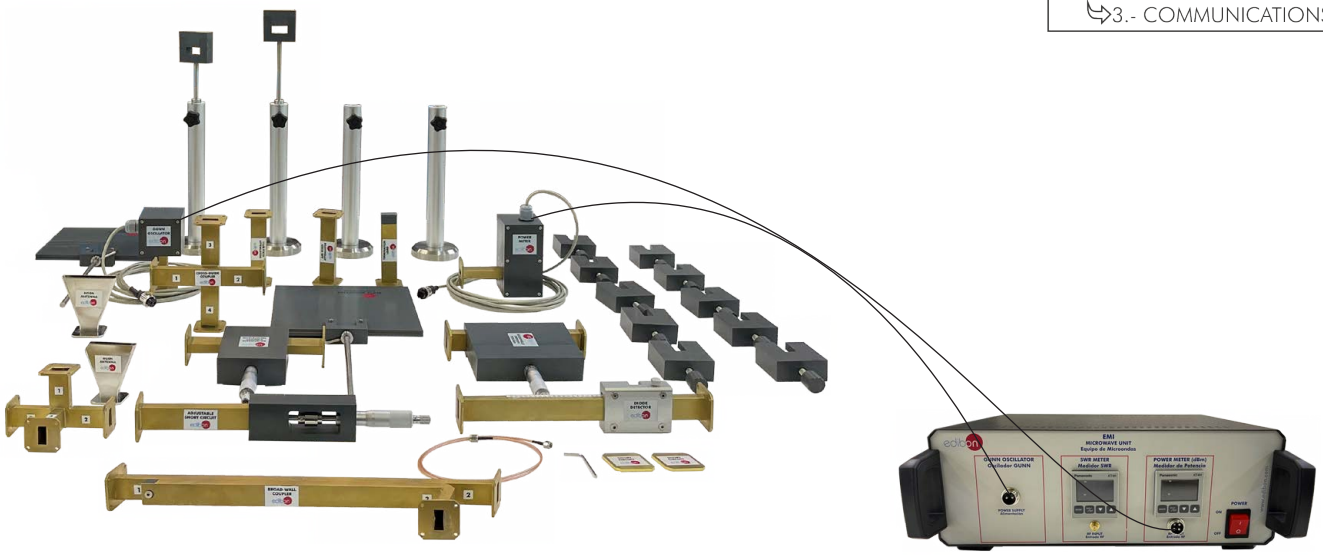
edibon

Engineering and Technical Teaching Equipment

Microwave Unit

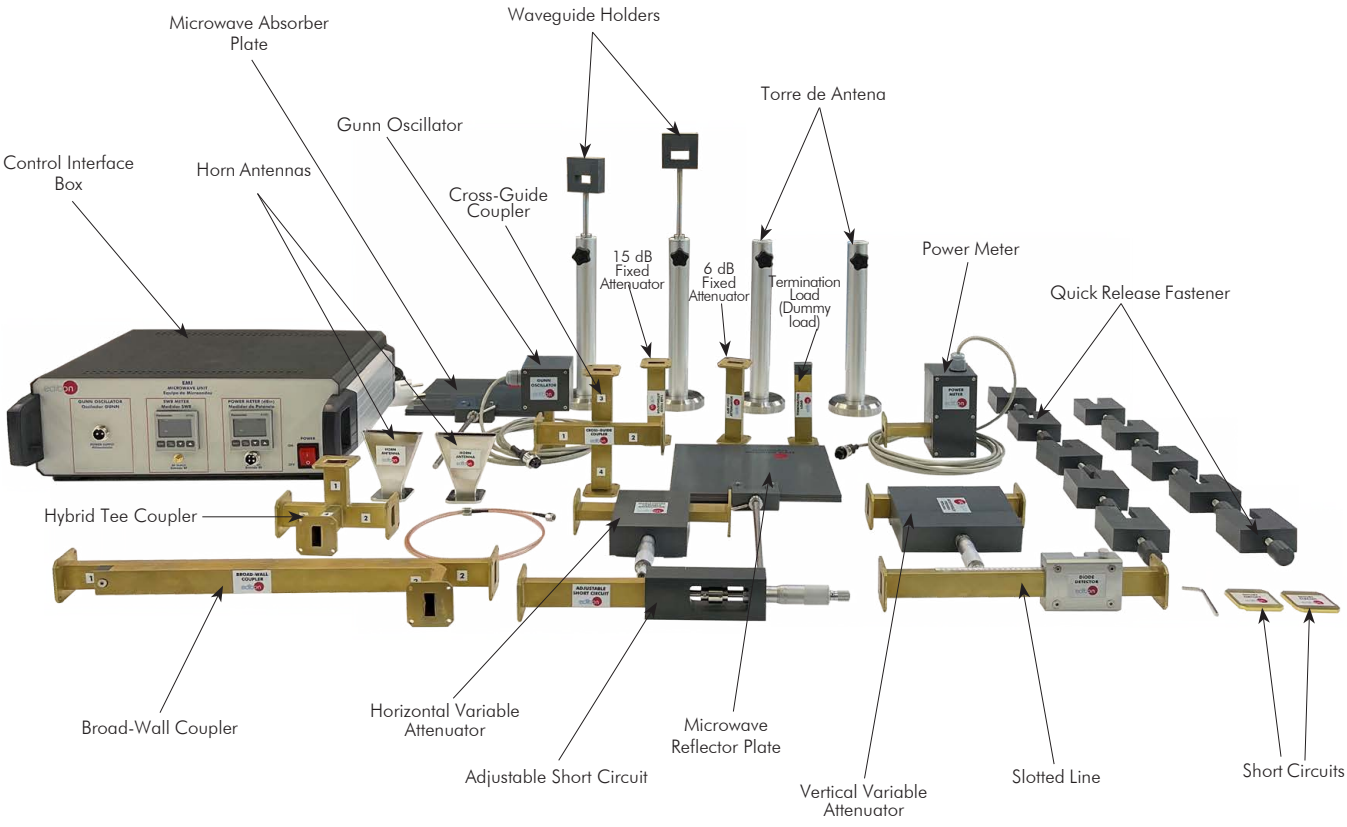
EMI

www.edibon.com
PRODUCTS
3.- COMMUNICATIONS



Electronic console

UNIT ELEMENTS ALLOCATION



LRQA CERTIFIED ISO 9001
Certificate of Approval of the Quality Management System

CE
European Union Certificate
(total safety)

UL CSA
UL and CSA Regulations
(All our products are manufactured according to current UL and CSA regulations)

LRQA CERTIFIED ISO 14001
Certificate of Approval of the Environmental Management System

WQC worlddidac
Worlddidac Association Certificate of Membership

INTRODUCTION

Nowadays the microwave systems are widely used in many branches of the communications technologies, in military and civilian applications, because microwaves links allow reliable and long range communications. With their small wavelength allows using smaller sized antennas than other system at lower radio frequencies, this is very important in systems where the space and weight are limited, like satellite system.

The waveguide devices are efficient systems that allow signal transmission with low losses and low noise added. The only losses of these systems are caused by the stationary waves formed by mismatched loads.

The Microwave Unit, "EMI", designed by EDIBON, allows to study different microwave waveguide configurations for introduce students the main concepts about microwave communications through waveguide and antennas systems.

The unit is provided with a set of practical exercises, through which the student will understand how to work with different devices of the unit in order to obtain a basic knowledge of the concepts behind the microwave communication system; stationary wave ratio (SWR) measurement in waveguide systems, attenuation, function of different waveguide components, aerial communication links, reflection and absorption of different materials, matched and mismatched load, operation with Smith chart, etc.

GENERAL DESCRIPTION

The Microwave Unit, "EMI", integrates a microwaves measuring test bench formed by microwaves generator, a kit of different standardized (WR-90) waveguides devices (horns antennas, attenuators, etc) and measure devices for complete the set of practices (power-meter, slotted line, etc).

This unit includes different components to conform many configurations of the microwave test bench, including an aerial microwaves link, hybrid Tees's configurations, determination of unknown impedance, etc, all of them are full explained in the set of practices.

The unit "EMI" allows the familiarization and experimentation with essential measurements in microwaves systems: power emission, attenuation, matched and mismatched loads, gain of a horn antenna, frequency, wavelength, stationary wave (SWR), impedance, operation with Smith chart, etc.

SPECIFICATIONS

The "EMI" unit basically consists of:

- Electronic console (in metallic box):
  - Gunn oscillator connector.
  - Power meter connector.
  - Power meter display.
  - SMA connector to slotted line.
  - SWR measurement display.
- Power meter:
  - Based on thermistor. Wide frequency range: 10 – 12000 MHz.
  - Level range: -55 dBm – 18 dBm. Stability over temperature. Slope: -25mV/dB.
  - Connector to electronic console.
- Slotted line:
  - Tunnel diode detector mounted. Frequency range: 2 – 18 Ghz. VSWR max: 3.5:1.
  - Maximum input power: 100 mW (20 dBm). Work in the quadratic detection zone.
  - Designed for 8.2 – 12.4 GHz (X-band). Longitudinal movable diode detector holder.
  - Millimeter ruler. Waveguide in the standard size WR-90.
  - SMA connector to electronic console.
- Gunn oscillator (microwave signal generator):
  - Gunn oscillator diode. Frequency band: X band (fixed at 10.525 Ghz).
  - Power output: 17 dBm. Waveguide in the standard size WR-90.
  - Connector to electronic console.
- Broad-wall waveguide directional coupler:
  - Designed for 8.2 – 12.4 GHz (X-band). Three ports (input, output and coupled).
  - Waveguide in the standard size WR-90.
- Cross-guide waveguide directional coupler:
  - Designed for 8.2 – 12.4 GHz (X-band). Four ports (input, output, isolated and coupled). Waveguide in the standard size WR-90.
- Hybrid Tee:
  - Designed for 8.2 – 12.4 GHz (X-band).
  - 3 dB coupler. Four ports (two co-linear, sum and difference). Waveguide in the standard size WR-90.
- 6 dB fixed attenuator:
  - Designed for 8.2 – 12.4 GHz (X-band). Fixed attenuator at 6 dB. Waveguide in the standard size WR-90.
- 15 dB fixed attenuator:
  - Designed for 8.2 – 12.4 GHz (X-band). Fixed attenuator at 15 dB. Waveguide in the standard size WR-90.
- Vertical variable attenuator:
  - Designed for 8.2 – 12.4 GHz (X-band). Precision micrometer. Waveguide in the standard size WR-90.
- Horizontal variable attenuator:
  - Designed for 8.2 – 12.4 GHz (X-band). Precision micrometer. Waveguide in the standard size WR-90.
- Termination load (dummy load):
  - Designed for 8.2 – 12.4 GHz (X-band). Adapted load. Waveguide in the standard size WR-90.
- Two short circuit terminations.
- Two horn antennas:
  - Designed for 8.2 – 12.4 GHz (X-band). Sectorial horn flared in the direction of the electric plane (H-plane).
  - Waveguide in the standard size WR-90.
- Adjustable termination:
  - Designed for 8.2 – 12.4 GHz (X-band). Movable short circuit. Precision micrometer. Waveguide in the standard size WR-90.
- Microwave absorber plate: plate with resistive material.
- Microwave reflector plate: plate with metallic material.
- Four tower antennas with adjustable height, including each one: waveguide holder and degree disc with position indicator.
- Ten quick release fasteners for an easy operation with the waveguide devices.

Cables and accessories, for normal operation.

Manuals:

This unit is supplied with the following manuals: Required services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices manuals.

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Familiarization with the microwave unit.
2.- Power emission measurement.
3.- Study of different fixed attenuators and variable attenuators.
4.- Calibration of variable attenuators.
5.- Wavelength, frequency and SWR measurement with the waveguide slotted line.
6.- Basic principles of Smith chart.
7.- Calculation of impedance, admittance and reflection coefficient, with the Smith chart.
8.- Calculation of impedance, admittance and reflection coefficient for different terminations, with the Smith chart.
9.- Comparison between matched and mismatched loads.
10.- Study of the broad-wall waveguide directional coupler.
11.- Study of the cross-guide waveguide directional coupler.
12.- Study of the hybrid T.
13.- Measure of power emission in free space.
14.- Measure of wavelength, frequency and SWR measurement in free space.
15.- Radiation pattern of a horn antenna.
16.- Study of gain and directivity of a horn antenna (dBi).
17.- Reflectance and absorbance of metallic and resistive plates.

REQUIRED SERVICES

- Electrical supply: single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz.

DIMENSIONS AND WEIGHTS

EMI:
Unit:
- Dimensions: 800 x 600 x 450 mm approx.
(31.49 x 23.62 x 17.72 inches approx.)
- Weight: 20 Kg approx.
(44 pounds approx.)

Electronic console:
- Dimensions: 310 x 220 x 180 mm approx.
(12.20 x 8.26 x 7.08 inches approx.)
- Weight: 3 Kg approx.
(6.61 pounds approx.)

SIMILAR UNITS AVAILABLE

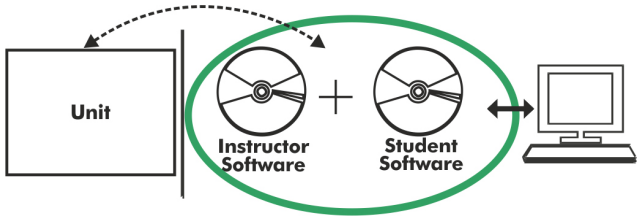
Offered in this catalog:

- EMI. Microwave Unit.

Offered in other catalog:

- EMIC. Computer Controlled Microwave Unit.

EMI/ICAI. Interactive Computer Aided Instruction Software:



With no physical connection between unit and computer, **this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF)**. Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

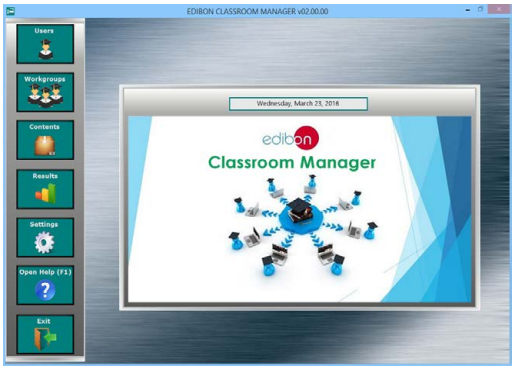
Instructor Software

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).

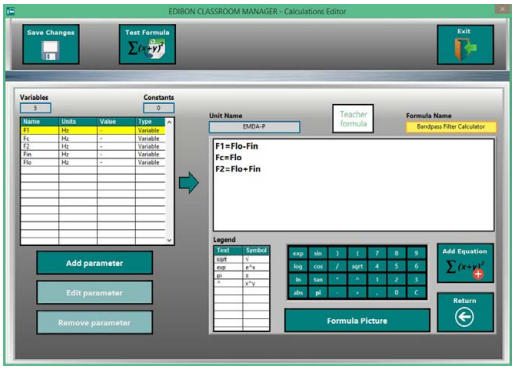
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

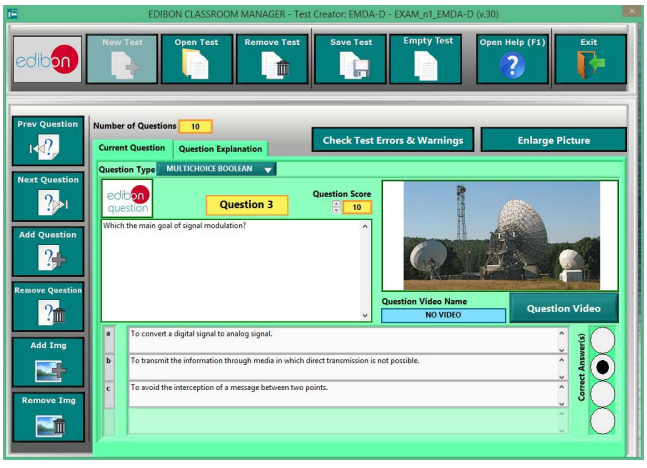
- **User Data Base Management.**
- **Administration and assignment of Workgroup, Task and Training sessions.**
- **Creation and Integration of Practical Exercises and Multimedia Resources.**
- **Custom Design of Evaluation Methods.**
- **Creation and assignment of Formulas & Equations.**
- **Equation System Solver Engine.**
- **Updatable Contents.**
- **Report generation, User Progression Monitoring and Statistics.**



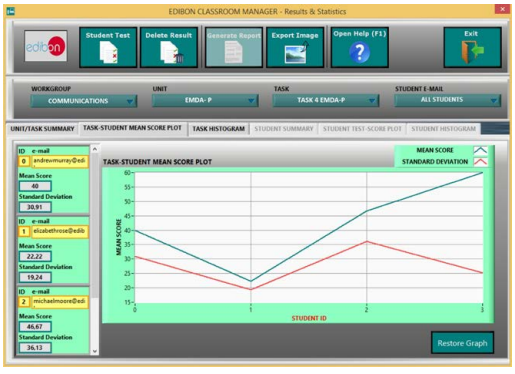
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question



ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

Optional

Student Software

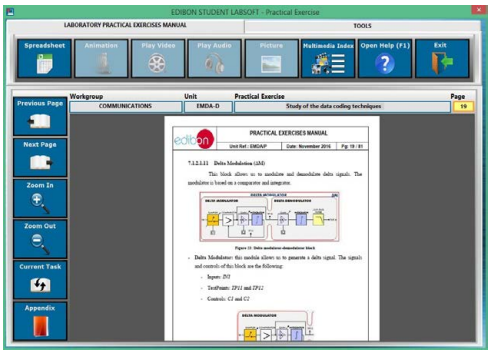
- ESL-SOF. EDIBON Student Labsoft (Student Software).

ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

- **Student Log-In & Self-Registration.**
- **Existing Tasks checking & Monitoring.**
- **Default contents & scheduled tasks available to be used from the first session.**
- **Practical Exercises accomplishment by following the Manual provided by EDIBON.**
- **Evaluation Methods to prove your knowledge and progression.**
- **Test self-correction.**
- **Calculations computing and plotting.**
- **Equation System Solver Engine.**
- **User Monitoring Learning & Printable Reports.**
- **Multimedia-Supported auxiliary resources.**

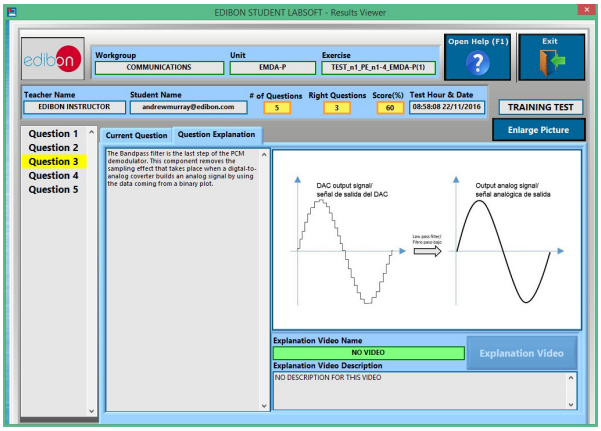
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



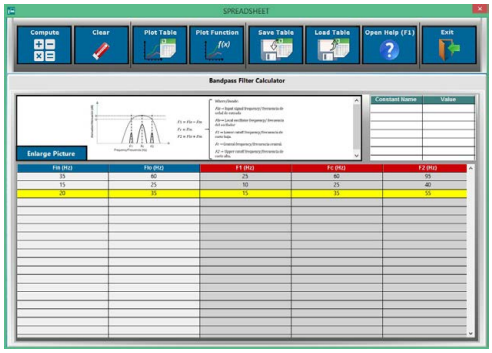
EPE. EDIBON Practical Exercise Program Package Main Screen

For more information see **ICAI** catalogue. Click on the following link:

www.edibon.com/en/interactive-computer-aided-instruction-software



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

✱ Specifications subject to change without previous notice, due to the convenience of improvement of the product.

C/ Julio Cervera, 10. Móstoles Tecnológico.
28935 MÓSTOLES. (Madrid). ESPAÑA - SPAIN.
Tel.: 34-91-6199363 Fax: 34-91-6198647
E-mail: edibon@edibon.com Web: **www.edibon.com**

Edition: ED01/23
Date: October/2023

REPRESENTATIVE: