

APPLICATION NOTE

MD8470A

Signalling Tester

Supplementary Services

ANRITSU CORPORATION

Copyright © 2005 by ANRITSU CORPORATION

The contents of this manual shall not be disclosed in any way or reproduced in any media without the express written permission of Anritsu Corporation.

MD8470A Signalling Tester Application Note

- Supplementary Services -

Supplementary
Services

Anritsu Corporation
Measurement Business Center
Wireless Measurement Division
July 2005
Version 1.0

Discover What's Possible™
MD8470A-E-F-9

Slide 1

Anritsu

Contents

Supplementary
Services

1. Glossary of Terms
2. Reference Standards
3. What are Supplementary Services?
4. Performing Supplementary Service Tests
 - 4-1. Testing Call Waiting/Call Hold Function
 - 4-2. Testing Multi Party Function
 - 4-3. Testing Advice of Charge Function
 - 4-4. Testing USSD Function
5. Advantages of Using MD8470A



Discover What's Possible™
MD8470A-E-F-9

Slide 2

Anritsu

1. Glossary of Terms

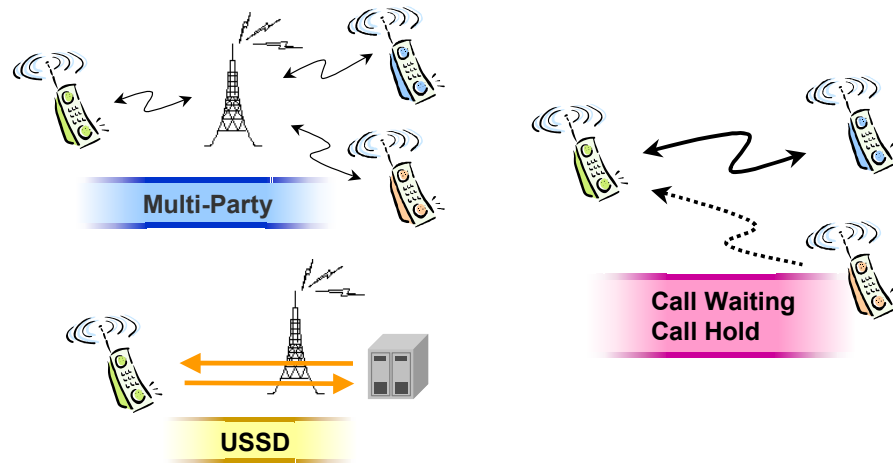
3GPP:	3 rd Generation Partnership Project
SS:	Supplementary Services
CW:	Call Waiting
CH:	Call Hold
CF:	Call Forwarding
CB:	Call Barring
AoC:	Advice of Charge
CAI:	Charge Advice Information
USSD:	Unstructured Supplementary Service Data

2. Reference Standards

- 3GPP
 - TS 22.083 Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 1
 - TS 23.083 Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2
 - TS 24.083 Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3
 - TS 22.084 MultiParty (MPTY) supplementary services - Stage 1
 - TS 23.084 MultiParty (MPTY) supplementary services - Stage 2
 - TS 24.084 MultiParty (MPTY) supplementary services - Stage 3
 - TS 22.024 :Description of Charge Advice Information (CAI)
 - TS 22.086 :Advice of Charge(AoC) supplementary services - Stage 1
 - TS 23.086 :Advice of Charge(AoC) supplementary services - Stage 2
 - TS 24.086 :Advice of Charge(AoC) supplementary services - Stage 3
 - TS 22.090 :Unstructured Supplementary Service Data (USSD) - Stage 1
 - TS 23.090 :Unstructured Supplementary Service Data (USSD) - Stage 2
 - TS 24.090 :Unstructured Supplementary Service Data (USSD) - Stage 3

3. What are Supplementary Services?

- Supplementary Services are functions offered to the end user using appended and supplementary data added to basic communication services such as voice and packet.



4. Performing Supplementary Service Tests

4-1. Testing Call Waiting/Call Hold Function

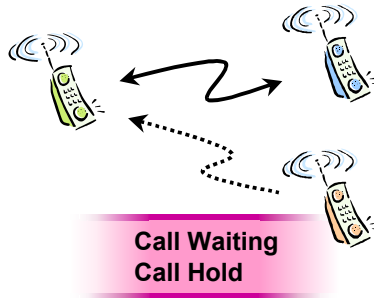
4-2. Testing Multi-Party Function

4-3. Testing Advice of Charge Function

4-4. Testing USSD Function

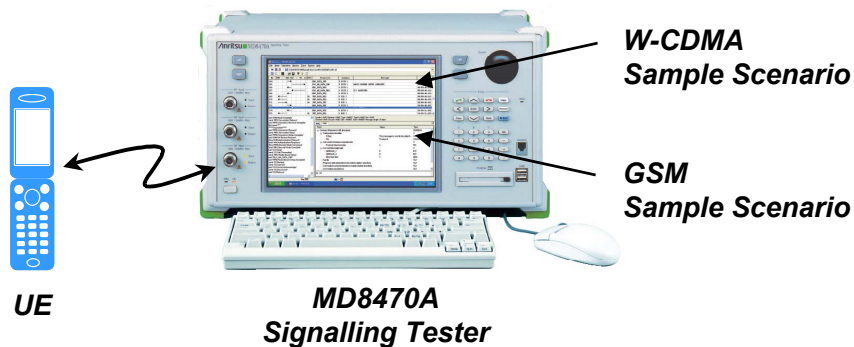
4-1. Testing Call Waiting/Call Hold Function (1/5)

- **Call Waiting/Call Hold Functions:**
 - ◆ With this function, when a new call occurs during another call, the user is notified and depending on the user's preferences, the current call can be put on hold to accept the new call.



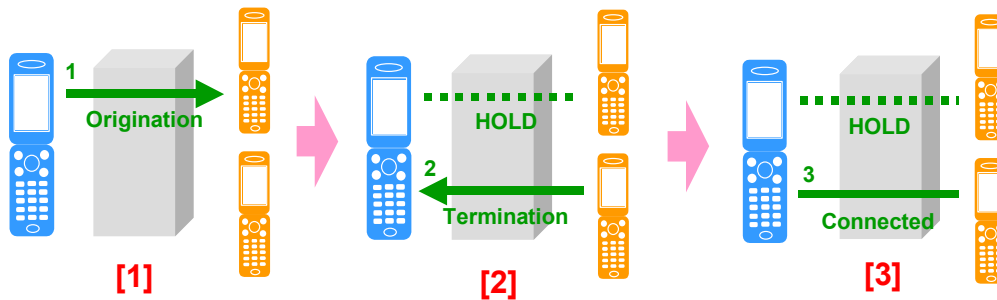
4-1. Testing Call Waiting/Call Hold Function (2/5)

- **Required Hardware & Software**



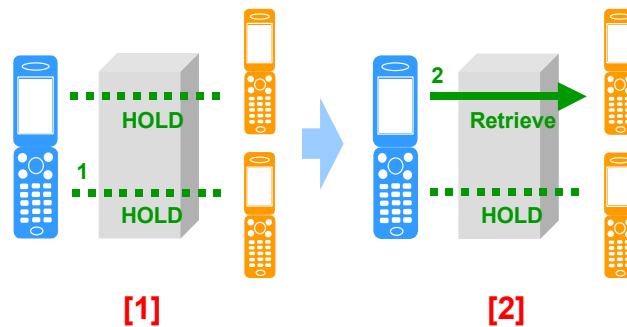
4-1. Testing Call Waiting/Call Hold Function (3/5)

- Second Caller Procedure
 - ✓ After location registration, the first call origination is performed. [1]
 - ✓ The second call is terminated from NW and the first call is put on hold. [2]
 - ✓ The second call is connected. [3]



4-1. Testing Call Waiting/Call Hold Function (4/5)

- Switching to Held First Caller
 - ✓ The connected second call is put on hold. [1]
 - ✓ The held first call is connected. [2]



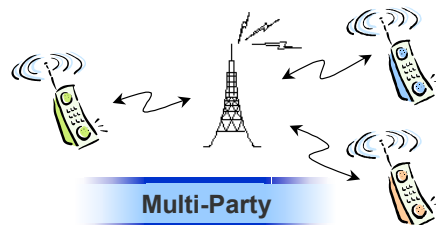
4-1. Testing Call Waiting/Call Hold Function (5/5)

- **Use Scenario**
 - ◆ **W-CDMA Sample Scenario**
 - CS + PS/Registration/Combined Attach
 - CS/Operation/Hold/Retrieve
 - ◆ **GSM Sample Scenario**
 - CS/Registration/Location Update
 - CS/Operation/Hold/Retrieve

* The above W-CDMA/GSM Sample Scenarios are offered by web download service of MD8470A support service (MX847010A-20).

4-2. Testing Multi-Party Function (1/4)

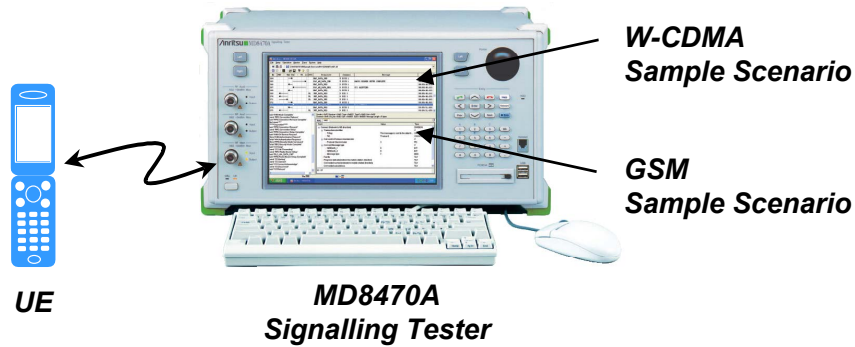
- **Multi-Party Functions:**
 - ◆ When there are both connected and held calls, this function allows the user to switch to multiple simultaneous calls as required.



4-2. Testing Multi-Party Function (2/4)

Supplementary
Services

- **Required Hardware and Software**



Discover What's Possible™
MD8470A-E-F-9

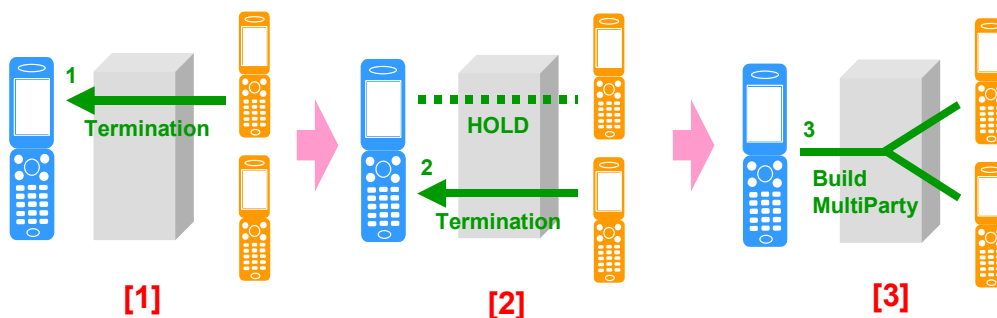
Slide 13

Anritsu

4-2. Testing Multi-Party Function (3/4)

Supplementary
Services

- **Multi Party (Merge) Procedure**
 - ✓ After location registration, the first call termination is performed from the NW. [1]
 - ✓ The second call is terminated from the NW and the first call is put on hold. [2]
 - ✓ BuildMPTY is sent to the NW to establish a multi-party call. [3]



Discover What's Possible™
MD8470A-E-F-9

Slide 14

Anritsu

4-2. Testing Multi-Party Function (4/4)

Supplementary
Services

- **Use Scenario**

- ◆ **W-CDMA Sample Scenario**

- CS + PS/Registration/Combined Attach
- CS/Operation/MPTY (Merge)
- CS/Operation/MPTY (Hold/Retrieve)
- CS/Operation/MPTY (Split)

- ◆ **GSM Sample Scenario**

- CS/Registration/Location Update
- CS/Operation/MPTY (Merge)
- CS/Operation/MPTY (Hold/Retrieve)
- CS/Operation/MPTY (Split)

* The above W-CDMA/GSM Sample Scenarios are offered by web download service of MD8470A support service (MX847010A-20).

Discover What's Possible™
MD8470A-E-F-9

Slide 15

Anritsu

4-3. Testing Advice of Charge Function (1/4)

Supplementary
Services

- **Advice of Charge (AoC):**
- This function^(*) notifies the user of the cost of the call based on charging information received from the NW.
 - ◆ By using a sample scenario and encode/decode tools, tests can be performed simply under various conditions including changes in call charging information and call charging updates during the call.



※1: Displays Advice of Charge (Information)

Discover What's Possible™
MD8470A-E-F-9

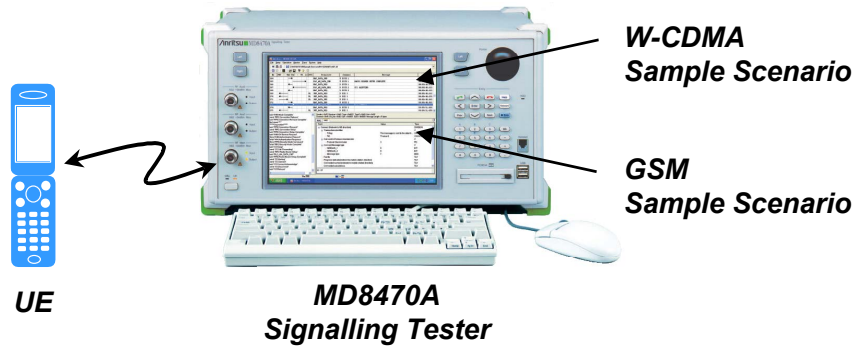
Slide 16

Anritsu

4-3. Testing Advice of Charge Function (2/4)

Supplementary Services

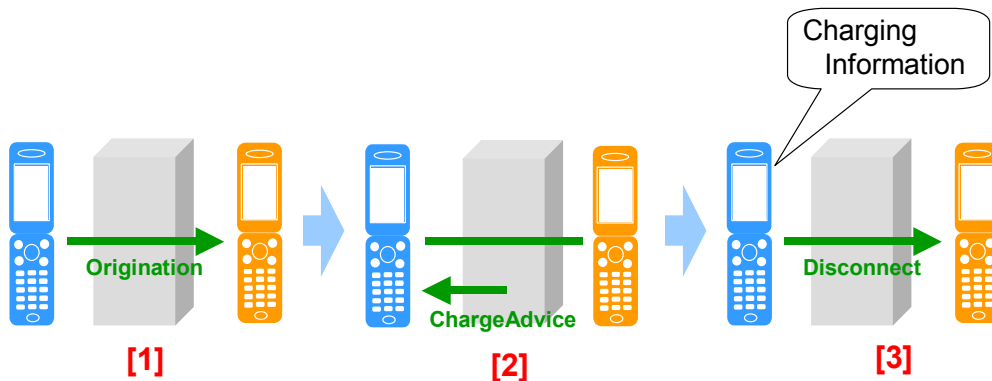
- **Required Hardware and Software**



4-3. Testing Advice of Charge Function (3/4)

Supplementary Services

- AoC (Advice of Charge) Procedure
 - ✓ After location registration, call origination is performed. [1]
 - ✓ During the call, Facility (forwardChargeAdvice) is sent from the NW. [2]
 - ✓ The call charge advice information (CAI) is confirmed at the mobile terminal. [3]



4-3. Testing Advice of Charge Function (4/4)

Supplementary
Services

- **Use Scenario**

- ◆ **W-CDMA Sample Scenario**

- CS + PS/Registration/Combined Attach
- CS/Operation/AMR MT SS (AoC)

- ◆ **GSM Sample Scenario**

- CS/Registration/Location Update
- CS/Operation/Conversation MT SS (AoC)

* The above W-CDMA/GSM Sample Scenarios are offered by web download service of MD8470A support service (MX847010A-20).

Discover What's Possible™
MD8470A-E-F-9

Slide 19

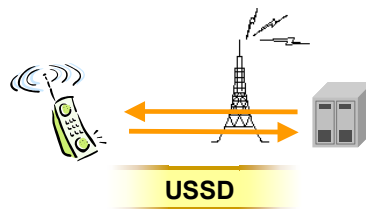
Anritsu

4-4. Testing USSD Function (1/4)

Supplementary
Services

- **USSD Functions**

- ◆ These functions are used from the UE to NW when performing carrier-related setting operations such as setting call forward and call hold functions.
- ◆ By using the sample scenario source code and encode/decode tools, it is possible to easily change the USSD code, USSD procedure, etc.



Discover What's Possible™
MD8470A-E-F-9

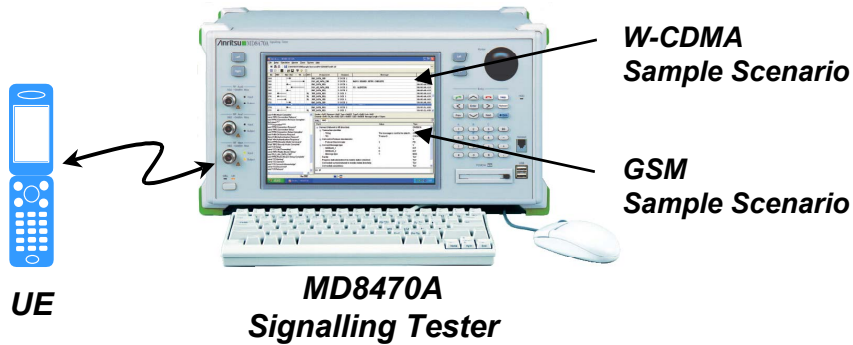
Slide 20

Anritsu

4-4. Testing USSD Function (2/4)

Supplementary
Services

- **Required Hardware and Software**



Discover What's Possible™
MD8470A-E-F-9

Slide 21

Anritsu

4-4. Testing USSD Function (3/4)

Supplementary
Services

- **USSD Procedure**
 - ✓ Register the location.
 - ✓ The USSD Notify (Facility:unstructuredSS-Notify) is terminated from the NW.
 - ✓ The mobile terminal behavior corresponding to the terminated USSD string is confirmed.

Discover What's Possible™
MD8470A-E-F-9

Slide 22

Anritsu

4-4. Testing USSD Function (4/4)

Supplementary
Services

● Use Scenario

◆ **W-CDMA Sample Scenario**

- CS + PS/Registration/Combined Attach
- CS/Operation/Idle – MO USSD (Response by Notify/Request)
- CS/Operation/Idle – MT USSD (Notify/Request)
- CS/Operation/AMR – MO USSD (Response by Notify/Request)
- CS/Operation/AMR – MT USSD (Notify/Request)

◆ **GSM Sample Scenario**

- CS/Registration/Location Update
- CS/Operation/Idle – MO USSD (Response by Notify/Request)
- CS/Operation/Idle – MT USSD (Notify/Request)
- CS/Operation/AMR – MO USSD (Response by Notify/Request)
- CS/Operation/AMR – MT USSD (Notify/Request)

* The above W-CDMA/GSM Sample Scenarios are offered by web download service of MD8470A support service (MX847010A-20).

Discover What's Possible™
MD8470A-E-F-9

Slide 23

Anritsu

5. Advantages of Using MD8470A

Supplementary
Services

■ No Dependence on Real Network

Compared to testing using a real network, the MD8470A connection is more stable and the test results have high reproducibility so the test efficiency is good.

■ Able to Retrieve and Analyze Wireless and SS Protocols

- The wireless protocol and SS protocol logs can be saved during testing so problems can be analyzed easily.

■ Use Sample Scenarios

Since sample scenario source code(*) can be used when performing SS tests, test parameters and sequences for regular and irregular systems can be changed easily.

* The above W-CDMA/GSM Sample Scenarios are offered by web download service of MD8470A support service (MX847010A-20).

Discover What's Possible™
MD8470A-E-F-9

Slide 24

Anritsu



Discover What's Possible™
MD8470A-E-F-9

Slide 25

Anritsu

Anritsu

Specifications are subject to change without notice.

ANRITSU CORPORATION

1800 Onna, Atsugi-shi, Kanagawa, 243-8555 Japan
Phone: +81-46-223-1111
Fax: +81-46-296-1264

● U.S.A.

ANRITSU COMPANY TX OFFICE SALES AND SERVICE

1155 East Collins Blvd., Richardson, TX 75081, U.S.A.
Toll Free: 1-800-ANRITSU (267-4878)
Phone: +1-972-644-1777
Fax: +1-972-644-3416

● Canada

ANRITSU ELECTRONICS LTD.
700 Silver Seven Road, Suite 120, Kanata,
ON K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

● Brasil

ANRITSU ELETRÔNICA LTDA.
Praça Amadeu Amaral, 27 - 1 andar
01327-010 - Paraisópolis, Sao Paulo, Brazil
Phone: +55-11-3283-2511
Fax: +55-11-3886940

● U.K.

ANRITSU LTD.

200 Capability Green, Luton, Bedfordshire LU1 3LU, U.K.
Phone: +44-1582-433280
Fax: +44-1582-731303

● Germany

ANRITSU GmbH

Grafenberger Allee 54-56, 40237 Düsseldorf, Germany
Phone: +49-211-96855-0
Fax: +49-211-96855-55

● France

ANRITSU S.A.

9, Avenue du Québec Z.A. de Courtabœuf 91951 Les
Ulis Cedex, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

● Italy

ANRITSU S.p.A.

Via Elio Vittorini, 129, 00144 Roma EUR, Italy
Phone: +39-06-509-9711
Fax: +39-06-502-2425

● Sweden

ANRITSU AB

Borgarfjordsgatan 13 164 40 Kista, Sweden
Phone: +46-853470700
Fax: +46-853470730

● Finland

ANRITSU AB

Teknobulevardi 3-5, FI-01530 Vantaa, Finland
Phone: +358-9-4355-220
Fax: +358-9-4355-2250

● Denmark

Anritsu AB Danmark

Korskildelund 6 DK - 2670 Greve, Denmark
Phone: +45-36915035
Fax: +45-43909371

● Singapore

ANRITSU PTE LTD.

10, Hoe Chiang Road #07-01/02, Keppel Towers,
Singapore 089315
Phone: +65-6282-2400
Fax: +65-6282-2533

● Hong Kong

ANRITSU COMPANY LTD.

Suite 923, 9/F., Chinachem Golden Plaza, 77 Mody
Road, Tsimshatsui East, Kowloon, Hong Kong, China
Phone: +852-2301-4980
Fax: +852-2301-3545

● P. R. China

ANRITSU COMPANY LTD.

Beijing Representative Office

Room 1515, Beijing Fortune Building, No. 5 North
Road, the East 3rd Ring Road, Chao-Yang District
Beijing 100004, P.R. China
Phone: +86-10-6590-9230

● Korea

ANRITSU CORPORATION

8F Hyun Juk Bldg. 832-41, Yeoksam-dong,
Kangnam-ku, Seoul, 135-080, Korea
Phone: +82-2-553-6603
Fax: +82-2-553-6604

● Australia

ANRITSU PTY LTD.

Unit 3/170 Forster Road Mt. Waverley, Victoria, 3149,
Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

● Taiwan

ANRITSU COMPANY INC.

7F, No. 316, Sec. 1, NeiHu Rd., Taipei, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817

050203