MICROWAVE TRAINER

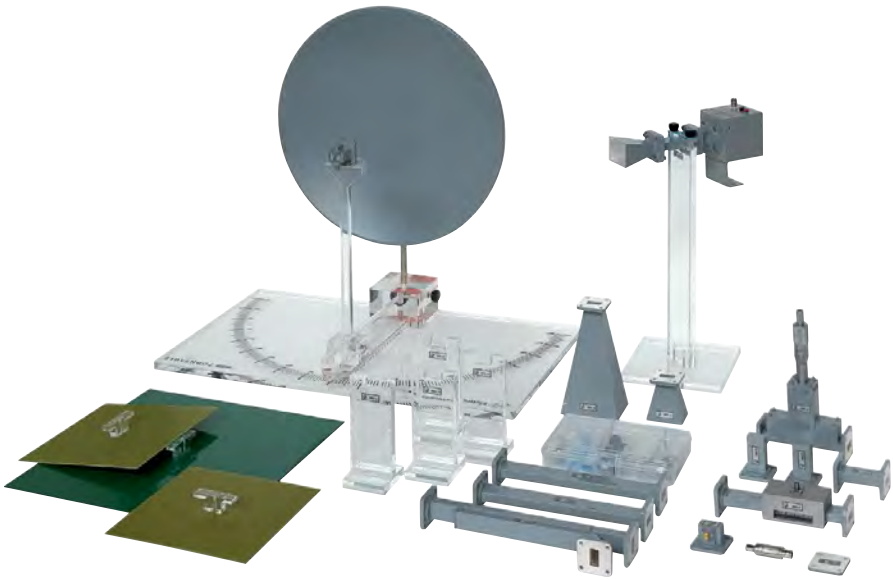
Mod. MW-E/EV

INTRODUCTION

This MICROWAVE TRAINER is designed to study and test lines and antennas used to broadcast information in microwave field.
In detail, it is possible to analyse and test the following major aspects related to microwaves and to their application in communication systems.

- Microwave generation with Gunn oscillator
- Waveguide Components and Antennas for microwaves
- Assembling and Measurements

This unit consists of a main Trainer and of a set of optional waveguide Components (WG).



TRAINING PROGRAM:

- General microwave theory
- Characteristics of:
  - Microwave components
  - Waveguide and flange
  - Horn antennas and parabolic reflector
  - Reflection and polarization system
- Gunn Diode oscillator
- Gunn transceiver: Gunn oscillator and Schottky diode
- Measurement of direct frequency **(with opt. Mod. MW-E1/EV)**
- Wavelength measurement: in free space and WG
- Measurement of direct and reflected power
- Attenuation measurement
- Power division and impedance mismatching measurement **(with opt. Mod MW-E2/EV)** SWR and impedance matching measurement.
- Use of Smith's chart for impedance calculation
- Impedance matching **(with opt. Mod MW-E3/EV)**
- Signals separation in a transceiver system and transmitter protection **(with opt. Mod MW-E4/EV)**
- Directional couplers and T-hybrid
- Microwave antennas: gain and irradiation diagram
- Measurement of antenna gain:
  - comparison method
  - method of the two antennas
- Link attenuation
- Passive repeaters (mirrors)
- Doppler Radar with different antennas: it is possible to observe the relationship between the object speed and the received doppler signal

TECHNICAL SPECIFICATION:

- Gunn oscillator Frequency: 10525 MHz (X band)
- Gunn oscillator output power: +7 dB
- Waveguide internal sheath: silver-coated
- 2 waveguides – coaxial adapter
- 3 straight waveguides (WG)
- 1 WG slotted line
- 1 WG variable attenuator of 30 dB
- 2 WG fixed attenuators of 3 dB and 6 dB
- 3 WG loading terminations:
  - 2 matched 1W and
  - 1 short-circuit
- 1 coaxial Detector:
  - Input: +20 dBm (max), 50 Ω, SMA, 10 – 12400 MHz
  - Output: BNC, negative polarity
- 1 WG directional coupler:
  - 3 ports, coupling 20 dB
- 3 WG horn antennas:
  - Gain of 10 dB (n.2) and of 15 dB (n.1)
- 1 parabolic antenna:
  - 0.36 m (diam.), 0.5 (f/D) and 29.5 dB (theoretical gain)
- 2 reflection planes:
  - dimensions: 180x180 mm and 300x300 mm
- 1 polarization plane:
  - dimensions. 180x180 mm
- 6 (high and low) supports and connection cables
- Rotary table with slider and graduated scale.

Power supply:	230 Vac 50 Hz single-phase - 20 VA (Other voltage and frequency under request)
Dimensions:	620 x 460 x 230 mm
Total weight:	25 Kg

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FREQUENCYMETER (optional) mod. MW-E1/EV

It is an optional waveguide (WG) component used for direct frequency measurements with the power absorption method.

- Calibration Report: 21-point Range.

T-MAGIC (optional) mod. MW-E2/EV

It is an optional waveguide (WG) component that can be used in six different situations.

- Four I/O ports.

TUNER / E-H IMPEDANCE MATCHING DEVICE (optional) mod. MW-E3/EV

This optional waveguide (WG) component can be used to improve the impedance matching of a transmission line or of a load not perfectly matched.

- Matching through 2 short-circuit stubs on E – H planes.

CIRCULATOR (optional) mod. MW-E4/EV

This optional waveguide (WG) component can be used to separate the signals in a Receiver-transmitter system or to protect the transmitter output.

- 3 ports: input, output and input/output.

SUPPLIED WITH

THEORETICAL-EXPERIMENTAL MANUAL

PRACTICAL EXERCISES: MEASUREMENT AND PARAMETERS VARIATION