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MX847015A Energy Management Test Simulator
MX847015A-01 Parallel Phone Test Software for ETS

MD8470A
Signalling Tester

MD8470A Signalling Tester

MX847015A Energy Management Test Simulator
MX847015A-01 Parallel Phone Test Software for ETS

Product Introduction

Evaluating Mobile Terminal Battery Life at Continuous Standby and Talk

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Background

- Mobile phones are evolving rapidly into increasingly sophisticated high-performance multifunctional devices incorporating features such as reception of digital TV, high-resolution digital cameras, GPS, high-resolution web browsing, video streaming, media players, etc., using advanced hardware and software.

- For a mobile phone, the battery and its power management is the key to assuring long operation, so mobile manufacturers are focusing a lot of attention on evaluation of battery current consumption and charge management software as well as on determining the true battery capacity.

- **A test environment is needed to simulate network conditions for easy measurement of current consumption and battery life verification under various multimedia services.**

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Current Test Environment Issues

Measurement of battery life and current consumption of mobile terminal at continuous standby and talk

Create Test Cases to Measure Current Consumption

- Current consumption must be measured for long periods under different network conditions, requiring creation of complex test cases

Stable/Accurate Power Consumption Measurement Results

- At evaluation using a live network, it is difficult to obtain stable results due to various external factors. High-accuracy measurement requires statistical data obtained by measuring multiple terminals, which can take a long time.

Long-Term Measurement

- Mobile terminal current consumption measurements at continuous standby and talk under various network conditions and frequency bands take a long time.

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Solve Current Consumption Measurement Problems

The MX847015A Energy Management Test Simulator solves these problems!

GUI Setting of Required Parameters

- The new MX847015A software for the MD8470A uses an easy-to-use GUI to set various network parameters required for measuring current consumption without creating test cases.

Efficient Simultaneous 2-Terminal Measurement

- The MD8470A offers a stable test environment compared to a live network. Moreover, it supports efficient and high-accuracy measurement environment of current consumption by measuring two mobile terminals simultaneously using the unique MX847015A-01 Parallel Phone Test Software.

Automated Test Environment with External Equipments

- The MX847015A supports GP-IB commands to control an automated test system combining a multi-meter, power supply, etc., from an external PC for long-term measurement without operator errors.
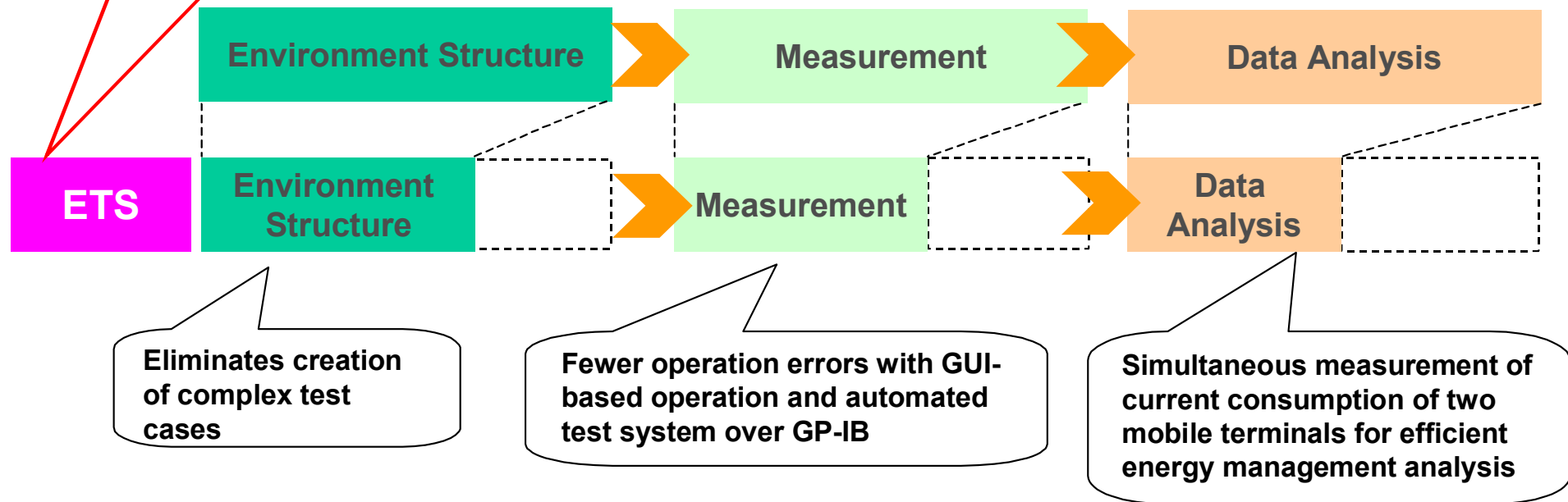
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Effect of Introducing MD8470A

- **The MX847015A makes system setup easy by eliminating creation of complex test cases for evaluating battery life and measuring current consumption. Moreover, its unique simultaneous measurement environment of two mobile terminals under GP-IB control supports configuration of an efficient test system and effective statistical data analysis.**
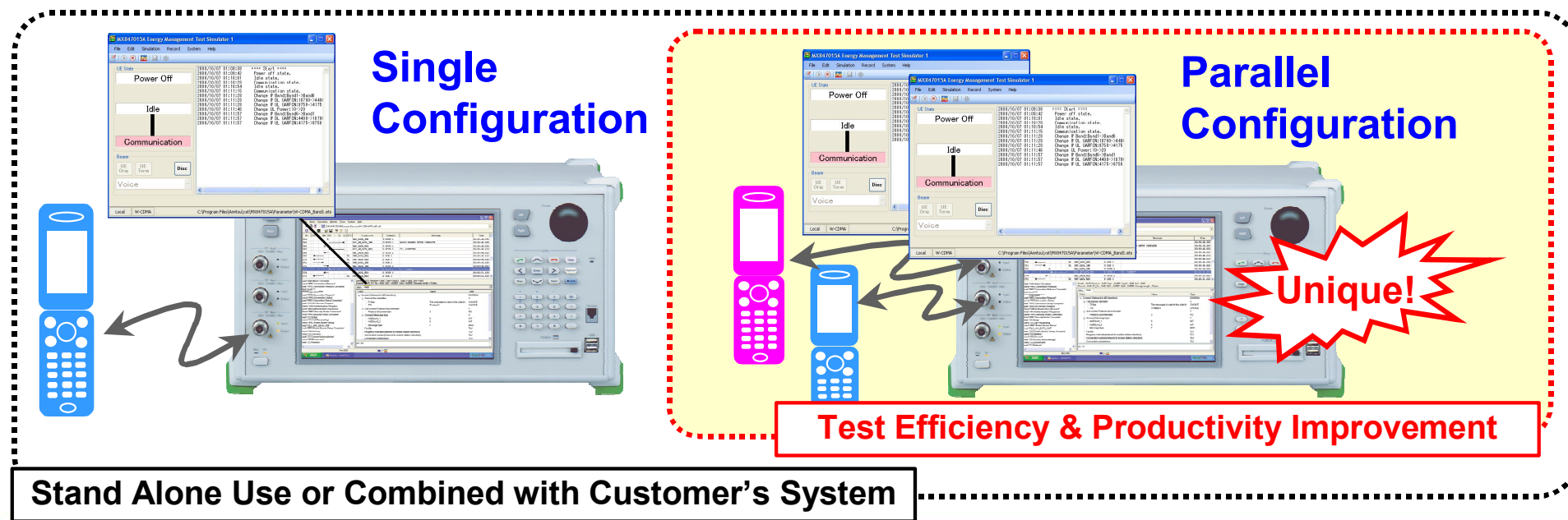

MD8470A
－MX847015A Energy Management Test Simulator (ETS)
－MX847015A Parallel Phone Test Software for ETS

Environment Structure	Measurement	Data Analysis

ETS

Environment Structure	Measurement	Data Analysis

Eliminates creation of complex test cases

Fewer operation errors with GUI-based operation and automated test system over GP-IB

Simultaneous measurement of current consumption of two mobile terminals for efficient energy management analysis

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MX847015A Energy Management Test Simulator Product Overview

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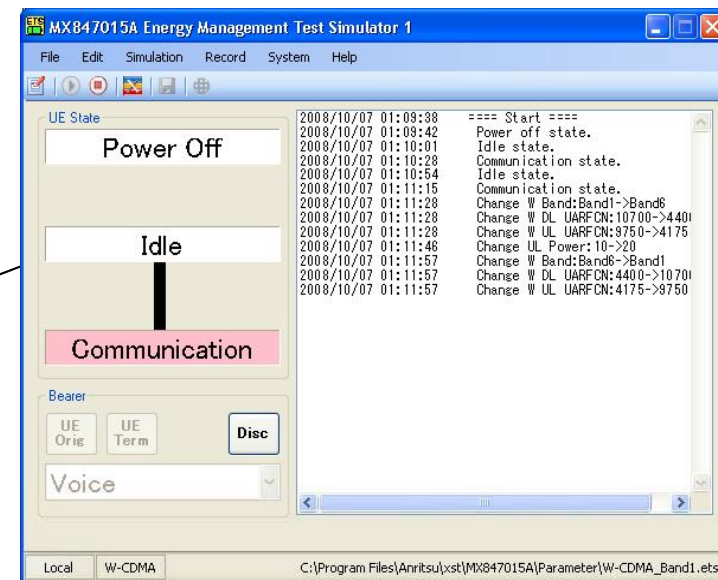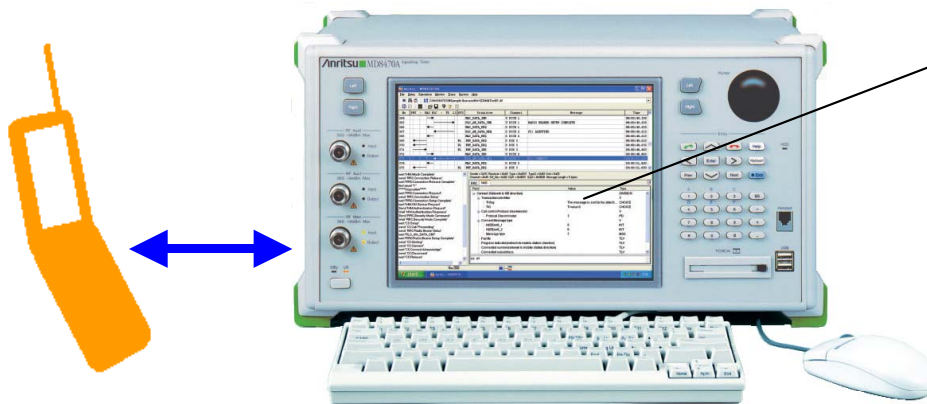
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Flexible Network Simulation (1/2)

- **MX847015A: Energy Management Test Simulator (ETS)**
- **MX847015A-01: Parallel Phone Test Software for ETS**
  - Current consumption-related network parameter settings are configurable to evaluate mobile-terminal continuous standby and talk times, etc
  - The mobile-terminal periodic location area update is implemented and the battery consumption can be tested
  - The flexible user interface allows users to configure various network parameters for battery life test specified by GSM Association
  - Test efficiency and productivity are highly improved by using unique parallel phone option (MX847015A-01)

Single Configuration

Parallel Configuration

Unique!

Test Efficiency & Productivity Improvement

Stand Alone Use or Combined with Customer's System

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Flexible Network Simulation (2/2)

- **Key Energy Management Test Simulator Functions**
  - **Evaluation environment of battery life at continuous standby and talk**
  - **Evaluation environment of battery life based on GSM Association "Battery Life Measurement Technique" reference**
  - **Measurement environment of current consumption under multimedia-services using high-speed packet data**
  - **Evaluate management software for current consumption and charging on mobile**
  - **Evaluation environment of terminal thermal heating at max. power transmission from mobile**

Standby Time
Talk Time · · ·

Energy Management Test Simulator (ETS)

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Examples of Test System Configurations

The MX847015A supports remote control over the common GP-IB standard, permitting easy configuration of an automated test system combining an external PC, MD8470A, multi-meter and power supply.

Network Simulation
MX847015A Energy Management Test Simulator (ETS)

MX847015A-01 Parallel Phone Test Software

Supports automatic testing under GP-IB control

External Control Interface

USB/GP-IB

USB

GP-IB

Multi-meter*

GP-IB

Power Supply*

Remote Control PC*

Test Management

Test Case

Test Report

Automated Test Execution

Equipment Control

*Customer's equipment

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MX847015A Energy Management Test Simulator User Interface

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ETS User Interface (1/2)

- ## ETS Main Screen

  - The MX847015A Energy Management Test Simulator (ETS) is a software application that runs on the MD8470A to interactively simulate base station operations supporting W-CDMA/HSDPA/HSUPA and GSM/GPRS/EGPRS communications bearers.

  - This application screen displays the mobile terminal status, event history, and test bearers. The history log displays the terminal condition during simulation, parameter changes, and errors.

UE Status Indicator

Event History Display

Bearer Display for Testing

ETS
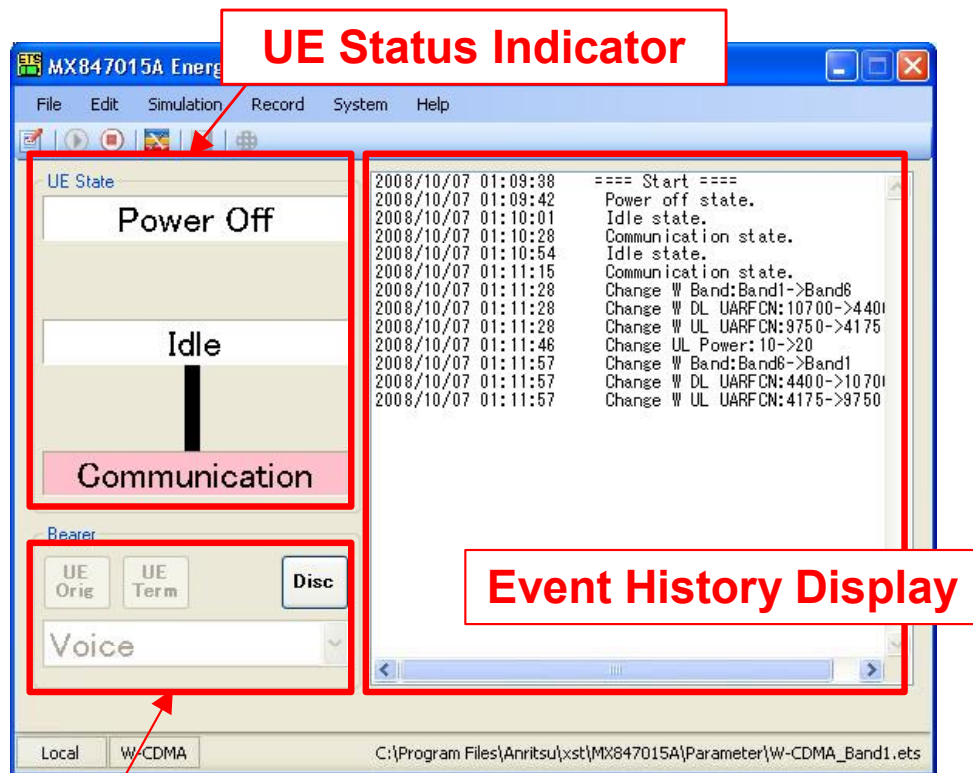
Supported Bearers

- ### W-CDMA/HSDPA/HSUPA

  - Voice Call (MO/MT): Handset/Loopback
    - AMR: 12.2k
  - Packet Call (MO): IP/PPP
    - DL64k/UL64k to DL7.2M/UL2.0M
  - Video Call (MO/MT): ISDN/Loopback
  - Multi-Call
    - Voice + Packet (DL64k/UL64k)
    - Video + Packet (DL64k/UL64k)

- ### GSM/GPRS/EGPRS

  - Voice Call (MO/MT): Handset/Loopback
    - EFR
  - Packet Call (MO)
    - Multi Slot Class 12
  - DTM (Dual Transfer Mode)

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ETS User Interface (2/2)

- **Parameter Setting Screen**

  Sets various network parameters and test conditions related to current consumption

Common Tab
Sets common ETS parameters
- USIM Parameters
- Communication Standard
- Initial Ref. Power (DL/UL), Cable Loss
- Periodic Update (Location Area/Routing Area) etc.

W-CDMA Tab
Sets network parameters for W-CDMA Simulation
- Band/Channel
- Packet Rate (DL 64K/UL 64K to DL 7.2M/UL 2.0M)
- System Information
- DRX Cycle Length
- Power Control, No. of Neighbor Cell, etc.

GSM Tab
Sets network parameters for GSM simulation
- Band/ARFCN
- GPRS CS, EGPRS MCS, Slot
- Paging
- Power Control, No. of Neighbor Cell, etc.

Parameter Setup

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ETS Configurable Parameters (1/3)

- **Following network parameters can be configured commonly for W-CDMA and GSM network simulation.**

[ ] : Configurable during communication state

Common	Parameter	Description
USIM	MCC	Mobile Country Code (MCC)
	MNC	Mobile Network Code (MNC)
	K	USIM Security Key (K)
	Test USIM Mode	ON or OFF
	RAND	USIM RAND value (RAND)
	AUTN	USIM Authentication Number (AUTN)
	IK	USIM Integrity Key (IK)
Initial Reference Power	DL Power	-120 ~ -20 [dBm]
	UL Power	-40 ~ 30 [dBm]
Cable Loss	Cable Loss	RF loss of connected cable: 0~55 [dB]
System	System	W-CDMA, GSM, GSM (DTM)
Domain	Domain	CS/PS, CS Only, PS Only
PS Bearer	PS Bearer	IP, PPP
IDLE Mode	IDLE Mode	IDLE, IDLE+Packet
Security	Security	ON, OFF, FAKE
Location Area	Location Area Code	LocationAreaCode setting; 0 ~ 65535
	Periodic Update	ON, OFF
	Interval	0~255
	Unit	decihour
Routing Area	Routing Area Code	RoutingAreaCode setting; 0 ~ 65535
	Periodic Update	ON, OFF
	Interval	0~31
	Unit	2seconds,1minute,decihour
IP Address	UE Address	
	DNS Server Address	Primary, Secondary
	Router	Gateway Address, Subnetmask

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ETS Configurable Parameters (2/3)

- **Following network parameters can be configured for W-CDMA network simulation.**

    : Configurable during communication state

W-CDMA	Parameter	Description
Band	Band	Band I , Band II , Band III, Band IV, Band V , Band VI, Band VII, Band VIII, Band IX , Band X , Band XI, Not specified
	DL UARFCN (Channel)	Downlink UARFCN specification
	UL UARFCN (Channel)	Uplink UARFCN specification
Activation Time	Voice	0~255
	Packet	0~255
	Video	0~255
	Multi-Call	0~255
Packet	DL Window Size	1~2047
	UL Window Size	1~2047
	Packet Rate	DL64k/UL64k, DL128k/UL64k, DL384k/UL64k, DL384k/UL128k, DL384k/UL384k, DL Auto/UL384, DL1.8M/UL384, DL3.6M/UL384, DL7.2M/UL384, DL1.8M/UL1.46M, DL1.8M/UL2.0M, DL3.6M/UL1.46M, DL3.6M/UL2.0M, DL7.2M/UL1.46M, DL7.2M/UL2.0M, DL Auto/UL Auto
Registration	Registration	Normal, Combined
Voice Phone	Voice Phone Loopback	Handset, Loopback
Video Phone	Video Phone Loopback	ISDN, Loopback
System Information	SIB3 MAX Allowed	-50~ 33 [dBm]
	SIB5 CPICH Tx Power	-10~ 50 [dBm]
	SIB5 Constant Value	-35~ -10 [dBm]
	SIB7 UL Interference	-110~ -70 [dBm]
Paging	CS Interval	0.640,1.280,2.560,5.120 [s]
	PS Interval	0.640,1.280,2.560,5.120 [s]
	UTRAN Interval	0.080,0.160,0.320,0.640,1.280,2.560,5.120 [s]
	PICH Indicator	e18,e36,e72,e144
RB Setup	BLER Quality Value	-63~0 [dBm]
	DTX	ON, OFF
Power Control	Power Control	Mode1, Mode2, ALL1
	MAX Allowed	-50~33 [dBm]
Serving Cell	PSC	Primary Synchronization Code: 0~511
Neighbour Cell	Intra Freq. Neighbour Cell	Cell1 to Cell16 (-1~511)
	Inter Freq. Neighbour Cell	Cell1 to Cell16 (-1~16383)
	Inter RAT Neighbour Cell	Cell1 to Cell16 (-1~1023)

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ETS Configurable Parameters (3/3)

- Following network parameters can be configured for GSM network simulation.

GSM	Parameter	Description
Band	Band	GSM450,GSM480,GSM850,P-GSM900, E-GSM900,R-GSM900,DCS1800,PCS1900
	CCH ARFCN	CCH ARFCN specification
	TCH ARFCN	TCH ARFCN specification
Voice Phone	Voice Phone Loopback	Handset, Loopback
GPRS/EGPRS	Coding Scheme (GPRS)	CS1, CS2, CS3, CS4
	DL MCS (EGPRS)	MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8, MCS9
	UL MCS (EGPRS)	MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8, MCS9
Paging	PA_MFRMS	2~9
	AG_BLKS	0~7
	CCCH_CONF	0,1
Slot	Slot	DL1/UL1, DL2/UL1, DL3/UL1, DL4/UL1, DL1/UL2, DL2/UL2, DL3/UL2, DL1/UL3, DL2/UL3, DL1/UL4
Power Control	Power Control	ON, OFF
	Power Class	0~31
	GAMMA	0~31
Neighbour Cell	Neighbour Cell	Cell1 to Cell16 (-1~1023)
	Inter RAT Neighbour Cell	Cell1 to Cell16 (-1~16383)

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Test Examples
Current Consumption Measurement at Each Band

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Current Consumption Measurement at Each Band

Continuous Standby and Talk

- Mobile terminal current consumption is measured to calculate continuous standby and talk time by changing network parameters at each band.

- The MX847015A ETS supports band switching, and editing of various parameters, such as DL/UL Reference Power, Cable Loss, Power Control, Neighbor Cell, etc., during test execution. Moreover, it supports automated testing under GP-IB control.

- Statistical values required for high-accuracy results considering individual terminal characteristics are supported by simultaneous measurements environment using the MX847015A-01 Parallel Phone Test option, further increasing work efficiency.

Example

GSM900 → Standby ⟶ Current Consumption Meas.*
GSM900 → Talk ⟶ Current Consumption Meas.*

Changing band during test

GSM1800 → Standby ⟶ Current Consumption Meas.*
GSM1800 → Talk ⟶ Current Consumption Meas.*

Calculates continuous standby and talk time (battery life) from captured data.

Continuous Execution
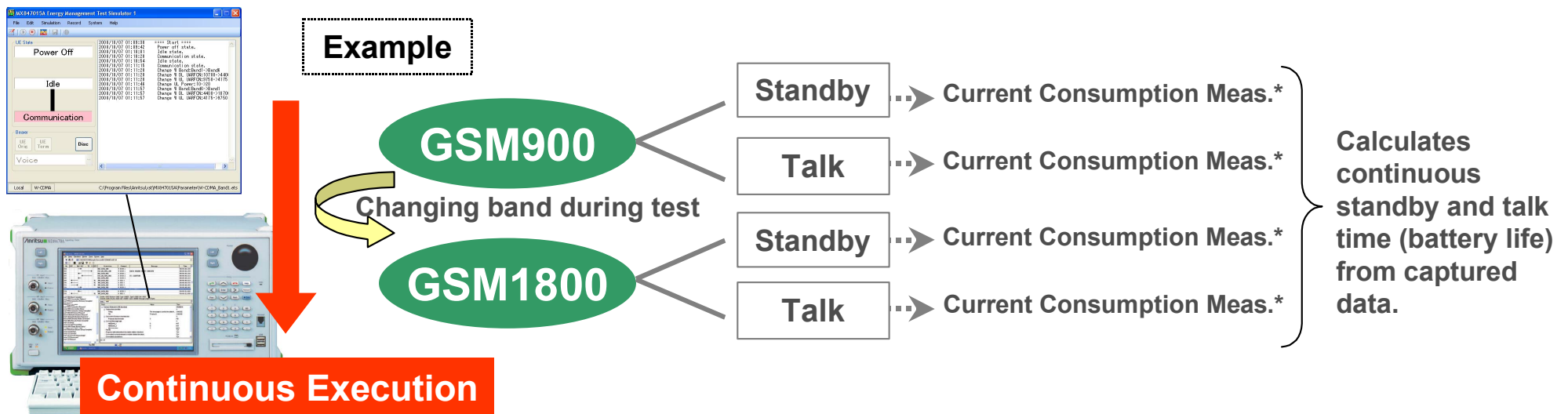
*Specified measurement time using multi-meter

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Test Examples

Current Consumption Measurement
at High-Speed Packet Services

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Current Consumption Measurement at High-speed Services

High-Speed Packet Services such as HSDPA/HSUPA

- Today, use of packet-based multimedia services including high-speed internet browsing and video streaming is accelerating, making evaluation of battery management and current consumption as important as evaluating the quality of voice communications.

- The ETS not only supports GPRS/EGPRS but also supports a wide range of packet data rates for both W-CDMA (DL64k/UL64k) and HSDPA/HSUPA (DL7.2M/UL2.0M). It is the ideal platform for evaluating battery life in today's high-speed packet communications service environment as well future multimedia service environments.

ETS

Application Server

HSDPA

HSUPA

Multi-meter

Video Streaming

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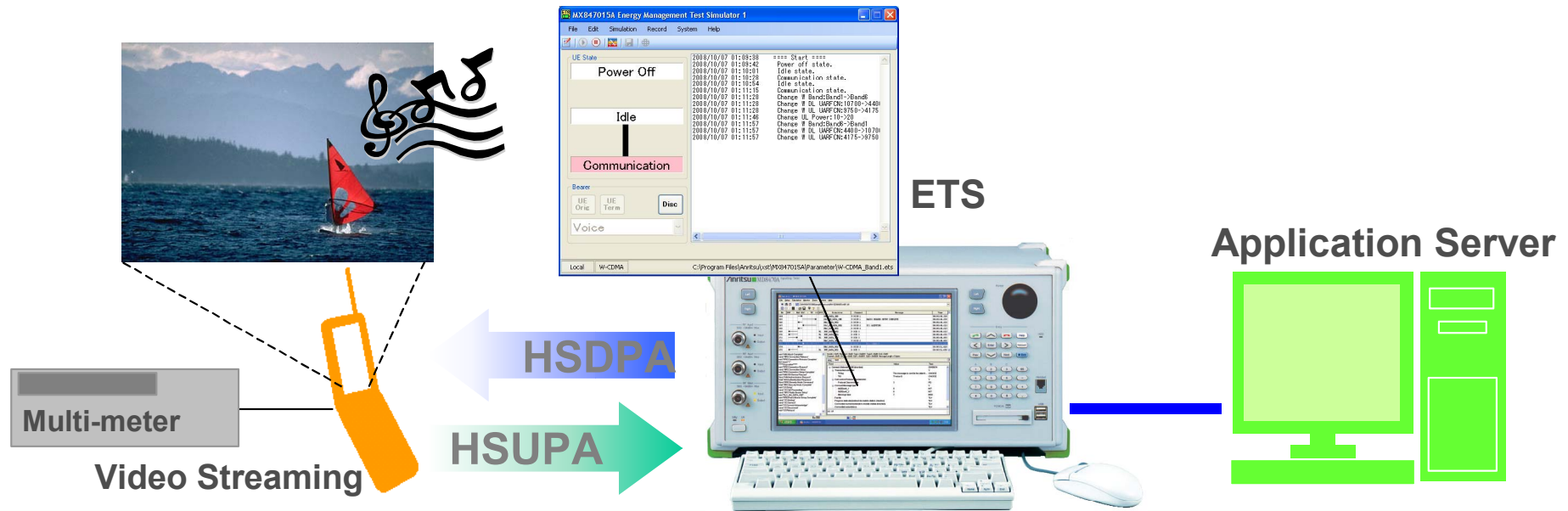
Test Examples
Terminal Thermal Heating Tests

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Terminal Thermal Heating Tests

Evaluation environment of terminal thermal heating at max. power transmission from mobile

- The Power Control settings of ETS are used to specify the Downlink TPC Pattern mode, supporting battery life evaluation at the expected mobile transmitting power.

- In addition, this parameter can also be used to support terminal thermal heating tests at max. power transmission from the mobile or data card.
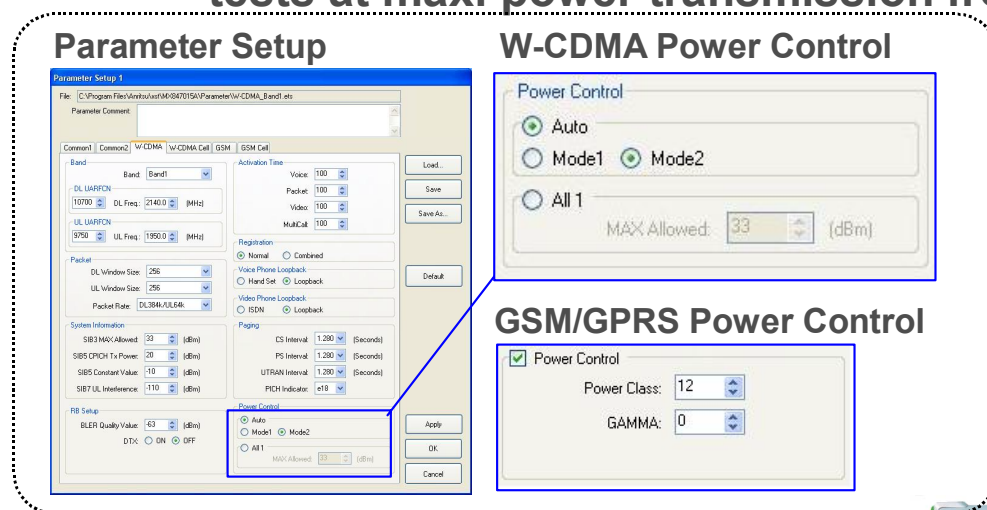
System	Name	Setting Outline
W-CDMA	Auto	Mode1: Sets TPC Pattern to value approaching Reference Power
		Mode2: Sets TPC Pattern to Reference Power
	All1	Specifies mobile MAX Allowed Power as –50 to +33 dBm
GSM	Power Class	Specifies Power Class as 0 to 31
	GAMMA	Specifies GPRS Power Class as 0 to 31
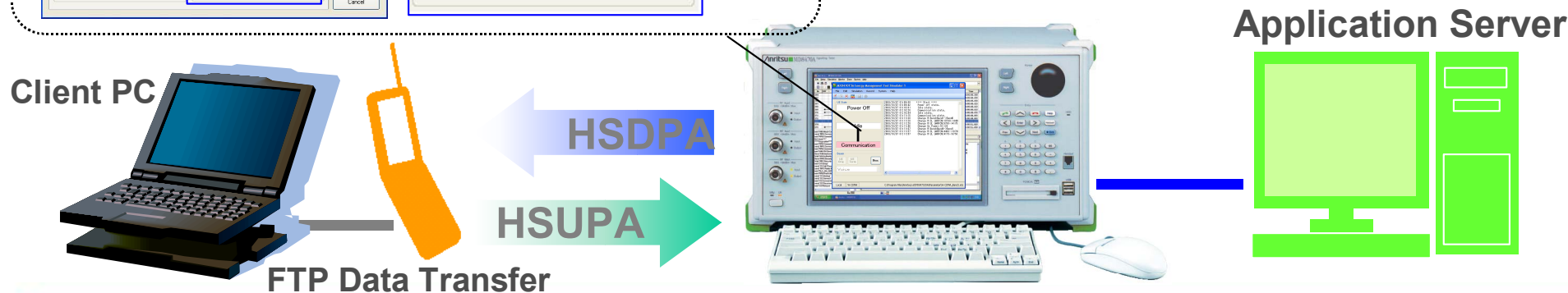
Parameter Setup

W-CDMA Power Control

GSM/GPRS Power Control

Client PC

Application Server

HSDPA

HSUPA

FTP Data Transfer

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Ordering Information

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Ordering Information

Configurations

Test Configuration	Option/Unit/Software	MD8470A	MD8470A-02	MU847010B	MU847010B	MU847020B	MU847020B	MU847090B	MX847010A	MX847015A	MX847015A-01	MX847010A-01	MX847010A-11	MX847010A-12	MX847010A-20	Remarks
Single Configuration	W-CDMA Test Configuration	v		v				v*1	v	v					v	
	W-CDMA/HSDPA/HSUPA Test Configuration	v		v				v*1	v	v			v	v	v	
	GSM/GPRS Test Configuration	v				v			v	v					v	*2
	GSM/GPRS/EGPRS Test Configuration	v				v			v	v		v			v	*2
Parallel Phone Configuration	W-CDMA Parallel Phone Test Configuration	v	v	v	v			v*1	v	v	v				v	
	W-CDMA/HSDPA/HSUPA Parallel Phone Test Configuration	v	v	v	v			v*1	v	v	v		v	v	v	
	GSM Parallel Phone Test Configuration	v	v			v	v			v	v				v	*2
	GSM/GPRS/EGPRS Parallel Phone Test Configuration	v	v			v	v			v	v	v			v	*2
	W-CDMA + GSM Parallel Phone Test Configuration	v	v	v		v		v*1	v	v	v				v	
	W-CDMA/HSDPA/HSUPA + GSM/GPRS/EGPRS Parallel Phone Test Configuration	v	v	v		v		v*1	v	v	v		v	v	v	
	W-CDMA/HSDPA/HSUPA Parallel Phone Test Configuration GSM/GPRS/EGPRS Parallel Phone Test Configuration	v	v	v	v	v	v	v*1	v	v	v	v	v	v	v	

*1: Optional
*2: Minimum configuration

Wireless Test Suite Package

- The MX847015A Energy Management Test Simulator, MX847015A-01 Parallel Phone Test Software, MX847016A Multi-cell Network Simulator and related hardware options are also offered as the "Wireless Test Suite" package.

- For more details, contact your local sales. (Refer to the separate catalog for details about the MX847016A.)

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Note

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