/Inritsu

For MD8470A Signalling tester

MX8470015A

Energy Management Test Simulator

MX847015A-01 Parallel Phone Test Software for ETS

Evaluating Mobile Terminal Battery Life at Continuous Standby and Talk

Mobile terminals 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 terminal, the battery and its power management is the key to assuring long operation, so mobile terminal 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.

Anritsu's new MX847015A Energy Management Test Simulator (ETS) sets network parameters related to current consumption for evaluating the mobile terminal's battery life at continuous standby and talk. It performs the battery current consumption test by executing periodic location area updates. Additionally, Anritsu's unique Parallell Phone test system allowing two mobile terminals to be tested simultaneously supports efficient collection and statistical analysis of high-accuracy current consumption results.

Key Energy Management Test Simulator Applications

- 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 in multimedia-services environment using high-speed packet data
- Evaluate management software for current consumption and charging on mobile terminal
- Evaluation environment of mobile terminal thermal heating at max. uplink power transmission

MX847015A
Energy Management Test Simulator

Flexible Network Simulation

MX847015A Energy Management Test Simulator (ETS)

The MX847015A 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. It offers a graphical user interface (GUI) to evaluate current consumption for battery life at continuous standby and talk without the need to create complex test scripts. Various network parameters related to current consumption and test conditions can be configured flexibly. When used in combination with the MX847015A-01 Parallel Phone Test Software option, the current consumption of two mobile terminals can be measured simultaneously for efficient results collection and statistical analyses.
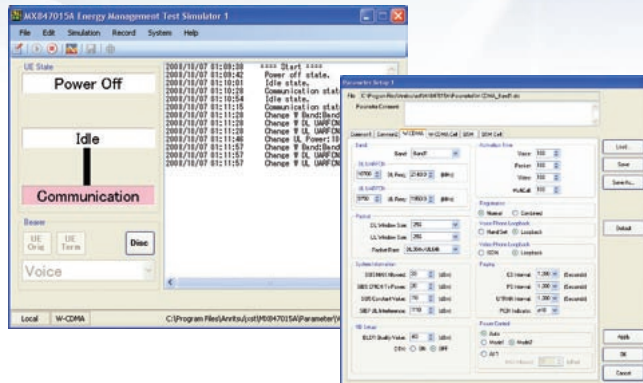

Energy Management Test Simulator (ETS)

Features

GUI Setting for Battery Life Related Network Parameters

The GUI makes it easy to set battery-life related network parameters such as the interval of periodic location area updates, discontinuous reception of paging messages, power control and neighbor cell settings, etc. Additionally, network parameters based on the GSM Association's Battery Life Measurement Technique can also be set. Elimination of complex test cases lightens the burden of system settings and facilitates efficient testing in an easy-to-configure test environment.
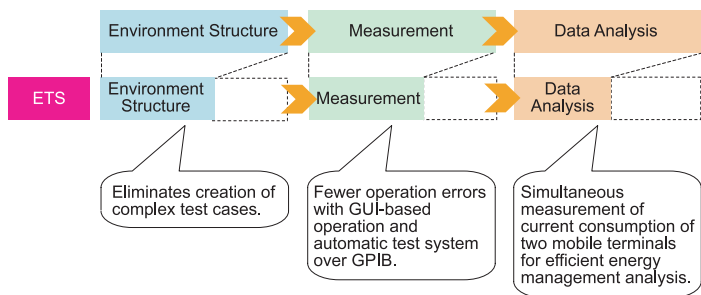
Efficient, Reliable Battery Life Test Environment for Simultaneous Measurement of Two Mobile Terminals

Measuring battery life reliably in a live network environment is difficult due to changing external factors, making it hard to get repeatable results. Moreover, obtaining high-accuracy results depends on measuring multiple mobile terminals and using statistical analyses. Unlike a live network, the MD8470A provides a high-reproducibility, stable test environment, supporting efficient measurement and statistical analysis of current consumption for two mobile terminals when used with the MX847015A-01 Parallel Phone Test Software option.
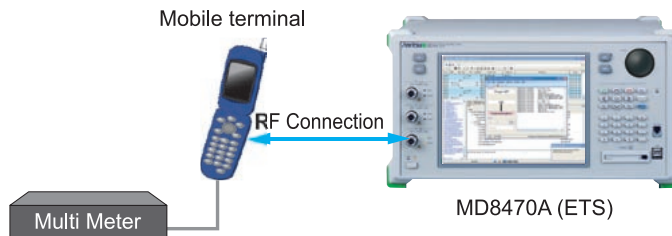
Automated Test System with External Controller

Measurement of current consumption for battery life requires long-term measurements where the battery condition is evaluated at continuous standby and talk in each frequency band under various network conditions. The MX847015A supports remote control over the common GPIB interface, permitting easy configuration of an automated test system combining an external PC, MD8470A, multi-meter and power supply. It allows users to make easier long-term measurements and eliminate operation errors.

Mobile terminal

RF Connection

Multi Meter

MD8470A (ETS)

Flexible Network Parameter Settings

Periodic Location Area Update Setting

Periodic Update can be set for both Location Area and Routing Area. Various network states, such as On/Off settings and interval value for periodic CS registration (Location Area Update) and PS registration (Routing Area Update), can be configured. This function allows users to test battery consumption at periodic updates.
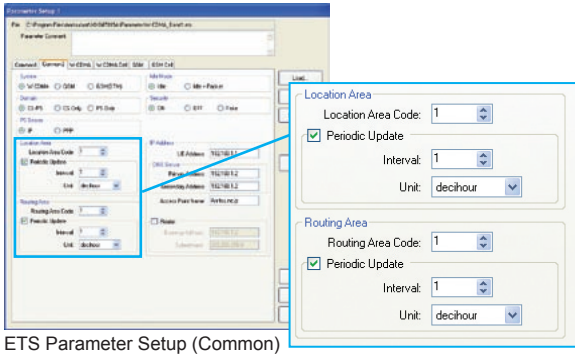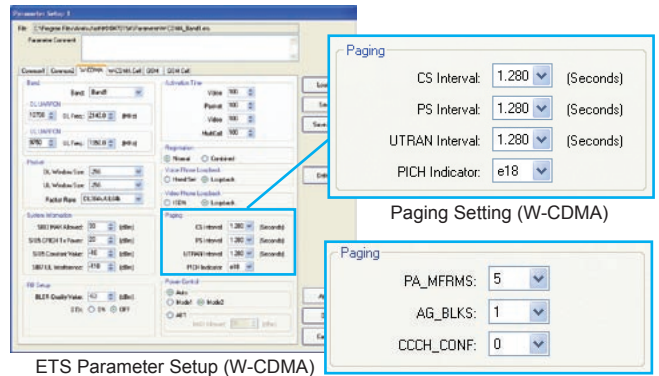

ETS Parameter Setup (Common)

Location Area/Routing Area Setting

Neighbor Cells Setting (Cell 1 to Cell 16)

Up to 16 Neighbor Cells can be reported in the broadcast list using the Neighbor Cell setting. Battery and current consumption are evaluated while emulating conditions with multiple Neighbor Cells.
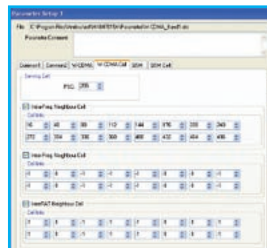
W-CDMA Cell Setting

System	Name	Setting Outline
W-CDMA	Intra Freq Neighbor Cell	Cell1 to Cell16: PSC OFF or set as 0 to 511
	Inter Freq Neighbor Cell	Cell1 to Cell16: Neighbor Cell ARFCN set to OFF or 0 to 16383
	InterRAT Neighbor Cell	Cell1 to Cell16: GSM Neighbor Cell ARFCN set to OFF or 0 to 1023
GSM	Neighbor Cell	Cell1 to Cell16: Neighbor Cell ARFCN set to OFF or 0 to 1023
	InterRAT Neighbor Cell	Cell1 to Cell16: W-CDMA Neighbor Cell UARFCN set to OFF or 0 to 16383

Various Packet Data Rates Setting

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.

Application Server

High Speed Data

Discontinuous Reception Setting of Paging Message

Paging Setting can be used to set the DRX Cycle Length as CS Interval, PS Interval and UTRAN Interval on W-CDMA, as well as paging multi-frames (PA_MFRMS) on GSM. Discontinuous reception of paging messages can be set to expected value.
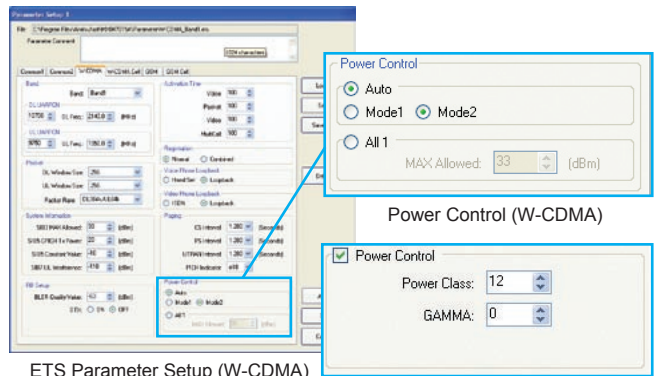

Paging Setting (W-CDMA)

ETS Parameter Setup (W-CDMA)

Paging Setting (GSM)

Power Control Setting

The Power Control settings are used to specify the Downlink TPC Pattern mode, supporting battery life evaluation at the expected mobile terminal transmitting power. In addition, this parameter can also be used to support terminal thermal heating tests at max. uplink power transmission from the mobile terminal or data card.

Power Control (W-CDMA)

ETS Parameter Setup (W-CDMA)

Power Control (GSM)

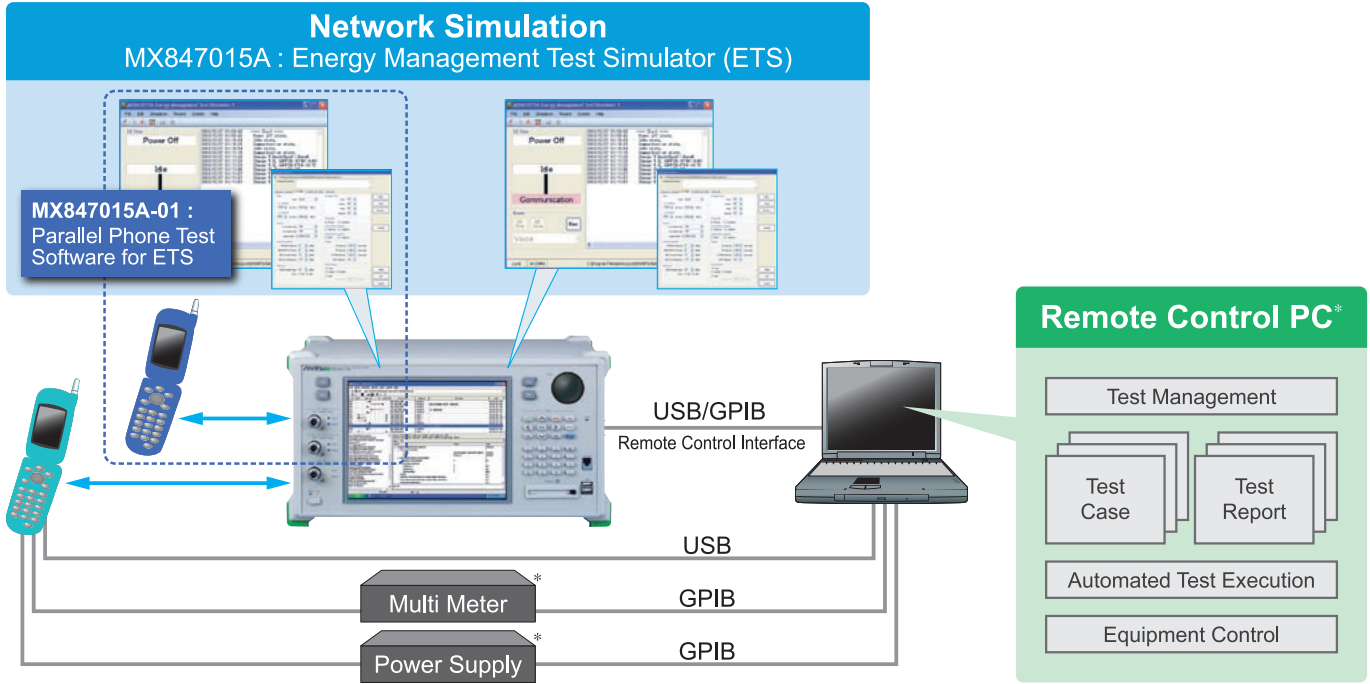| System	Name	Setting Outline
W-CDMA	Auto	Mode1: Sets TPC Pattern to value approaching Reference Power Mode2: Sets TPC Pattern to Reference Power
	All1	Specifies mobile terminal MAX Allowed Power as –50 to +33 dBm
GSM	Power Class	Specifies Power Class as 0 to 31
	GAMMA	Specifies GPRS Power Class as 0 to 31

Typical Test System Configurations

Example of Mobile Terminal Current Consumption Measurement System

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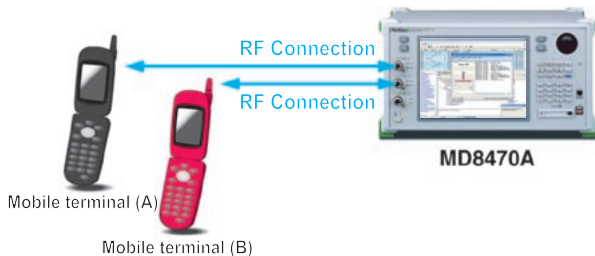

Network Simulation
MX847015A : Energy Management Test Simulator (ETS)

MX847015A-01 :
Parallel Phone Test Software for ETS

USB/GPIB
Remote Control Interface

Remote Control PC*

Test Management

Test Case

Test Report

Automated Test Execution

Equipment Control

USB

Multi Meter *
GPIB

Power Supply *
GPIB

∗: Customer's equipment

High Test Efficiency using Parallel Phone

MX847015A-01 Parallel Phone Test Software for ETS

Adding the MX847015A-01 Parallel Phone Test Software option and the required hardware supports independent battery life evaluation environment of two mobile terminals connected to one MD8470A. Because two models can be tested for long-term periods under various conditions, such as continuous standby and talk at each frequency band, productivity is doubled, raising testing efficiency to new levels.

RF Connection

RF Connection

MD8470A

Mobile terminal (A)

Mobile terminal (B)

MX847015A-01 Parallel Phone Test Software for ETS

Remote Control over GPIB

The ETS supports remote control over GPIB. The ETS run/shut down, simulation start/stop, bearer open/close and various network parameters can be set by remote control. This makes it easy to configure an automated test system in combination with a multi-meter and power supply.

Change Parameters while Calling

The ETS supports changes to settings for DL/UL Reference Power, Cable Loss, Band, Power Control, and Neighbor Cell while the mobile terminal is communicating. As a result, each network parameter can be changed flexibly without stopping testing. For example, current consumption can be measured remotely and continuously in each frequency band for both standby and talk over GPIB automatically.

GSM900 — During test — GSM1800

Band switch
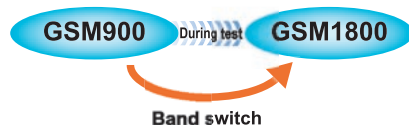
Main Functions

MX847015A Energy Management Test Simulator (ETS)

Supported Bearers	W-CDMA/HSDPA*1/HSUPA*2		Voice Call (MO/MT), Packet Communications (MO), PPP [Built-in Server] Packet Communications (MO), Video Call (MO/MT), Multicall (Voice + Packet (DL64k/UL64k), Video + Packet (DL64k/UL64k))
	GSM/GPRS/EGPRS*3		Voice Call (MO/MT), Packet Communications (MO), DTM (Dual Transfer Mode)
Setting Parameters	Common 1	USIM	USIM Parameter: MCC, MNC, K, Test USIM MODE, RAND, AUTN, IK
		Initial Reference Power	DL Power: –120 to –20 dBm UL Power: –40 to +30 dBm
		Cable Loss	Cable Loss: 0 to 55 dB
	Common 2	System	W-CDMA, GSM, GSM (DTM)
		Domain	Registration Type: CS/PS, CS Only, PS Only
		PS Bearer	Packet Communication Type: IP, PPP
		Location Area	Location Area Code: 0 to 65535, Periodic Update On/Off Interval: 0 to 255, Unit: decihour
		Routing Area	Routing Area Code: 0 to 65535, Periodic Update On/Off Interval: 0 to 31, Unit: 2 s, min, decihour
		Idle Mode	Idle State Type: Idle, Idle + Packet (Set Preservation State to Idle)
		Security	Authentication Method: ON, OFF, Fake
		IP Address	Client IP Address, Server IP Address, Access Point Name, Router Connection Setup
	W-CDMA	Band	Band I, II, III, IV, V, VI, VII, VIII, IX, X, XI, Not specified
		UARFCN	Downlink UARFCN, Uplink UARFCN

		Packet	DL Window Size, UL Window Size
			Packet Rate: DL64k/UL64k, DL128k/UL64k, DL384k/UL64k, DL384k/UL128k,
			     DL384k/UL384k, DL Auto/UL384k, DL1.8M/UL384k, DL3.6M/UL384k, DL7.2M/
			     UL384k, 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

		System Information	SIB3 MAX Allowed: –50 to +33 dBm SIB5 CPICH Tx Power: –10 to +50 dBm SIB5 Constant Value: –35 to –10 dBm SIB7 UL Interference: –110 to –70 dBm
		RB Setup	BLER Quality Value: –63 to 0 dBm DTX On/Off: Discontinuous Transmission
		Activation Time	Voice, Packet, Video, Multi Call Activation Time
		Registration	Registration Type: Normal, Combined
		Voice Phone	Handset, Loopback
		Video Phone	ISDN, Loopback
		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
		Power Control	Auto: Mode1, Mode2, All 1 (MAX Allowed Power): –50 to +33 dBm
	W-CDMA Cell	Serving Cell	Primary Scrambling Code: 0 to 511
		Intra Freq Neighbor Cell	Intra Freq Neighbor Cell On/Off Cell Info (Cell 1 to Cell 16): Primary Scrambling Code (OFF or 0 to 511)
		Inter Freq Neighbor Cell	Inter Freq Neighbor Cell On/Off Cell Info (Cell 1 to Cell 16): ARFCN (OFF or 0 to 16383)
		InterRAT Neighbor Cell	InterRAT Neighbor Cell On/Off Cell Info (Cell 1 to Cell 16): GSM ARFCN (OFF or 0 to 1023)
	GSM	Band	Band: GSM450, GSM480, GSM850, P-GSM900, E-GSM900, R-GSM900, DCS1800, PCS1900 ARFCN (CCH, TCH)
		Voice Phone	Handset, Loopback
		Paging	PA_MFRMS: 2 to 9, AG_BLKS: 0 to 7, CCCH_CONF: 0, 1

		GPRS/EGPRS	GPRS Coding Scheme: CS1, CS2, CS3, CS4
			EGPRS Modulation and Coding Scheme
			  DL: MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8, MCS9
			  UL: MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8, MCS9

		Multi Slot Config	Multi 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 Level On/Off, Power Class: 0 to 31, GAMMA: 0 to 31
	GSM Cell	Neighbor Cell	Neighbor Cell On/Off Cell Info (Cell 1 to Cell 16): ARFCN (OFF or 0 to 1023)
		InterRAT Neighbor Cell	InterRAT Neighbor Cell On/Off Cell Info (Cell1 to Cell16): W-CDMA UARFCN (OFF or 0 to 16383)

*1: MX847010A-11: HSDPA Software option separately required
*2: MX847010A-12: HSUPA Software option separately required
*3: MX847010A-01: EGPRS Software option separately required

Configuration

MX847015A
Energy Management Test Simulator

The ETS is a software application that runs on the MD8470A to interactively simulate base stations supporting the W-CDMA/HSDPA/HSUPA and GSM/GPRS/EGPRS bearers. It has an easy-to-use GUI for evaluating the battery life of mobile terminals at continuous standby and talk without the need to create complex test scripts by offering flexible setting of network parameters related to current consumption and test conditions.

Running ETS on MD8470A Signalling Tester

The test functions of the MX847015A Energy Management Test Simulator vary according to the MD8470A Signalling Tester configuration. Refer to the following table for details.

MX847015A-01
Parallel Phone Test Software for ETS

Adding the MX847015A-01 Parallel Phone Test Software option and the required hardware supports independent battery life evaluation environment of two mobile terminals connected to one MD8470A, offering a high-productivity test environment.

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	√		√				√*1	√	√					√	
	W-CDMA/HSDPA/HSUPA	√		√				√*1	√	√			√	√	√	
	GSM/GPRS	√				√			√	√					√	*2
	GSM/GPRS/EGPRS	√				√			√	√		√			√	*2
Parallel Phone Configuration	W-CDMA Parallel Phone	√	√	√	√			√*1	√	√	√				√	
	W-CDMA/HSDPA/HSUPA Parallel Phone	√	√	√	√			√*1	√	√	√		√	√	√	
	GSM Parallel Phone	√	√			√	√		√	√	√				√	*2
	GSM/GPRS/EGPRS Parallel Phone	√	√			√	√		√	√	√	√			√	*2
	W-CDMA + GSM Parallel Phone	√	√	√		√		√*1	√	√	√				√	
	W-CDMA/HSDPA/HSUPA + GSM/GPRS/EGPRS Parallel Phone	√	√	√		√		√*1	√	√	√	√	√	√	√	
	W-CDMA/HSDPA/HSUPA Parallel Phone + GSM/GPRS/EGPRS Parallel Phone	√	√	√	√	√	√	√*1	√	√	√	√	√	√	√	

∗1: Optional
∗2: Minimum configuration

The MX847015A Energy Management Test Simulator, MX847015A-01 Parallel Phone Test Software for ETS, 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 MX847016A catalog for details about the MX847016A.

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Specifications are subject to change without notice.

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