

TECHNICAL NOTE

MD8470A

Signalling Tester

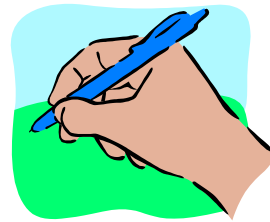
Scenario Test

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General Explanation of Scenario Testing



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Slide 1

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Contents

- Wireless Protocol Sequence Overview (W-CDMA)
- What is a scenario?
- How to write a scenario?
- Tools for writing a Layer3 message (Message Coder tool) and Debug functions
- Introduction of an example protocol scenario
- How to see a log?



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Slide 2

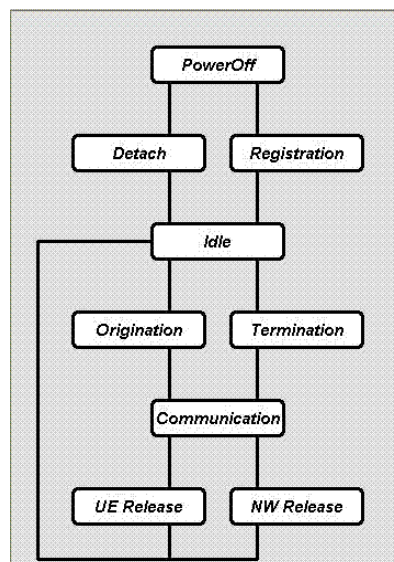
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ToC

- **Wireless Protocol Sequence Overview (W-CDMA)**
- What is a scenario?
- How to write a scenario?
- Tools for writing a Layer3 message (Message Coder tool) and Debug functions
- Introduction of the example protocol scenario
- How to see a log?



Wireless Protocol Sequence Overview (W-CDMA)



W-CDMA (Protocol Sequence)

Sample Sequence
of Registration

```
/* *****  
/* Registration arrow diagram in this Scenario */  
/* MS MD8480 */  
/* |----- RRC Connection Request ----->| */  
/* | (TR-Mode PRACH-RACH-CCCH) | */  
/* |<----- RRC Connection Setup ----->| */  
/* | (UM-Mode S-CCPCH-FACH-CCCH) | */  
/* |----- RRC Connection Setup Complete ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- MM Location Updating Request ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- GMM Attach Request ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |<----- MM Authentication Request ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- MM Authentication Response ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |<----- Security Mode Command ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- Security Mode Complete ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |<----- MM Identity Request ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- MM Identity Response ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |<----- MM Location Updating Accept ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- MM TMSI Reallocation complete ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* */  
/* *****
```

W-CDMA (Protocol Sequence)

Sample Sequence
of Registration

```
/* *****  
/* Registration arrow diagram in this Scenario */  
/* MS MD8480 */  
/* |<----- GMM AuthenticAndCiphering Req. ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- GMM AuthenticAndCiphering Resp. ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |<----- Security Mode Command ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- Security Mode Complete ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |<----- GMM Identity Request ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- GMM Identity Response ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |<----- GMM Attach Accept ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |----- GMM Attach Complete ----->| */  
/* | (AM-Mode DPCH-DCH-DCCH) | */  
/* |<----- RRC Connection Release ----->| */  
/* | (UM-Mode DPCH-DCH-DCCH) | */  
/* |----- RRC Connection Release complete ----->| */  
/* | (UM-Mode DPCH-DCH-DCCH) | */  
/* */  
/* End Of Sequence */  
/* *****
```

W-CDMA (Protocol Sequence)

Sample Sequence
of Registration &
PDP activation
(H3G case)

```

/*****/
/* Registration arrow diagram in this Scenario */
/* MS MD8480 */
/* |----- RRC Connection Request ----->| */
/* | (TR-Mode PRACH-RACH-CCCH) | */
/* |<----- RRC Connection Setup ----->| */
/* | (UM-Mode S-CCPCH-FACH-CCCH) | */
/* |----- RRC Connection Setup Complete ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- MM Location Updating Request ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- GMM Attach Request ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- MM Authentication Request ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- MM Authentication Response ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- Security Mode Command ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- Security Mode Complete ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- MM Identity Request ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- MM Identity Response ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- MM Location Updating Accept ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- MM TMSI Reallocation complete ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* */
/*****/

```

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W-CDMA (Protocol Sequence)

Sample Sequence
of Registration &
PDP activation
(H3G UE case)

```

/*****/
/* Registration arrow diagram in this Scenario */
/* MS MD8480 */
/* |<----- GMM AuthenticAndCiphering Req. ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- GMM AuthenticAndCiphering Resp. ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- Security Mode Command ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- Security Mode Complete ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- GMM Identity Request ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- GMM Identity Response ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- GMM Attach Accept ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- GMM Attach Complete ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- SM PDP Context Request ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- Radio Bearer Setup ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- Radio Bearer Setup Complete ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- SM PDP Context Accept ----->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* */
/* End Of Sequence */
/*****/

```

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W-CDMA (Protocol Sequence)

Sample Sequence
of Voice & Video
Origination

```

/*****
/* Origination arrow diagram in this Scenario */
/* MS MD8480 */
/* |----- RRC Connection Request ---->| */
/* | (TR-Mode PRACH-RACH-CCCH) | */
/* |<----- RRC Connection Setup -----| */
/* | (UM-Mode S-CCPCH-FACH-CCCH) | */
/* |----- RRC Connection Setup Complete ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- MM CM Service Request ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- MM Authentic Request -----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- MM Authentic Response ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- Security Mode Command -----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- Security Mode Complete ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- MM CM Service Accept -----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- CC Setup ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- CC Call Proceeding -----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- Radio Bearer Setup ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- Radio Bearer Setup Complete ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- CC Alerting ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- CC Connect ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- CC Connect Acknowledge ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* | End Of Sequence */
/*****

```

W-CDMA (Protocol Sequence)

Sample Sequence
of Voice & Video
Termination

```

/*****
/* Termination arrow diagram in this Scenario */
/* MS MD8480 */
/* |<----- Paging Type 1 -----| */
/* | (TR-Mode S-CCPCH-PCH-PCCH) | */
/* |----- RRC Connection Request ---->| */
/* | (TR-Mode PRACH-RACH-CCCH) | */
/* |<----- RRC Connection Setup -----| */
/* | (UM-Mode S-CCPCH-FACH-CCCH) | */
/* |----- RRC Connection Setup Complete ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- Paging Response ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- MM Authentic Request -----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- MM Authentic Response ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- Security Mode Command -----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- Security Mode Complete ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- CC Setup ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- CC Call Confirmed ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- Radio Bearer Setup ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- Radio Bearer Setup Complete ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |----- CC Alerting ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- CC Connect ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<----- CC Connect Acknowledge ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* | End Of Sequence */
/*****

```

W-CDMA (Protocol Sequence)

Sample Sequence
of Packet
Origination

```

/*****/
/* Origination arrow diagram in this Scenario */
/* MS MD8480 */
/* |---- RRC Connection Request ---->| */
/* | (TR-Mode PRACH-RACH-CCCH) | */
/* |<---- RRC Connection Setup ----| */
/* | (UM-Mode S-CCPCH-FACH-CCCH) | */
/* |---- RRC Connection Setup Complete ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |---- MM CM Service Request ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<---- GMM AuthenticAndCiphering Req. ----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |---- GMM AuthenticAndCiphering Resp.---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<---- Security Mode Command ----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |---- Security Mode Complete ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<---- MM CM Service Accept ----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |---- SM Active PDP Context Request ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<---- Radio Bearer Setup ----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |---- Radio Bearer Setup Complete ---->| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* |<---- SM Active PDP Context Accept ----| */
/* | (AM-Mode DPCH-DCH-DCCH) | */
/* */
/* End Of Sequence */
/*****/

```

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ToC

- Wireless Protocol Sequence Overview (W-CDMA)
- **What is a scenario?**
- How to write a scenario?
- Tools for writing a Layer3 message (Message Coder tool) and Debug functions
- Introduction of the example protocol scenario
- How to see a log?



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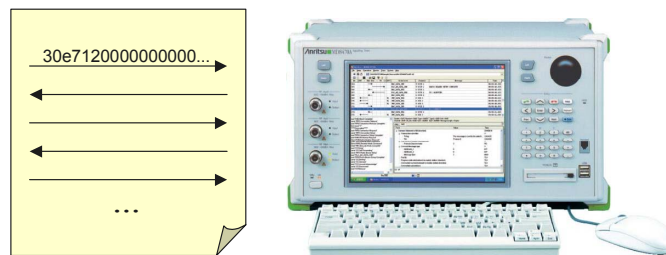
Slide 12

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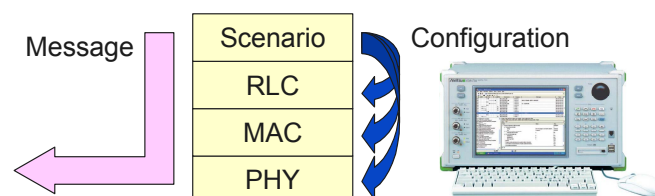
What is a scenario? - Definition -

- “Scenarios” are used for testing UEs on MD8470A.
- A “Scenario” is a sequence of messages that are exchanged between a UE and BTS
 - Used for checking whether UE behaves as expected.



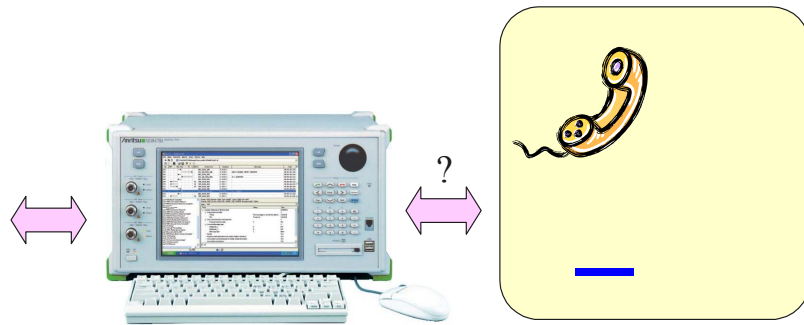
What is a scenario? - radio bearer configuration -

- For the purpose of efficient usage of radio resources, the network changes the radio bearer configuration while exchanging messages with the UE.
- Radio bearer information is also included in some messages, and a “Scenario” has to configure MD8470A hardware for sending/receiving messages.



What is a scenario? - The other party -

- MD8470A provides interfaces to the other party: handset, Ethernet, ISDN.
- In the case of service testing, these interfaces have to be configured.



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ToC

- Wireless Protocol Sequence Overview (W-CDMA)
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- **How to write a scenario?**
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How to write a scenario? - General -

A scenario consists of the following 5 parts:

- 1. Beginning**
- 2. Setting into MD8470A**
- 3. Send message to UE**
- 4. Receive message from UE**
- 5. TE setting**

Some scenarios are big and complex, but the scenario is the combination of the above 5 parts.

How to write a scenario? - 1. Beginning -

```
/****** INCLUDE *****/  
#include <windows.h>  
#include "primitive.h"  
#include "parameter.h"  
#include "scenario.h"  
#include "stdio.h"  
  
/****** FUNCTION *****/  
DLLEXPORT INT ScenarioMain(LPVOID);  
  
INT ScenarioMain(LPVOID dmy)  
{  
    SimulatorStart(0,NO_TIMEOUT);  
}
```

How to write a scenario? - 2. Setting into MD8470A -

```
CalcRMPParameter(D_DPCH,  
    &CphyRlSetup_D_DPCH_SDCCH, &CphyTrchConfig_D_DPCH_SDCCH);  
CphyRlSetup(UNIT_BTS1, D_DPCH, 0,  
    &CphyRlSetup_D_DPCH_SDCCH, ACTIVATE_NOW, NO_TIMEOUT);  
CphyTrchConfig(UNIT_BTS1, D_DPCH, 0,  
    &CphyTrchConfig_D_DPCH_SDCCH, ACTIVATE_NOW, NO_TIMEOUT);  
CmacConfig(UNIT_BTS1, D_DPCH, 0,  
    &CmacConfig_D_DPCH_SDCCH, ACTIVATE_NOW, NO_TIMEOUT);  
CalcRMPParameter(U_DPCH,  
    &CphyRlSetup_U_DPCH_SDCCH, &CphyTrchConfig_U_DPCH_SDCCH);  
CphyRlSetup(UNIT_BTS1, U_DPCH, 0,  
    &CphyRlSetup_U_DPCH_SDCCH, ACTIVATE_NOW, NO_TIMEOUT);  
CphyTrchConfig(UNIT_BTS1, U_DPCH, 0,  
    &CphyTrchConfig_U_DPCH_SDCCH, ACTIVATE_NOW, NO_TIMEOUT);
```

How to write a scenario? - 2. Setting into MD8470A -

```
CmacConfig(UNIT_BTS1, U_DPCH, 0,  
    &CmacConfig_U_DPCH_SDCCH, ACTIVATE_NOW, NO_TIMEOUT);  
CrlcConfig(UNIT_BTS1, CRLC_UM_ESTABLISH, DCCH, 0,  
    &CrlcConfig_DCCH, RRC, NO_TIMEOUT);  
CrlcConfig(UNIT_BTS1, CRLC_AM_ESTABLISH, DCCH, 1,  
    &CrlcConfig_DCCH, RRC, NO_TIMEOUT);  
CrlcConfig(UNIT_BTS1, CRLC_AM_ESTABLISH, DCCH, 2,  
    &CrlcConfig_DCCH, RRC, NO_TIMEOUT);  
CrlcConfig(UNIT_BTS1, CRLC_AM_ESTABLISH, DCCH, 3,  
    &CrlcConfig_DCCH, RRC, NO_TIMEOUT);
```

How to write a scenario? - 3. Send message to UE -

```
/* Send Message: Identity Request */
{
    UCHAR SndData[] = {
        0x14, 0x00, 0x04, 0x0a, 0x30, 0x02
    };
    SndMessageIntegrity(UNIT_BTS1,RLC_AM_DATA_REQ,D_DCCH,2,
        SndData,47);
}
```

How to write a scenario? - 4. Receive message from UE -

```
/* Receive Message: RRC Connection Setup Complete */
{
    INT BtsNo, Frame, Lo_Ch, Lo_No, ret;
    UCHAR RcvData[255];

    for ( ;; ){
        ret = RcvMessage(&BtsNo, &Frame, &Lo_Ch, &Lo_No,
            RcvData, NO_TIMEOUT);
        if (((Frame == RLC_AM_DATA_IND) && (Lo_Ch == U_DCCH)
            && (GetMessageTypeMsgNo(U_DCCH, RcvData)
                == Mar2002_RrcConnectionSetupComplete))
            || (ret == TIME_OUT)){
            break;
        }
    }
}
```

How to write a scenario? - 5. TE setting -

```
CteConfig(DTCH,0,&CteConfigAmrA,NO_TIMEOUT);
CteConfig(DTCH,1,&CteConfigAmrB,NO_TIMEOUT);
CteConfig(DTCH,2,&CteConfigAmrC,NO_TIMEOUT);
...
CteConnect(DTCH,0,TE_PORT_LOOPBACK,TE_PORT_LOOPBACK,
CALL_FROM_AIR,(UCHAR *)0,NO_TIMEOUT);
CteConnect(DTCH,1,TE_PORT_LOOPBACK,TE_PORT_LOOPBACK,
CALL_FROM_AIR,(UCHAR *)0,NO_TIMEOUT);
CteConnect(DTCH,2,TE_PORT_LOOPBACK,TE_PORT_LOOPBACK,
CALL_FROM_AIR,(UCHAR *)0,NO_TIMEOUT);
```

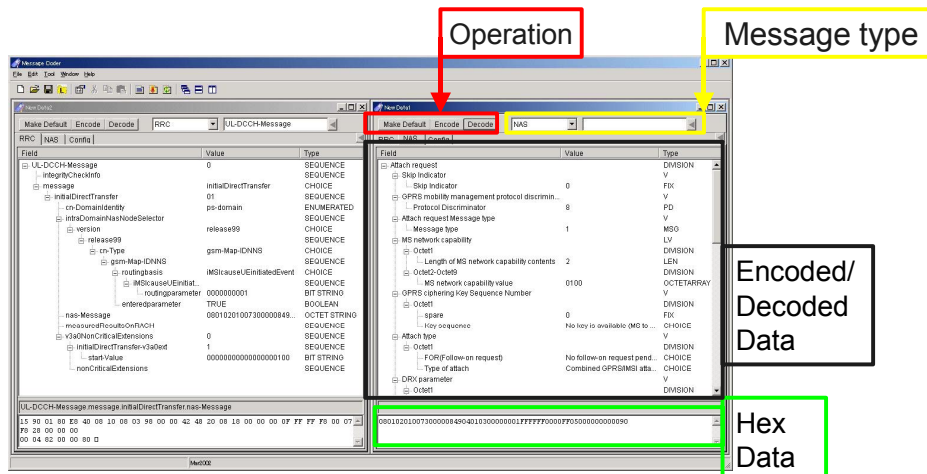
ToC

- Wireless Protocol Sequence Overview (W-CDMA)
- What is a scenario?
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- **Tools for writing a Layer3 message (Message Coder tool) and Debug functions**
- Introduction of the example protocol scenario
- How to see a log?



Message Coder

- One of the parts of a scenario is 'send message to UE'.
- By using this tool, users can create messages via GUI.
- Copy the 'HEX' data (bottom portion of this tool) to the scenario.



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Debug functions

- A message can be printed when something occurs: SequenceDisp().
- Users can select one from several patterns: SequenceBtn().
- Users can input any string message: SequenceStr().

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ToC

- Wireless Protocol Sequence Overview (W-CDMA)
- What is a scenario?
- How to write a scenario?
- Tools for writing a Layer3 message (Message Coder tool) and Debug functions
- **Introduction of an example protocol scenario**
- How to see a log?



Introduction of an example protocol scenario

- Please look at the 'W01_voice.c' scenario located in
c:¥MX847010¥Sample Scenario¥W01

ToC

- Wireless Protocol Sequence Overview (W-CDMA)
- What is a scenario?
- How to write a scenario?
- Tools for writing a Layer3 message (Message Coder tool) and Debug functions
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- **How to see a log?**



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How to see a log?

The screenshot displays the Anritsu MX847010A software interface. The top window shows a 'Real-time Trace log' with columns for No, PHY, MAC, RLC, TE, L3, BTS, Primitive, Channel, Message, and Time. A specific log entry is highlighted, and a red box labeled 'Click' points to it. Below the log, the 'Decoded Data' window shows a hierarchical tree structure of the message content, including fields like 'Identity response', 'Mobile Identity', and 'Identity digits'. A green box labeled 'Hex Data' points to the raw hex data at the bottom of the decoded data window. A yellow box labeled 'Comment in the scenario' points to the left-hand pane of the interface.

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Specifications are subject to change without notice.

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