

## A group of Mobile Communication Trainers YMT-3000 / YLTE-1000

These equipments provide instructions on basic concepts of mobile communication to students who study for mobile communication, information technology and electronics.

LTE Cellular Mobile  
Communication



YLTE-1000

Equipments for experiment  
on mobile communication



YMT-3000

# **MOBILE** Telecom Trainer **Model: YMT-3000**

An experimental equipment to educate basic concept of the Full Duplex wireless system and Mobile telecommunication.



[November 23, 2010]

# MOBILE Telecom Trainer

## Model: YMT-3000

### YMT-3000 Features

- Full Duplex Voice & Data Communication
- Half Duplex Voice & Data Communication
- Practice of RF interference & mobile environment
- Chatting by using Computer.
- Board level and full system level experiment is available using one set
- Auto Mode and Manual mode can be selectable
- Built-in Software equal to the Commercial Products.
- Operating like as Commercial Mobile Products in Auto Mode.
- 16 x 2 Character LCD.
- LED Indicator.
- Over Charge Protection.



YMT-3000-B Base Set



YMT-3000-M Mobile Set



### YMT-3000 Experiment Steps

- 1) Board Unit Module Experiment : Power, Audio, Control, Radio Frequency
- 2) Half Duplex Audio and Data Experiment : Half Duplex Transmitting and Receiving Experiment
- 3) Full Duplex Audio and Data Experiment : Full Duplex Communication Experiment
- 4) Mobile Environmental Experiment : RF Interference Experiment Among Systems
- 5) Data Communication : Chatting Practice by Serial Communication.

# MOBILE Telecom Trainer

Model: YMT-3000

## YMT-3000 Training Contents

### Part 1. Introduction of Products

- Experiment 1. Full Duplex Mobile Telecommunications Lab Equipment
- Experiment 2. Power Part

### Part 2. Audio Frequency Part

- Experiment 3. Condenser Mike and Limiter
- Experiment 4. Compressor
- Experiment 5. Pre-emphasis and De-emphasis
- Experiment 6. Expander
- Experiment 7. Band-Pass Filter and Squelch Circuit

### Part 3. Radio Frequency Part

- Experiment 8. PLL Oscillator I
- Experiment 9. PLL Oscillator II
- Experiment 10. Transmitting Part
- Experiment 11. Receiving Part

### Part 4. Control Part

- Experiment 12. Microcomputer and Key Matrix Control Peripheral Circuits

### Part 5. Full Duplex Communication

- Experiment 13. Half-Duplex Transmitting Integration Experiment
- Experiment 14. Half-Duplex Receiving Integration Experiment
- Experiment 15. Full-Duplex Integration Experiment
- Experiment 16. Radio Environment Experiment
- Experiment 17. Chatting by using Serial communication



## YMT-3000 Components

- |                |      |                              |      |
|----------------|------|------------------------------|------|
| • Mobile set   | 1 EA | • Base set                   | 1 EA |
| • Carriage Bag | 1 EA | • Textbook                   | 1 EA |
| • Handset      | 2 EA | • Program CD(Multi-media CD) | 1 EA |
| • Adaptor      | 2 EA | • RS-232C Cable              | 2 EA |

## YMT-3000 Specifications

Items	Specifications
RF	Communication Method Full Duplex / Half Duplex
	Channel Access Multi Channel Access
	Frequency Range Base 46.51 ~ 46.97 [MHz]
	Remote 49.67 ~ 49.99 [MHz]
	Output Power +4.5 [dBm] Max
	Channels 15 Duplex Channels
	Bandwidth / Channel 25 [kHz]
	Modulation FM
	Frequency Stability ± 5 [ppm]
	Receiving Sensitivity Over 20 [dB] SINAD (at -100 [dBm])
	Auto Channel Scan Time 200 [ms]
	Data rate 2,400 bps



# MobileTelecom Board Level Kit

Model:  
YMT-1500

## YMT-1000 Features

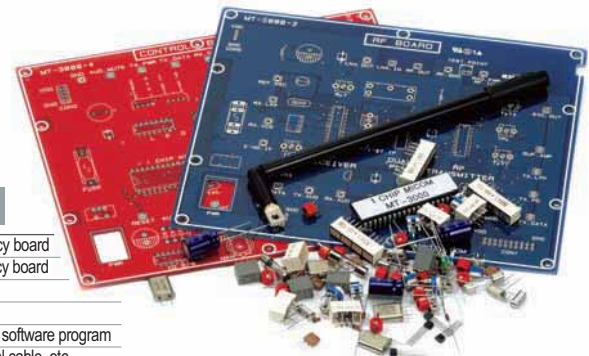
- Allowing students to train themselves about board manufacturing.
- Learning about parts and product through actual manufacturing.
- Capable of operation measurement for each circuit.
- Providing PCB designed with patterns.
- Capable of Full Duplex voice conversation training.
- Capable of Half Duplex voice conversation training.
- Capable of Detailed Module Training at Single Board Level.
- Training in full set experiment with four boards combined.

## Kit Components

- 1) Parts for Radio Frequency board
- 2) Parts for Audio Frequency board
- 3) Parts for Power board
- 4) Parts for Control board
- 5) Microcomputer including software program
- 6) Handset, adaptor, coaxial cable, etc.
- 7) Operation Manual
- 8) Textbook

## List of Training Contents and Specifications

Same as YMT-3000 model.



# LTE Cellular Mobile Communication

## Model: YLTE-1000

YLTE-1000 is education engineering tool for measurement and optimization of the LTE mobile communication network utilizing Android OS-based smartphones

### YLTE - 1000 Features

- YLTE - 1000 supports mobile voice and data technologies, including GSM, UMTS, CDMA, EVDO, LTE, VoLTE, LTE - A and WiFi.
- Portable and easy - to - use
- No need of additional equipment
- Application Software Installed on Android OS smartphone and Tablet computer
- No need of additional equipment
- Portable and easy - to - use
- Various Call Test (Voice call, FTP, PING, HTTP etc.)
- Real - time output on Google Map

### YLTE - 1000 Functions

- Voice call, FTP, Ping, HTTP etc Test
- The status of mobile device
- Throughput by each Layer
- Common Air Interface Message
- LTE Active cell & Neighbor list
- The changes of RF Signal which phone Antennas(0,1) receive
- Output the state of RF Signal in numeric form



### YLTE - 1000 Specification

LTE App	Android OS based (ver. 4.0.4) Qualcomm chip
	The status of mobile device
	Test progress display
	Auto call test Type ( Voice , FTP - up/download)
	DATA function/Throughput by each Layer
	Graphic and numeric displays the throughput in real - time
	CAI ( Common Air Interface ) Message between eNodeB & UE
	PCI ( Physical Cell Identifier ) function
	SIGNAL function
	Output the state of RF Signal in graphic form
	PARAM ( Parameter ) function
	LTE network information, EMM Status, ESM Status
	SERVING function



### Contents of YLTE - 1000 Textbook

- PART 1. YLTE - 1000 introduction  
 Chapter 1 LTE - 1000 introduction  
 Chapter 2 LTE - 1000 installing the software
- PART 2. LTE call processing  
 Chapter 3 Basis of the mobile communication  
 Chapter 4 Experiment for debug screen environment  
 Chapter 5 YLTE - 1000 operating system Demo  
 Chapter 6 System acquisition  
 Chapter 7 System access  
 Chapter 8 Call processing  
 Chapter 9 Location Registration
- PART 3. LTE - Performance Test  
 Chapter 10 Power control  
 Chapter 11 High - Speed Downlink Packet Access  
 Chapter 12 Handoff  
 Chapter 13 Idle mode  
 Chapter 14 Block error rate  
 Chapter 15 File Transfer Protocol

### YLTE - 1000 Components

LET Educational Software	1copy
Android OS LTE smartphone	1
LTE prepayment USIM card	1
CABLE SET	1set
Computer (Option), Monitor (Option)	1
textbook	1book