

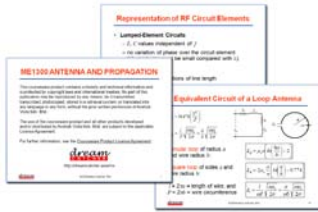
# ME1300

## Antenna and Propagation Courseware



### Teaching slides

- Editable Microsoft® PowerPoint® slides
- Covers 45 hours of teaching



### Training kit

- Antenna transmitter and receiver modules
- Radiation Pattern Plotting (RadPat) software
- Lab sheets & model answers
- Problem-based assignments
- Covers 24 hours of labs



### Instrument

- Vector network analyzer



Target university subject	Target year of study	Prerequisite(s)
Antenna and Propagation	3rd or final year undergraduate	Electromagnetic Theory

The ME1300 serves as a ready-to-teach package in the areas of antenna fundamentals, practical antenna design, and antenna measurement techniques. It consists of teaching slides, a training kit, and an instrument (to be purchased separately).

### Designed to impart knowledge in

- Antenna fundamentals
- Antenna parameters
- Antenna impedance matching techniques
- Practical antenna design
- Antenna measurement techniques
- Software tools usage
- Measurement instruments usage

### Benefits of the ME1300 courseware

- Lab sheets are specially designed to enable students to perform  $S_{11}$  and  $S_{21}$  antenna measurements using an industry-grade vector network analyzer.
- The rotating receiver module has a built-in RF detector, allowing you to perform antenna measurements with an existing RF signal generator.
- By using the recommended instrument, the Windows-based antenna radiation pattern plotting software can perform fully automated antenna measurements with selectable resolution (1 to 30 degrees per step).
- Examples of antenna design and measurement techniques are included in the teaching slides and lab sheets, enhancing the understanding of practical antenna design for industrial applications.



## Teaching Slides

More than 500 editable Microsoft PowerPoint teaching slides, covering 45 hours of teaching for one full semester is provided. The slides cover the following topics:

- Introduction to Antennas
- Antenna Parameters
- Impedance Matching Techniques
- Antenna Measurements
- Wire Antenna Design
- Broadband Antenna Design
- Yagi-Uda Antenna Design
- Microstrip Patch Antenna Design
- Introduction to Wi-Fi, Bluetooth, and ZigBee
- WLAN Antennas
- Smart Antennas
- Antennas for Wireless Communications
- Introduction to Portable Device Antennas



## Training Kit

The training kit consists of the transmitter module and the receiver module. The Radiation Pattern Plotting (RadPat) software is also included with the training kit.



### Transmitter Module

- Frequency range: 2 MHz to 4 GHz
- Maximum output power to antenna port: 3 mW
- Output impedance: 50  $\Omega$

Note: This module requires an external signal source. Specifications above are based on the recommended instrument (Agilent N9912A FieldFox RF Analyzer).

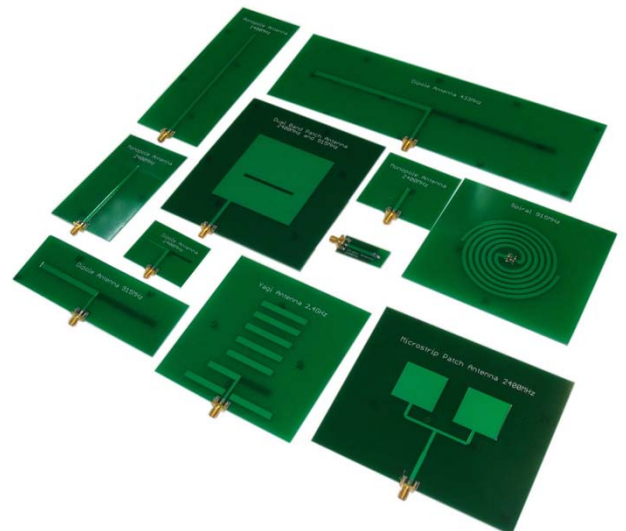
### Receiver Module

- Frequency range:
  - 50 MHz to 3 GHz (with built-in RF detector)
  - 2 MHz to 4 GHz (with N9912A FieldFox RF Analyzer)
- RF input level:
  - 60 dBm to 0 dBm (with built-in RF detector)
  - 125 dBm to 27 dBm (with N9912A FieldFox RF Analyzer)
- Input impedance: 50  $\Omega$
- PC-based controlled rotator (0 to 359 degrees)
- Variable step size: 1 to 30 degrees/step

## Accessories

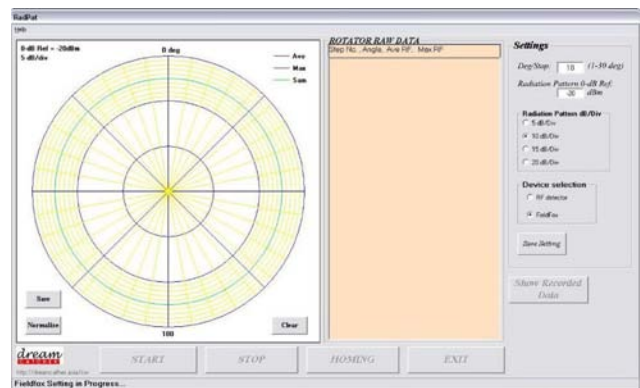
The following accessories are provided with the training kit.

Item	Quantity
Power adapter, 5 Vdc, 2 A	1
RF coaxial cable, 1 m	2
RF coaxial cable, 0.18 m	1
SMA(m)-to-SMA(m) adapter, straight	2
SMA(f)-to-SMA(m) adapter, right-angle	2
N(m)-to-SMA(f) adapter	2
Type A-to-Type B USB cable, 1.5 m	1
LAN cable, 1 m	1
Antenna set:	1
434 MHz: Dipole and monopole antennas	
915 MHz: Dipole, monopole, and spiral antennas	
2.4 GHz: Dipole, monopole, microstrip patch, ceramic, and Yagi-Uda antennas	
915 MHz & 2.4 GHz dual-band antenna	



## Radiation Pattern Plotting (RadPat) software

The RadPat software is a Windows-based software that is included with the training kit. It enables you to perform radiation pattern plotting with just a click. This software currently works with the Agilent N9912A FieldFox RF Analyzer.



## Lab sheets

The training kit includes 8 lab sheets in editable Microsoft Word format. Each lab requires 3 hours to complete. Model answers are provided with all lab sheets. The required training kit hardware and instruments for the labs are listed below.

Lab Sheet	Hardware Training Kit		Required Instrument
	Transmitter Module	Receiver Module	Vector Network Analyzer
Familiarizing with the ME1300	√	√	√
Antenna Impedance Measurement	√	√	√
Radiation Pattern Measurement	√	√	√
Antenna Gain Measurement	√	√	√
Polarization Measurement	√	√	√
Free Space Propagation	√	√	√
Comparison of Antenna's Characteristics	√	√	√
Scale Model Measurement	√	√	√

## Problem-based assignments

The problem-based assignments below allow students to enhance their problem-solving skills.

- Wire Antenna Design
- Microstrip Patch Antenna Design



## Instruments

The recommended instrument from Agilent Technologies, to be purchased separately, is listed below.

Instrument	Model <sup>[1]</sup>
Vector Network Analyzer	N9912A FieldFox RF Analyzer, 4 GHz [with option 104, 110, 303]

[1] The instrument may be replaced by a vector network analyzer with equivalent or better performance.

# Training Kit Hardware Specifications

	Min	Typical	Max
<b>Receiver Module</b>			
RF input power at 900 MHz <sup>[1]</sup>	-60 dBm		0 dBm
RF input power at 2.4 GHz <sup>[1]</sup>	-60 dBm		-5 dBm
<b>Antenna Rotator</b>			
Input voltage	4.5 V	5 V	5.5 V
Input current	0.5 A	0.75 A	1.0 A
Step size (degree/step)	1	10	30
Angular coverage (degree)	0 deg		359 deg

[1] This specification is for the built-in RF detector.

## Ordering Information

Description	Package	Product Number
Teaching Slides	1 user license	ME1300-100
Training Kit	1 set	ME1300-200
Teaching Slides + Training Kit	1 user license + 1 set	ME1300-300
Instrument	where applicable	Purchase separately from Agilent or its distributor

Training courses related to subject matter are available on request. Visit [dreamcatcher.asia](http://dreamcatcher.asia) for details.

For more information or enquiries:

Website: [dreamcatcher.asia/cw](http://dreamcatcher.asia/cw)  
E-mail: [cw.enquiry@dreamcatcher.asia](mailto:cw.enquiry@dreamcatcher.asia)

Acehub Vista Sdn Bhd (785702-P)  
*A member of the DreamCatcher group*  
10, Persiaran Mahsuri 1/2  
Sunway Tunas, 11900 Bayan Lepas  
Malaysia

© 2009 Acehub Vista Sdn Bhd

We reserve the right to change or alter the information in this material without prior notice. The information provided in this material is accurate as of the print date.

Microsoft and Windows are trademarks of Microsoft Corporation in the United States and/or other countries. All other copyrights and trademarks belong to their respective owners.

Printed on 13 November 2009

*dream*  
CATCHER