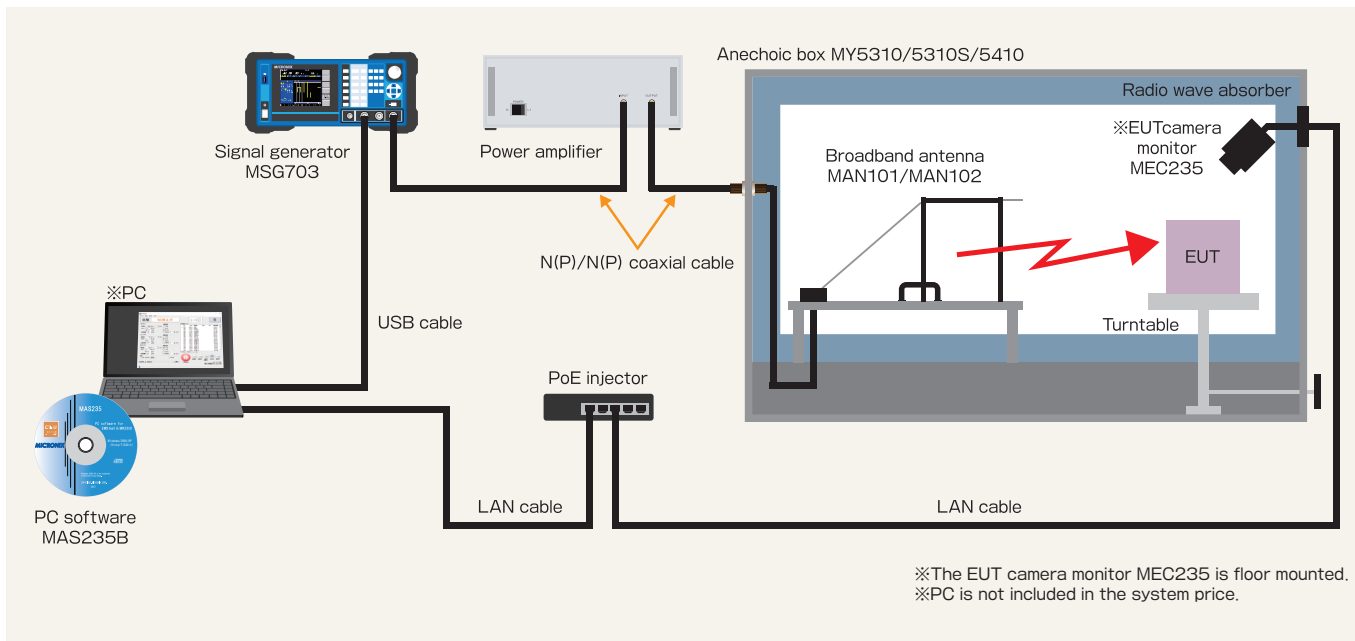
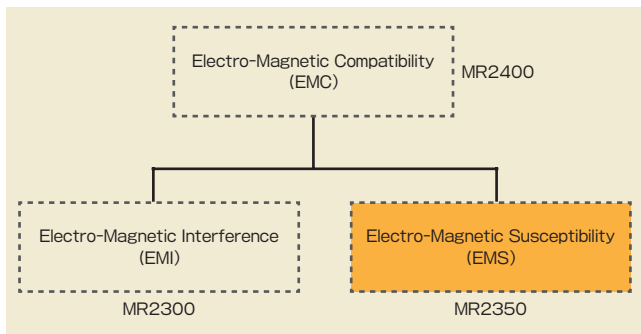


**Compact and easy-to-use EMS total test system  
-Precompliance-**





About EMS test



EMC test consists of EMI and EMS tests. As for EMI test, it is evaluated whether the radiated emission or the conducted emission discharged from EUT (Equipment Under Test) exceeds the limit value set beforehand. This limit value is used to guarantee that the EUT operation doesn't give a remarkable disturbance to operation of other equipment and wireless communication. The emission test described above can be done by the EMI test system MR2300. On the other hand, it is evaluated in the EMS test whether the EUT causes the malfunction by a peripheral electromagnetic wave. This radiation immunity test can be done with the precompliance EMS test system MR2350 described in this catalogue. The malfunction of the EUT can be observed on the PC screen through the EUT camera monitor put in the anechoic box. Of course, the EUT should be an equipment whose malfunction can be visually judged such as an equipment with LED or LCD.

**EMI+EMS test system MR2400**

The system combining the EMI test system MR2300 and the EMS test system MR2350 is the EMC test system MR2400. The PC software is MAS440/540.

The price of MR2400 becomes much lower than purchasing MR2300 and MR2350 separately because the anechoic box MY5310/5310S/5410 and the broadband antenna MAN101/102 are common to two systems.

Features of MR2350

**1 Electric field strength of 1, 3, 10V/m**

The electric field strength of 1, 3, 10V/m and moreover optionally 1 to 10V/m can be generated.

**2 Multifunction detection by EUT camera monitor**

The malfunction of the EUT by the electromagnetic radiation can be observed by a camera put in the anechoic box. The image is displayed on the PC screen.

**3 Compact and broadband antenna by our own development**

MAN101 is small antenna, 578(W) x 401(H) x 250(D) mm (not including the baseplate), and bandwidth is as broad as 30MHz to 1GHz, we have developed it by ourselves.

**4 EMI+EMS test by MR2400**

MR2400 combining the EMI test system MR2300 and the EMS test system MR2350 makes the EMC (EMI+EMS) test possible.

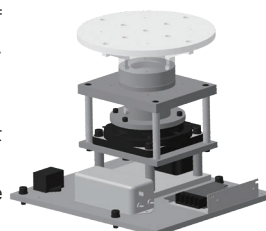
**5 Whole system controlled with one PC**

One PC controls all of applications such as the EMI test, the EMS test, the EUT camera monitor and the electric turntable (option).

**6 Electric turntable (factory option)**

This option is an electric turntable of 220mm in diameter and 15kg in load. And this is controlled by the PC.

※ This can be applied to the EMI test system MR2300 as well. MAS20T and MAS430T/530T are lined up as PC software.



## Power amplifier MAP202

MAP202 is a power amplifier of gain approximately 45dB and frequency range 80 to 1000MHz. The input damage level is +20dBm. MAP202 amplifies the signal from the signal generator MSG703 and then supplies it to the broadband antenna. In addition, MAP202 is applied only to the anechoic box MY5310/5310S.



## Signal generator MSG703

The AM signal modulated by CW (continuous wave) or sine wave is output. The modulation level is normally 80%, but it can be arbitrarily set in the range of 0 to 90%. The output level is programmed to compensate for the amplitude characteristics of the power amplifier MAP202 and wideband antenna MAN101, corresponding to a field strength of 1 to 10 V/m.



## Anechoic box MY5310/5310S/5410

The anechoic box is necessary not to leak the high power electromagnetic wave radiated by the antenna outside.

MY5310/5310S/5410 utilize ferrite tiles as radio wave absorbers, demonstrating absorption performance of over 20dB between 30MHz and 400MHz, and over 12dB between 400MHz and 1GHz. As a result, unnecessary reflections and resonances within the box are suppressed.

Additionally, it is equipped with a turntable with a diameter of 220mm and a load capacity of 10kg. The turntable can be rotated using an externally mounted rotary knob. It also features a rotation indicator, allowing precise setting of the rotation angle. Alternatively, an electric turntable is available as an option in place of this manual turntable. Furthermore, it is equipped with a power outlet, D-sub connector, LAN connector, and N-type coaxial connector.

MY5410 is an anechoic box for a large EUT and with the turntable of 756mm in diameter and 100kg in load. As for the broadband antenna, MAN102 is installed. Moreover, the antenna can be moved up and down in maximum 90cm width each 10cm by hand with the antenna trestle installed. The radio wave absorber is the same one as MY5310.



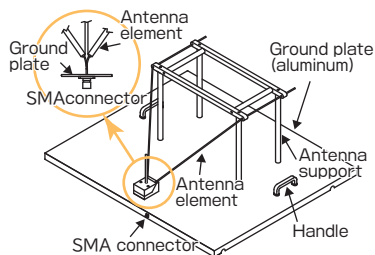
MY5310



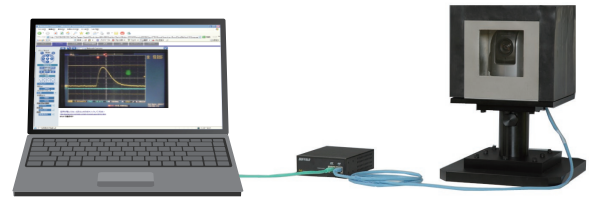
MY5410

## Broadband antenna MAN101/102

A transformational Y character monopole antenna (the original name by MICRONIX) with the frequency bandwidth 30MHz to 1GHz was developed by ourselves and greatly miniaturized. Furthermore, as for the distance of the antenna and the EUT, the transmission reference point of the antenna is the position of the signal pin of SMA connector where two antenna elements intersect.

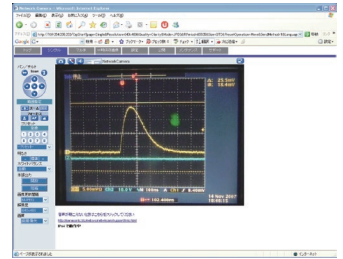


## EUT camera monitor MEC235



MEC235 is a camera to observe the malfunction of the EUT caused by the electromagnetic radiation. The EUT should be such an equipment as the malfunction can be visually judged. Because of being put in the anechoic box, the main body of camera is covered with the radio wave absorber (ferrite tile) and the pedestal is made of plastic. Therefore, the unnecessary reflection by the camera are suppressed. The camera can be zoomed up to 42 times, and the view range can be controlled within  $\pm 29^\circ$  on the right and left, up to  $23^\circ$  upward and up to  $35^\circ$  downward.

This control can be done with the PC, and the image is displayed on the PC screen. The right picture is an example of the digital oscilloscope screen taken with MEC235. In addition, the power source of the camera is supplied through LAN cable from the PoE injector.



## PC software MAS235B

### ① RF output status display

This displays the output status of the signal generator (SG). When the RF output of SG is on, [SG is outputting] is displayed, and when it is off, [SG is stopped] is displayed.

### ③ Test scenario

### ② Test condition setting

Set the conditions for creating test scenario data. It can be ② Test condition setting ④ Playback Control up to 3 band settings and modulation method.

The sweep frequency range is specified by the start frequency and stop frequency. The sweep step has a frequency step and a ratio step, the former sweeps at a specified frequency step (1kHz to 100MHz) at equal intervals, and the latter sweeps at a specified ratio (0.1 to 20%). For example, if the start frequency is 80 MHz in 10% steps, the sweep will be 80, 88, 96.8 MHz.... Specify the interval (0.1 to 20 seconds) from the start of RF output to the stop of each step in the emission time.

The electric field strength is basically set to either 1, 3 or 10 V/m, but it can be set arbitrarily within the range of 1 to 10 V/m for each band. Select the modulation method from CW or AM modulation.

### ③ Test scenario

The calculated test scenario is displayed from the set test conditions, power amplifier settings, and field strength calibration information.

### ④ Playback Control

You can start and pause the scenario, radiate at any position, stop the test, and move the playback position. By the way, there are two types of sweeps: single sweeps and repeated sweeps (repeats). Below the operation section, the total number of steps in the scenario and the number of steps at the playback position are displayed. It also shows the time remaining when the scenario is played to the end.



## Specifications

### System specifications

<b>Test frequency range</b>	80 to 1000MHz
<b>Electric field strength</b>	1, 3, 10V/m and option (1 to 10V/m, 1V/m resolution)
<b>AM modulation</b>	
<b>Waveform</b>	Sine wave
<b>Depth</b>	80% and option (0 to 90%, 1% resolution)
<b>ON/OFF</b>	Available
<b>Sweep mode</b>	
<b>Frequency generation</b>	Fix, Sweep
<b>Resolution @ Fix</b>	1kHz
<b>Step of sweep</b>	Frequency step : 1kHz to 100MHz, 1kHz resolution Ratio step : 0.1 to 20%, 0.1% resolution
<b>Step time</b>	0.1 to 20 sec, 0.1 sec resolution
<b>Sweep method</b>	Single, Repeat
<b>EUT malfunction detection</b>	By EUT camera monitor MEC235
<b>Anechoic box supported</b>	MY5310, MY5310S, MY5410
<b>Accessories</b>	·N(P)/N(P) 1.5m coaxial cable(1pc.) ·N(P)/N(P) 1m coaxial cable(1pc.) ·USB cable(1pc.) ·Operating manual(1pc.)

### Power amplifier MAP202 (Used with the exception of anechoic box MY5410)

<b>Frequency range</b>	80 to 1000MHz
<b>Gain</b>	46dB typ @ 80 to 600MHz 44.5dB typ @ 600 to 1000MHz
<b>1dB compression level</b>	42.5dBm typ @ 80 to 600MHz 41dBm typ @ 600 to 1000MHz
<b>Input VSWR</b>	Less than 2.0
<b>Output VSWR</b>	Less than 5.5
<b>Maximum input level</b>	+20dBm
<b>Modulation output</b>	50Ω
<b>Input/Output connectors</b>	N (J) @ INPUT, OUTPUT
<b>Power supply voltage</b>	100 to 240VAC, 50 to 60Hz
<b>Power consumption</b>	Approx. 80VA @ maximum output
<b>Dimensions</b>	430(W) × 150(H) × 440(D)mm (excluding projections)
<b>Weight</b>	Approx. 10kg

### Anechoic box MY5310/5310S/5410

Model	MY5310-F1	MY5310S-F1	MY5410-F1
Outside Dimensions (W × H × D)	1340×1210×1030mm	1350×1220×1080mm	2364×1902×1424mm
Inside Dimensions (W × H × D)	1280×960×960mm	1280×960×960mm	2215×1485×1275mm
Door opening dimensions (W × H)	410×710mm	510×920mm	940×1440(H)mm
Weight	400kg	400kg	1020kg
Turntable dimensions	φ220mm	φ220mm	φ756mm
Turntable load	10kg in load	10kg in load	100kg in load
Shielding Characteristics	70dB typ@2.2GHz		65dB typ@2.2GHz
Radio wave absorber	single-layer ferrite tile		
Reflection Loss	· more than 20dB @ 30MHz to 400MHz · more than 12dB @ 400MHz to 1GHz		
Coaxial connector	N(J) × 1 (Front left bottom for antenna) N(J) × 1 (Right side bottom)		N(J) × 2 (Left side bottom) N(J) × 1 (Front right bottom for antenna)
I/F	D-sub25pins × 1 (female) LAN × 1 AC × 1 (250Vmax/10A) ※ When electric-powered turntable is attached, AC100V		

※ Dimensions and weight are approximate. Excluding casters and projections

※ MICRONIX Corporation reserves the right to make change in design, specification and other information without prior notice.

### Broadband antenna MAN101/102

Model	MAN101	MAN102
Element	578(W) × 401(H) mm × 250(D)mm	628(W) × 401(H) mm × 250(D)mm
Ground plate	700(W) × 900(D)mm	800(W) × 950(D)mm
Weight	5.3kg (including ground plate)	6.0kg (including ground plate)
Frequency range	30MHz to 1GHz	
Polarization	Linear	
Impedance	50Ω (nominal)	
Antenna type	Transformational Y character monopole antenna (original name by us)	

※ Dimensions and weight are approximate.

### EUT camera monitor MEC235

<b>Image compression method</b>	JPEG, MPEG-4
<b>Resolution</b>	640×480, 320×240, 192×144ドット
<b>Zoom</b>	42times/12stages (21times @ optical, twice @ digital)
<b>Pan</b>	±29°
<b>Tilt</b>	23° @ upward, 35° @ downward
<b>Illuminance range</b>	2 to 100,000 lx 0.09 to 100,000 lx @ color night view
<b>Radio wave absorber</b>	Ferrite tile and absorption seat ※ Pedestal is made of plastic.
<b>Interface</b>	LAN(100BASE-TX/10BASE-T)
<b>Power supply</b>	Supplied from PoE injector
<b>Power consumption</b>	Approx. 5W @ waiting, approx. 9W @ pan scan
<b>Dimensions</b>	Camera part : 210(W) × 190(H) × 180(D)mm Pedestal : 230(W) × 200(D)mm Total height : 342mm
<b>Weight</b>	Approx. 5.7kg (including pedestal)
<b>Accessories</b>	·PoE injector and accessories (1 set) ·LAN cable (3 pcs.) ·Operating manual (1 pc.)

### RF SIGNAL GENERATOR MSG703

<b>Frequency range</b>	5MHz to 3GHz
<b>SSB phase noise</b>	<-95dBc/Hz @ 1 to 3GHz, 20kHz offset <-100dBc/Hz @ 5M to 1GHz, 20kHz offset
<b>Maximum output level</b>	<at ALC on> +14dBm @ 5MHz to <1.025GHz +13dBm @ 1.025 to <2.025GHz +11dBm @ 2.025 to <2.825GHz +10dBm @ 2.825 to 3GHz
<b>Kinds of sweep</b>	List sweep, Step sweep
<b>Kinds of modulation</b>	FSK modulation, PSK modulation, Amplitude modulation(AM)
<b>Interface</b>	USB device, USB host, LAN(1000BASE-T)
<b>Option</b>	·IQ modulator MIQ700 ·High stability timebase MSG700-03

### PC software (MAS235B)

<b>Recommended PC</b>	More than Core i5-440, Memory: more than 8GB, HD remainder capacity: more than 100MB, Communication: port USB
<b>Providing media</b>	CD-ROM
<b>OS</b>	Windows 8.1, 10(64bit)
<b>Web browser</b>	Since Internet Explorer 6.0(for MEC235)

### Others

<b>Operating temperature</b>	0 to 40°C (guaranteed at 23±10°C)
<b>Operating humidity</b>	Less than 40°C/80%RH (guaranteed at less than 33°C/70%RH)
<b>Storage temperature</b>	-20 to 60°C, less than 60°C/70%RH
<b>Options</b>	Electric turntable (factory option)