such wireless communication as a handover test of mobile communication equipment and a dynamic motion test of ETC/DSRC.

Five models are available for each frequency band.

model A 1.5 to 4.5GHz

model B 3 to 9GHz

model C 4.5 to 13.5GHz

model D 1.95 to 5.85GHz

model E 0.75 to 2.25GHz

Maximum attenuation 80dB

Minimum step of attenuation 0.05dB

High-speed programmable attenuator MAT810



A multifunctional programmable attenuator which can switch the attenuation of a microwave signal at high speed (2μs). The attenuation pattern is transferred to the program memory in the MAT810 after being made using a software of standard accessory on the PC. Suitable for the evaluation of communication quality of such wireless communication devices as mobile phone, WiMAX, PHS, ETC/DSRC and wireless LAN.

Frequency range 300MHz to 6.6GHz

Maximum attenuation 60dB

Minimum step of attenuation 0.05dB

Step attenuator MAT850



A compact and lightweight step attenuator in which the attenuation can be changed confirming the value by LED display. The chattering and spike won't be generated at the moment of switching the attenuation.

Suitable for the evaluation of communication quality of such wireless communication devices as mobile phone, WiMAX, PHS, ETC/DSRC and wireless LAN.

Frequency range 300MHz to 6.1GHz

Maximum attenuation 60dB

Minimum step of attenuation 0.1dB

Signal generator

Arbitrary & function synthesizer MFG206



- 1mHz to 20MHz/30Vp-p (output open)
- High accuracy and high stable frequency based on synthesized method
- Sine, triangle, square, arbitrary wave and DC
- Arbitrary wave: 10M words/s, 12bits and 128k words
 - ※ Software for making arbitrary waveform MAS206 is a standard accessory.
- Functions: Burst, Gate, Frequency sweep (linear, log) and VCF
- Interface: RS-232C
- Option: GP-IB board (MFG206-GP-IB)
 - GP-IB cable (MI200)
 - Coaxial cable (MC314)

Standard signal generator MSG700 series



※ Now under development.

- Lineup by 3 models of 3GHz, 6GHz and 9GHz
- With vector signal generation function (IQ modulation option is needed)
- Switching speed 100μs (ALC off)
- Large color LCD screen (5.7 inches)
- Low cost and high performance
- Suitable for development, production line and school in wireless communication field.

Item	MSG703	MSG706	MSG709
Frequency range	10MHz to 3GHz	10MHz to 6GHz	10MHz to 9GHz
SSB phase noise	≤ -95dBc @20kHz offset		
Output level	+10 to -70dBm @ALC on		
Sweep function	List sweep, Step sweep		
Modulation function	FSK(DC to 1MHz), PSK(0 to 360°)		
Interface	USB (device and host), LAN		
Option	<ul style="list-style-type: none"> • IQ modulation • High power output • Low power output • High stable time base • Software for making sweep waveform 		

ETC/DSRC inspection system

Automatic inspection system

RSU/OBE inspection system ME8500



ME8500 was developed for the production or inspection line of RSU and OBE of ETC. This allows to automatically do the wireless system test and the dynamic motion test. It is possible to perform a test of whole device or only RF circuit.

OBE inspection system ME8600



ME8600 is a low price automatic inspection system developed for ETC/OBE production line. It is possible of wireless system test, protocol test and dynamic motion test (option).

Option

- Receiving sensitivity test (option A)
- Burst BER measurement (option B)
- Communication test (R/W) (option C)
- Dynamic motion test (option E)

ASK+QPSK OBE inspection system ME9000



- Based on ARIB STD-T75 and ARIB TR-T16.
- Equipped with both ASK and QPSK modulations.
- Supports profile 9 to 12.
- Capable of protocol test, dynamic motion test and wireless system test.
- Capable of amplitude level calibration and self-check test of system.

ME9000 enables the low price system for reason why the necessary ones can be selected from among abundant test items.

DSRC OBE tester

ME9100



ME9100 is a tester to check the wireless communication of DSRC OBE installed on a car. After transmitting FCMC from ME9100, it is confirmed whether ACTC and WCNC are returned by OBE correctly. Since the power is automatically turned off after 7 seconds from test start, battery life becomes longer. The number of test times is about 500 times without exchanging the battery.

- Supporting ETC and ITS spot
- Supporting all 7 channels and all 4 profiles
- Complete one piece and handheld type without any connection cable
- Easy operation by one multi-direction switch

Technical standards conformity certification has been obtained. (Radio license is not required.)

DSRC communication unit

ME9115



Lineup by 4 models of A, C, A+C and CN.

It is possible to read WCN of OBE and to measure electric field strength of OBE and RSU.

- model A
Reads and displays WCN of OBE.
- model C
Measures electric field strength of OBE and RSU.
- model A+C
Is a compound equipment of model A and model C.
- model CN
Measures electric field strength of RSU such as "ITS spot" in a moving car, extending the function of model C.

WCN and electric field strength measurement data can be saved up to maximum 100 data respectively. Moreover, since this operates as a removable disk, the saved data can be transferred to the PC through USB interface.

ETC OBE tester

ME8800Dα



ME8800D on hand is upgraded.

The modulation factor of radio wave of ETC OBE has changed compared with the early stage. For this fact, some OBE needs the distance shorter than 1m in order to communicate with ME8800D which is an initial version of the tester.

So, ME8800D will be returned as ME8800Dα after revised to communicate securely at the distance of 1m.

ETC/ITS spot electric field strength measurement system

ME9200



ME9200 is a system that measures the electric field strength distribution of ETC or ITS spot and makes a graph and map of electric field strength.

- Actual wave or CW is measured in a short time.
- Capable of the measurement by cart type and on-board type.
- Capable of being equipped with maximum 17 antennas (9 pcs at standard).
- If the cart is equipped with 17 antennas at 20cm intervals, the lane width of 3.2m will be measured at one time.
- When some RSUs on the main lane are measured with the on-board type using the automatic mode, the measurement is automatically performed in accordance with the position within the measurement section and the measurement conditions that are registered in advance.

System for car production line

ETC inspection system in car production line ME8900



ME8900 is used in the production line of car manufacturer to confirm whether the built-in OBE operates correctly. This supports ETC (profile 9) only.

- System configuration
Tester part, Main frame, Lamp (green, red, yellow), Tester cable, Lamp cable and Start switch & cable (option)

RSU simulator

ASK+QPSK simulator ME9010



Equipped with both ASK and QPSK modulations.

ME9010 is based on ARIB STD-T75 and ARIB TR-T16. Moreover, this is RSU simulator equipped with ASK and QPSK modulations and supporting profile 9 to 12.

This is a necessary tool by all means to do Protocol test, Dynamic motion test and Wireless system test of ASK OBE, QPSK OBE or ASK+QPSK OBE.

PC software MAS960 is available for controlling ME9010 and external equipment (spectrum analyzer, high-speed programmable attenuator MAT800/B, microwave AM detector MMD850, digital oscilloscope and power meter), and displaying the test result.

ETC/DSRC related products

Programmable attenuator for dynamic motion test MAT800/B



The dynamic motion test described in ARIB TR-T16 <2-2-1> to <2-2-3> can be easily done with MAT800/B. The power pattern is created in the way of making arbitrary waveform on the PC using a standard accessory "Software for making attenuation program". And then this power pattern is transferred to the memory of MAT800/B.

The dynamic motion test is performed connecting such ETC/DSRC signal generator as RSU simulator to the input of MAT800/B and connecting antenna or OBE to the output.

Microwave AM detector MMD850



AM detection with 30dB dynamic range at 2 to 8GHz band.

By adding a microwave amplifier and linearizer, 30dB dynamic range is guaranteed for signal of more than -6dBm at peak level, and in addition, 10MHz bandwidth is guaranteed without being affected by the load.

Optimum for measuring opening eye ratio of ASK modulation and modulation factor.

Electromagnetic anechoic box ME8661A



Suitable for basic operation test, dynamic motion test and wireless system test of ETC/DSRC OBE by the space coupling. Various antennas, antenna movable mechanism and turntable are available as options.

Outside dimensions: 830(W)×608(H)×503(D)mm
Inside dimensions: 700(W)×380(H)×380(D)mm
Acrylic resin table: 200×200mm

Antenna

Patch antenna M211/211R



Frequency range: 5820±35MHz

M211 is a transmission & receiving antenna with right circular polarization used in the ETC/DSRC test.

The reference antenna M211R is with an antenna gain & VSWR data and is used when obtaining RF space coupling degree.

Spiral antenna M212/212R



A right circular polarization antenna with frequency band from 2 to 18GHz.

The reference antenna M212R is mounted on the acrylic resin stand, and is with an antenna gain & VSWR data and a semi-rigid cable.

Test accessories

Antenna

■ Dipole antenna M301 to 307/M401 to 407

M301 to 307



M401 to 407



Model	Freq. range
M301/401	0.8 to 1GHz
M302/402	1.25 to 1.65GHz
M303/403	1.7 to 2.2GHz
M304/404	2.25 to 2.65GHz
M305/405	300 to 500MHz
M306/406	4.8 to 6.2GHz
M307/407	470 to 770MHz

M300 series:SMA(P)
M400 series:N(P)

■ Patch antenna M211/211R



A right circular polarization antenna suitable for ETC/DSRC test.

Frequency range: 5820±35MHz

■ Spiral antenna M212/212R



A right circular polarization antenna with frequency band from 2 to 18GHz.

■ Log periodic antenna M213/213R



A linear polarization antenna with frequency band from 750MHz to 2GHz.

■ Loop antenna MAN120



A small and 40cmφ loop antenna suitable for low frequency measurement.
The noise measurement of the magnetic field radiation from LED lighting and the EMI measurement can be performed.

Frequency range: 50kHz to 33MHz

Connector: N(P)

Impedance: 50Ω

Dimensions: 420φ(outside)×320φ(inside)
×13mm(thickness)

Weight: 1.2kg

■ Biconical antenna MAN150



Broadband, compact and lightweight antenna.

Frequency range: 20MHz to 3GHz

Gain: -45 to +1dBi (nominal)

Antenna factor: 20 to 51dB/m

Dimensions: 350(L)×160(W)×140(D)mm

Weight: approx. 350g

Probe

■ Magnetic field probe CP-2S



Measures the magnetic field strength at pattern on PCB and terminals of device.

The probe is calibrated in the spectrum analyzer.

Frequency range: 10MHz to 3GHz

Space resolution: approx. 0.25mm
(depending on objects)

Applied models: MSA300/400/500 series

■ Wideband passive probe MP300



A passive probe with low input capacitance and wide frequency band.

Frequency range: DC to 6GHz

Attenuation ratio: 10:1, ±2%

Input resistance: 500Ω±2%

Input capacitance: 0.25pF(typ)

VSWR bridge

MVS300B



Enables to measure the return loss of electronic component and circuit.

Frequency range: 5 to 3000MHz

Directivity: more than 40dB @50 to 3000MHz
more than 25dB @5 to 50MHz

Insertion loss: less than 7dB @SOURCE-DUT
less than 8dB @DUT-REFLECTED

Interface cable

MI180



Model	Name	Length
MI180	RS-232C cable	1.5m
MI200	GP-IB cable	2m
MI400	USB cable	1m

Coaxial attenuator / Terminator

■ Coaxial attenuator MG-XXdB



Attenuation:

1 to 15dB (1dB step, excluding 11dB),
20dB and 30dB

Frequency range:

DC to 18GHz (DC to 8GHz @MG-30dB)

Impedance: 50Ω

Connector: SMA(P)/SMA(J)

■ Terminator MG-50S/-50N



50Ω terminator.

There are SMA(P) type (MG-50S) and N(P)
type (MG-50N).

Coaxial cable

Model	Connector	Length	Freq. range
MC102	SMA(P)/BNC(P)	1.5m	DC to 2GHz
MC201	SMA(P)/SMA(P)	0.5m	DC to 18.5GHz
MC202	SMA(P)/SMA(P)	3m	DC to 18.5GHz
MC203	SMA(P)/SMA(P)	4m	DC to 18.5GHz
MC204	SMA(P)/SMA(P)	1.5m	DC to 12.4GHz
MC301	SMA(P)/SMA(P)	0.5m	DC to 10GHz
MC302	SMA(P)/SMA(P)	1m	DC to 10GHz
MC303	SMA(P)/SMA(P)	1.5m	DC to 10GHz
MC304	SMA(P)/N(J)	0.2m	DC to 4GHz
MC305	SMA(P)/N(P)	0.2m	DC to 4GHz
MC306	SMA(P)/BNC(J)	0.2m	DC to 2GHz
MC307	SMA(P)/BNC(P)	0.2m	DC to 2GHz
MC308	N(P)/N(P)	0.5m	DC to 10GHz
MC309	N(P)/N(P)	1m	DC to 10GHz
MC310	N(P)/N(P)	1.5m	DC to 10GHz
MC311	N(P)/SMA(J)	0.2m	DC to 10GHz
MC312	N(P)/BNC(J)	0.2m	DC to 2GHz
MC313	N(P)/BNC(P)	0.2m	DC to 2GHz
MC314	BNC(P)/BNC(P)	1.5m	DC to 2GHz

Adapter

Model	Connector	Impedance	Freq. range
MA301	BNC(P)/BNC(J)	50Ω/75Ω	DC to 2GHz
MA302	BNC(P)/N(J)	75Ω/75Ω	DC to 1.8GHz
MA303	BNC(P)/N(P)	75Ω/75Ω	DC to 1.8GHz
MA304	BNC(P)/F(J)	75Ω/75Ω	DC to 1.8GHz
MA305	BNC(P)/F(P)	75Ω/75Ω	DC to 1.8GHz
MA306	N(P)/SMA(J)	50Ω/50Ω	DC to 12.4GHz
MA307	N(P)/BNC(J)	50Ω/50Ω	DC to 2GHz
MA308	N(P)/BNC(J)	50Ω/75Ω	DC to 2GHz
MA309	N(J)/BNC(P)	50Ω/50Ω	DC to 2GHz

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