

Getting Started with Message Coder

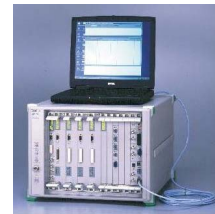
How to analyze L3 Messages

MD8480C

W-CDMA Signalling Tester

Getting Started with Message Coder

How to analyze L3 Messages



Version 1.0
Anritsu Corporation

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MD8480C-E-E-5

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What is Message Coder?

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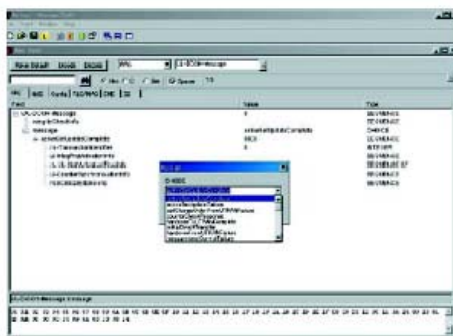
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What is Message Coder?

Message Coder*¹ is a software tool for creating and analyzing higher-layer messages exchanged between GSM/WCDMA base stations and mobile terminals.

*¹: The MD8480C includes this message encode/decode tool for scenario creation and analysis.



Message Coder Main Screen

Supported Messages

Category	Message	Reference Spec. * ¹
RRC	RRC Layer	3GPP TS25.331
NAS	NAS Layer	3GPP TS24.007, TS24.008
Config	Layer 1, Layer 2 Control	-
RLC/MAC Control	RLC/MAC Control	3GPP TS04.60
SS	Supplementary Service	3GPP TS24.080
SMS	SMS (SM-RL/SM-TL)	3GPP TS23.040
CBS	CBS	3GPP TS23.041, TS25.324
Layer 3 Messages * ²		Reference Spec. * ¹
CC	Messages for Circuit-switched Call Control (35)	3GPP TS24.008, 9.3
MM	Messages for Mobility Management (22)	3GPP TS24.008, 9.2
GMM	GPRS Mobility Management Messages (23)	3GPP TS24.008, 9.4
SM	GPRS Session Management Messages (16)	3GPP TS24.008, 9.5
SMS	Messages for Short Message or Notification Transfer on CM (3)	3GPP TS24.001, 7.2
RR	Messages for Radio Resource Management (82)	3GPP TS04.18, 9.1
SS	Messages for Supplementary Services Control (3)	3GPP TS24.080, 2.2

*¹: Bundled RRC and NAS definition files are standardized by 3GPP in June 2001 (R99), March 2002 (R99), December 2002 (R99), and December 2005 (Rel. 5). RRC definition files standardized in June 2006 (Rel. 6) are also bundled.

*²: High-layer protocols in messages are not supported.

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Analyzing RRC Messages from Trace Window

Analyzing RRC Messages from Trace Window

Message Coder decodes RRC Messages from the following messages on the Trace window.

Uplink CCCH (U_CCCH-U_RACH): rrcConnectinRequest

Downlink CCCH (D_CCCH-D_FACH): rrcConnectinSetup

Uplink DCCH (U_DCCH-U_DCH): rrcConnectinSetupComplete

Downlink DCCH (D_DCCH-D_DCH): rrcConnectinRelease

Procedure

- Select the target message in the Trace window.
- Copy message data from the primitive details partition in the Trace window.
- Paste the data to the Message View Area in Message Coder.
- Press the Decode button in Message Coder.
- View the message details in the Tree View Area in Message Coder.

Trace: U_CCCH (RRC CONNECTION REQUEST)

The screenshot shows a trace log window titled 'C:\MxB48000\Trace\R99.log'. The main table lists various messages with columns for PHY, MAC, RLC, TE, RRC, NAS, BTS, Primitive, Channel, Message, and Progress Time. The 'RRC CONNECTION REQUEST' message is highlighted in grey. A context menu is open over this message, showing 'Copy data only' and 'Copy all' options.

PHY	MAC	RLC	TE	RRC	NAS	BTS	Primitive	Channel	Message	Progress Time
←						1	PHY_DATA_REQ	D BCH		000:00:03:83
←						1	PHY_DATA_REQ	D BCH		000:00:03:85
←						1	PHY_DATA_REQ	D BCH		000:00:03:87
←						1	PHY_DATA_IND	U RACH		000:00:28:52
←						1	MAC_DATA_IND	U CCCH		000:00:28:52
←						1	RLC_TR_DATA_IND	U CCCH	RRC CONNECTION REQUEST	000:00:28:52
←						1	CRLC_CONFIG_REQ	D CCCH		000:00:28:55
←						1	CRLC_CONFIG_CNF	D CCCH		000:00:28:55
←						1	CPHY_RL_SETUP_REQ	D DPCH		000:00:28:57
←						1	CPHY_TRCH_CONFIG_REQ	D DPCH		000:00:28:59
←						1	CPHY_RL_SETUP_CNF	D DPCH		000:00:28:60
←						1	CMAC_CONFIG_REQ	D DPCH		000:00:28:61
←						1	CMAC_CONFIG_CNF	D DPCH		000:00:28:62

Message Data (Length=21)
 Sender:050 Receiver:060 Type:00510033 Channel:12000004 CH_No:0000 Opt0:00000000 Opt1:00000000 Opt2:00000000
 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
 0000 | 39 01 23 45 67 00 10 08 04 03 01 3d 10 00 00 00 | 00 00 00 00 00

- Select **RRC CONNECTION REQUEST**.
- Right-click and select **Copy data only**.

Message Coder: RRC (UL-CCCH-Message)

The screenshot shows the 'New Data2' window in the Message Coder software. The 'RRC' tab is active, and the 'UL-CCCH-Message' is selected. The 'message' field is expanded to show the 'rrcConnectionRequest' structure. The fields and their values are as follows:

Field	Value	Type
UL-CCCH-Message	0	SEQUENCE
integrityCheckInfo		SEQUENCE
message	rrcConnectionRequest	CHOICE
rrcConnectionRequest	11	SEQUENCE
initialUE-Identity	tmsi-and-LAI	CHOICE
tmsi-and-LAI		SEQUENCE
tmsi	0000000100100011010001...	BIT STRING
lai		SEQUENCE
plmn-Identity		SEQUENCE
mcc		SEQUENCE OF
Digit	0	INTEGER
Digit	0	INTEGER
Digit	1	INTEGER
mnc	2	SEQUENCE OF

UL-CCCH-Message.message.rrcConnectionRequest
 39 01 23 45 67 00 10 08 04 03 01 3d 10 00 00 00

- Setup:
RRC
UL-CCCH-Message
Hex
Spacer
- Paste the data.
- Press **Decode**.

Trace: D_CCCH (RRC CONNECTION SETUP)

PHY	MAC	RLC	TE	RRC	NAS	BTS	Primitive	Channel	Message	Progress Time
						1	CRLC_CONFIG_REQ	D CCCH 1		000:00:28:72
						1	CRLC_CONFIG_CNF	D CCCH 1		000:00:28:72
						1	CRLC_CONFIG_REQ	D CCCH 2		000:00:28:74
						1	CRLC_CONFIG_CNF	D CCCH 2		000:00:28:74
						1	CRLC_CONFIG_REQ	D CCCH 3		000:00:28:76
						1	CRLC_CONFIG_CNF	D CCCH 3		000:00:28:76
						1	RLC_UM_DATA_REQ	D CCCH 0	RRC CONNECTION SETUP	000:00:28:83
						1	MAC_DATA_REQ	D CCCH 0		000:00:28:83
						1	MAC_DATA_REQ	D CCCH 0		000:00:28:83
						1	MAC_DATA_REQ	D CCCH 0		000:00:28:83
						1	MAC_DATA_REQ	D CCCH 0		000:00:28:83
						1	MAC_DATA_REQ	D CCCH 0		000:00:28:83

Message Data (Length=111)

Sender:060 Receiver:050 Type:00500032 Channel:02000004 CH_No:0000 Opt0:00000000 Opt1:00008000 Opt2:00000000

```

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
0000 | 30 e7 20 24 68 ac e0 02 01 00 80 00 08 00 01 06 | b0 34 9d 3c 09 4f 06 a1 00 01 42 16 79 5a 0b 62
0020 | 60 ac 2e 74 f0 a5 3c 3a 8c 00 15 18 99 e5 68 ac | f1 a2 b0 b9 d3 c4 c4 f1 6a 50 00 94 a3 67 95 a2
0040 | h3 c6 8a c7 e7 4f 1b 53 c7 a9 e0 03 53 20 00 18 | 94 a3 c0 3c 00 90 08 8a 74 98 27 af 56 9a 0e 08
0060 | 00 00 04 0e 40 28 50 00 08 02 40 00 0a 78 04
    
```

- Select **RRC CONNECTION SETUP**.
- Right-click and select **Copy data only**.

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Message Coder: RRC (DL-CCCH-Message)

- Setup:
RRC
DL-CCCH-Message
Hex
Spacer

- Paste the data.

- Press **Decode**.

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Trace: U_DCCH (RRC CONNECTION SETUP COMPLETE)

PHY	MAC	RLC	TE	RRC	NAS	BTS	Primitive	Channel	Message	Progress Time
1						1	PHY_DATA_REQ	D FACH	0	000.00:28.85
1						1	CPHY_SYNC_IND	U DPCH	0	000.00:29.05
1						1	PHY_DATA_IND	U DCH	0	000.00:29.12
1						1	MAC_DATA_IND	U DCCH	1	000.00:29.12
1						1	PHY_DATA_IND	U DCH	0	000.00:29.13
1						1	MAC_DATA_IND	U DCCH	1	000.00:29.13
1						1	RLC_AM_DATA_IND	U DCCH	1	RRC CONNECTION SETUP COMPLETE 000.00:29.13
1						1	MAC_DATA_REQ	D DCCH	1	000.00:29.13
1						1	PHY_DATA_REQ	D DCH	0	000.00:29.14
1						1	PHY_DATA_IND	U DCH	0	000.00:29.14
1						1	MAC_DATA_IND	U DCCH	2	000.00:29.14
1						1	PHY_DATA_IND	U DCH	0	000.00:29.15
1						1	MAC_DATA_IND	U DCCH	2	000.00:29.15

Message Data (Length=30)

```

Sender:050 Receiver:060 Type:00510031 Channel:12000005 CH_No:0001 Opt0:00000000 Opt1:00000000 Opt2:0000005F
00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
0000 | 4a 88 00 01 20 00 05 22 aa d5 06 a5 56 a8 8a 68 | 83 04 08 00 18 00 11 82 34 9b 0a 94 59 80
    
```

- Select **RRC CONNECTION SETUP COMPLETE**.
- Right-click and select **Copy data only**.

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Message Coder: RRC (UL-DCCH-Message)

Make Default Encode Decode RRC UL-DCCH-Message Jun2006_Rel6_C

Hex Bin Spacer

Field	Value	Type
UL-DCCH-Message	0	SEQUENCE
integrityCheckInfo		SEQUENCE
message	rrcConnectionSetupComplete	CHOICE
rrcConnectionSetupComplete	101	SEQUENCE
rrc-TransactionIdentifier	0	INTEGER
startList	2	SEQUENCE OF
STARTSingle		SEQUENCE
cn-DomainIdentity	cs-domain	ENUMERATED
start-Value	00000000000000000100	BIT STRING
STARTSingle		SEQUENCE
cn-DomainIdentity	ps-domain	ENUMERATED
start-Value	00000000000000000100	BIT STRING
ue-RadioAccessCapability	1	SEQUENCE
pdcp-Capability		SEQUENCE

4a 88 00 01 20 00 05 22 aa d5 06 a5 56 a8 8a 68 83 04 08 00 18 00 11 82 34 9b 0a 94 59 80

- Setup:
RRC
UL-DCCH-Message
Hex
Spacer

• Paste the data.

• Press **Decode**.

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Trace: D_DCCH (RRC CONNECTION RELEASE)

PHY	MAC	RLC	TE	RRC	NAS	BTS	Primitive	Channel	Message	Progress Time
						1	MAC_DATA_IND	U DCCH 2		000:00:30:05
						1	PHY_DATA_IND	U DCH 0		000:00:33:16
						1	MAC_DATA_IND	U DCCH 2		000:00:33:16
						1	RLC_AM_DATA_IND	U DCCH 2	GMM: ATTACH COMPLETE	000:00:33:16
						1	MAC_DATA_REQ	D DCCH 2		000:00:33:16
						1	PHY_DATA_REQ	D DCH 0		000:00:33:17
						1	RLC_UM_DATA_REQ	D DCCH 0	RRC CONNECTION RELEASE	000:00:33:18
						1	MAC_DATA_REQ	D DCCH 0		000:00:33:18
						1	PHY_DATA_REQ	D DCH 0		000:00:33:19
						1	PHY_DATA_IND	U DCH 0		000:00:33:30
						1	MAC_DATA_IND	U DCCH 0		000:00:33:30
						1	RLC_UM_DATA_IND	U DCCH 0	RRC CONNECTION RELEASE COMPLETE	000:00:33:30
						1	PHY_DATA_IND	U DCH 0		000:00:33:62
						1	MAC_DATA_IND	U DCCH 0		000:00:33:62

Message Data (Length=7)
 Sender: 060 Receiver: 050 Type: 00500032 Channel: 02000005 CH_No: 0000 Opt0: 00000000 Opt1: 00000000 Opt2: 00000000
 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
 0000 | ec 93 78 35 83 c8 20

- Select **RRC CONNECTION RELEASE**.
- Right-click and select **Copy data only**.

Message Coder: RRC (DL-DCCH-Message)

DL-DCCH-Message.message.rrcConnectionRelease.r3.rrcConnectionRelease-r3.releaseCause
 ec 93 78 35 83 c8 20

- Setup:
RRC
DL-DCCH-Message
Hex
Spacer
- Paste the data.
- Press **Decode**.

Analyzing NAS Messages from Trace Window

Analyzing NAS Messages from Trace Window

Message Coder decodes NAS Messages from the following messages on the Trace window.

Uplink DCCH (U_DCCH-U_DCH): GMM, AttachRequest

Downlink DCCH (D_DCCH-D_DCH):

GMM, AuthenticationAndCipheringRequest

There are two steps to analyze NAS messages.

- First, analyze in the same way as RRC messages.
- Next, extract the NAS message from the decoded RRC message and decode the NAS message.

Trace: U_DCCH (GMM:ATTACH REQUEST)

PHY	MAC	RLC	TE	RRR	NAS	BTS	Primitive	Channel	Message	Progress Time
						1	MAC_DATA_IND	U DCCH 2		000:00:29:14
						1	PHY_DATA_IND	U DCH 0		000:00:29:15
						1	MAC_DATA_IND	U DCCH 2		000:00:29:15
						1	PHY_DATA_IND	U DCH 0		000:00:29:16
						1	MAC_DATA_IND	U DCCH 2		000:00:29:16
						1	RLC_AM_DATA_IND	U DCCH 2	GMM: ATTACH REQUEST	000:00:29:16
						1	MAC_DATA_REQ	D DCCH 2		000:00:29:16
						1	PHY_DATA_REQ	D DCH 0		000:00:29:17
						1	RLC_AM_DATA_REQ	D DCCH 2	GMM: AuthenticationAndCipheringREQ	000:00:29:25
						1	MAC_DATA_REQ	D DCCH 2		000:00:29:25
						1	MAC_DATA_REQ	D DCCH 2		000:00:29:25
						1	PHY_DATA_REQ	D DCH 0		000:00:29:26

Message Data (Length=44)

Sender:050 Receiver:060 Type:00510031 Channel:12000005 CH_No:0002 Opt0:00000000 Opt1:00000000 Opt2:00000062

```

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
0000 | 15 80 8d 01 18 40 08 17 2a 00 18 50 08 2f a0 09 | 1a 2b 38 07 88 80 04 00 00 68 b6 98 19 54 b8 aa
0020 | 33 12 65 4b 19 88 00 b8 2a 00 00 40
    
```

- Select **GMM: ATTACH REQUEST**.
- Right-click and select **Copy data only**.

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Message Coder: RRC (UL-DCCH-Message)

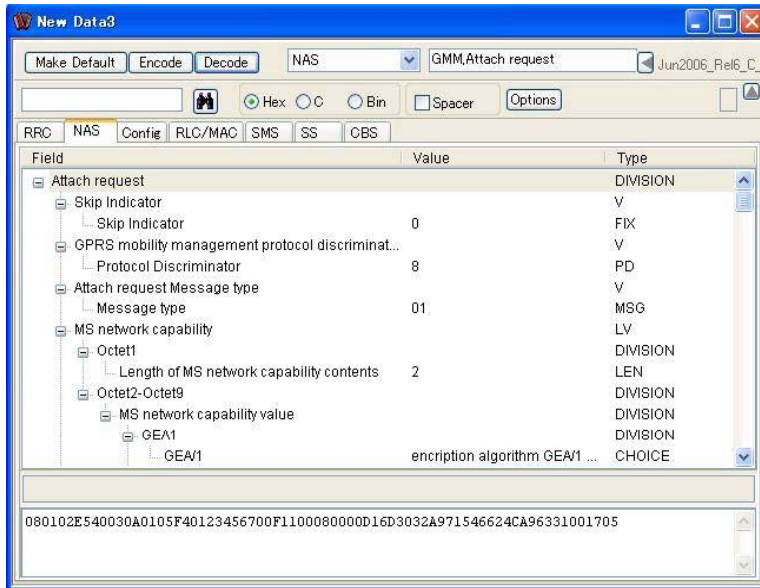
- Setup:
RRC
UL-DCCH-Message
Hex
Spacer
- Paste the data.
- Press **Decode**.
- Double-click **nas-Message**.
- Copy entire the **OCTET STRING** data.
- Press **Cancel**.

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Message Coder: NAS (GMM, Attach request)



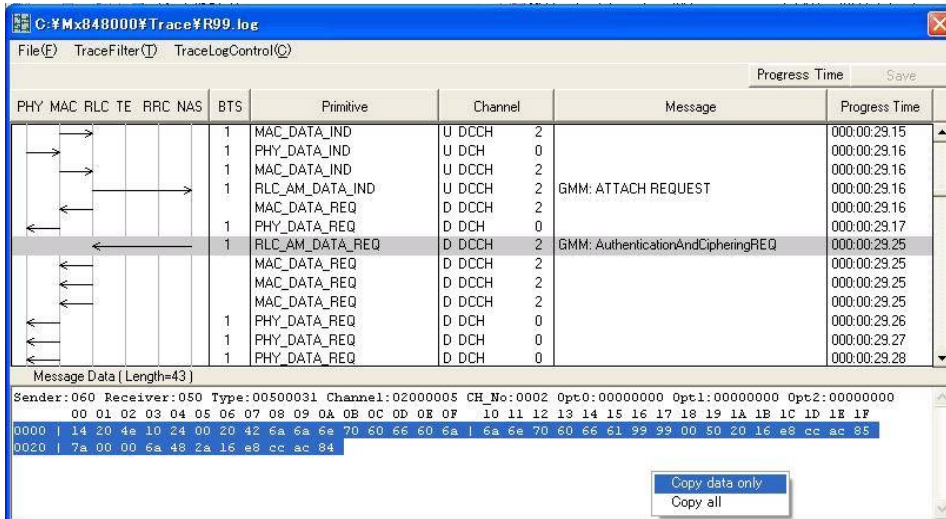
- Setup:
NAS
GMM, Attach request
Hex
No Spacer
- Paste the data.
- Press **Decode**.

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Trace: D_DCCH (GMM, AuthenticationAndCipherREQ)



- Select **GMM: AuthenticationAndCipheringREQ**.
- Right-click and select **Copy data only**.

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Message Coder: RRC(DL-DCCH-Message)

The screenshot shows the 'New Data2' window in the Message Coder software. The protocol is set to RRC and the message type is DL-DCCH-Message. The 'nas-Message' field is expanded, and its value is shown as an OCTET STRING. The hex dump at the bottom of the window displays the raw data for this field.

- Setup:
 - RRC**
 - DL-DCCH-Message**
 - Hex**
 - Spacer**
- Paste the data.
- Press **Decode**.
- Double-click **nas-Message**.
- Copy the entire **OCTET STRING** data.
- Press Cancel.

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Message Coder: NAS (GMM, Authentication and ciphering)

The screenshot shows the 'New Data2' window in the Message Coder software. The protocol is set to NAS and the message type is GMM, Authentication and ciphering. The tree view shows the structure of the NAS message, including fields for authentication and ciphering request, skip indicators, protocol discriminator, and ciphering algorithms.

- Setup:
 - NAS**
 - GMM, Authentication and ciphering**
 - Hex**
 - No Spacer**
- Paste the data.
- Press **Decode**.

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Analyzing System Information from Trace Window

Analyzing System Information from Trace window

Message Coder decodes System Information from the following messages on the Trace window.

Downlink BCCH (D_BCCH-D_BCH): MasterInformationBlock

Downlink BCCH (D_BCCH-D_BCH): SystemInformationBlockType5

There are two steps to Analyze System Information.

- First, analyze in the same way as RRC messages
- Next, extract the System Information from the decoded RRC message and decode the System Information.

If the System Information is segmented, it must be combined.

Trace: D_BCCH (SYSTEM INFORMATION-BCH) MasterInformationBlock

PHY	MAC	RLC	TE	RRC	NAS	BTS	Primitive	Channel	Message	Progress Time
						1	CRLC_CONFIG_REQ	D PCCH 0		000:00:03:54
						1	CRLC_CONFIG_CNF	D PCCH 0		000:00:03:54
						1	RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	000:00:03:61
						1	MAC_DATA_REQ	D BCCH 0		000:00:03:61
						1	RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	000:00:03:62
						1	MAC_DATA_REQ	D BCCH 0		000:00:03:62
						1	RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	000:00:03:63
						1	PHY_DATA_REQ	D BCH 0		000:00:03:63
						1	MAC_DATA_REQ	D BCCH 0		000:00:03:63
						1	RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	000:00:03:64
						1	MAC_DATA_REQ	D BCCH 0		000:00:03:64
						1	RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	000:00:03:65
						1	PHY_DATA_REQ	D BCH 0		000:00:03:65
						1	MAC_DATA_REQ	D BCCH 0		000:00:03:65

Message Data (Length=31)

Sender:060 Receiver:050 Type:00500033 Channel:02000002 CH_No:0000 Opt0:00000000 Opt1:00080000 Opt2:00000000

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F

0000 | 00 0e 00 a7 00 00 40 24 00 00 62 20 32 21 91 98 | 88 18 44 a8 d5 4a 40 10 02 00 00 00 00 00 00

- Select **SYSTEM INFORMATION-BCH**.
- Right-click and select **Copy data only**.

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Message Coder: RRC (BCCH-BCH-Message) 1 MasterInformationBlock

Make Default Encode Decode RRC BCCH-BCH-Message Jun2006_Rel6_C...

Hex Bin Spacer

Field	Value	Type
BCCH-BCH-Message		SEQUENCE
message		SEQUENCE
sfn-Prime	0	INTEGER
payload	completeSIB-List	CHOICE
completeSIB-List	1	SEQUENCE OF
CompleteSIBshort		SEQUENCE
sib-Type	masterInformationBlock	ENUMERATED
sib-Data-variable	00000000000000000000000000000000...	BIT STRING

00 0e 00 a7 00 00 40 24 00 00 62 20 32 21 91 98 88 18 44 a8 d5 4a 40 10 07 00 00 00

00 00 00

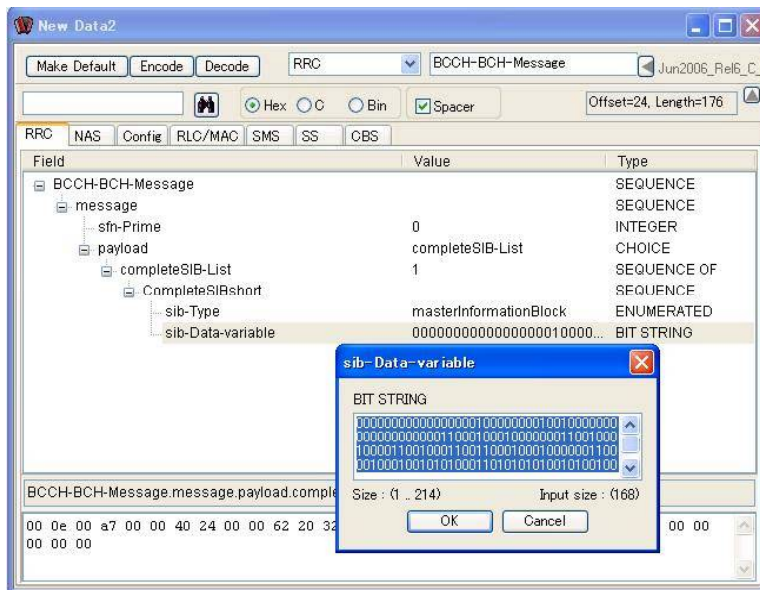
- Setup:
RRC
BCCH-BCH-Message
Hex
Spacer
- Paste the data.
- Press **Decode**.

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Message Coder: RRC (BCCH-BCH-Message) 2 MasterInformationBlock



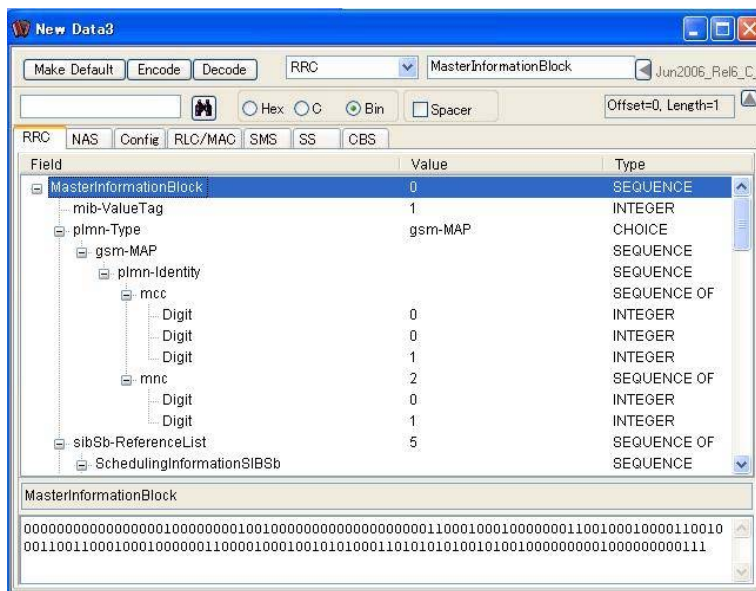
- Double-click the **sib-Data-variable**.
- Copy the entire **BIT STRING** data.
- Press Cancel.

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Message Coder: RRC MasterInformationBlock



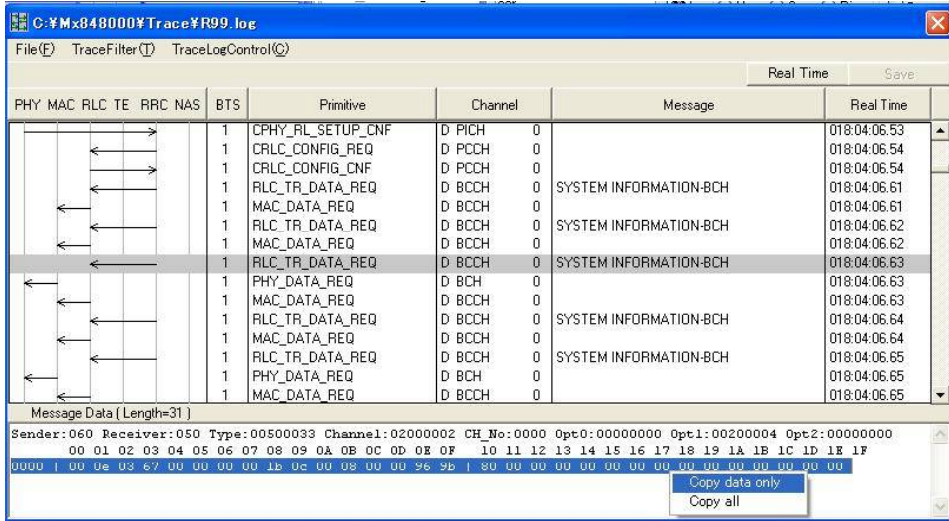
- Open a new MDI window.
- Setup:
RRC
MasterInformation-Block
Bin
No Spacer
- Paste the data.
- Press **Decode**.

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Trace: D_BCCH (SYSTEM INFORMATION-BCH) SystemInformationBlockType5 firstSegment



PHY	MAC	RLC	TE	RRR	NAS	BTS	Primitive	Channel	Message	Real Time
1							CPHY_RL_SETUP_CNF	D PICH 0		018:04:06:53
1							CRLC_CONFIG_REQ	D PCCH 0		018:04:06:54
1							CRLC_CONFIG_CNF	D PCCH 0		018:04:06:54
1							RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	018:04:06:61
1							MAC_DATA_REQ	D BCCH 0		018:04:06:61
1							RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	018:04:06:62
1							MAC_DATA_REQ	D BCCH 0		018:04:06:62
1							RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	018:04:06:63
1							PHY_DATA_REQ	D BCH 0		018:04:06:63
1							MAC_DATA_REQ	D BCCH 0		018:04:06:63
1							RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	018:04:06:64
1							MAC_DATA_REQ	D BCCH 0		018:04:06:64
1							RLC_TR_DATA_REQ	D BCCH 0	SYSTEM INFORMATION-BCH	018:04:06:65
1							PHY_DATA_REQ	D BCH 0		018:04:06:65
1							MAC_DATA_REQ	D BCCH 0		018:04:06:65

Message Data (Length=31)
 Sender:060 Receiver:050 Type:00500033 Channel:02000002 CH_No:0000 Opt0:00000000 Opt1:00200004 Opt2:00000000
 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
 0000 00 0e 03 e7 00 00 00 00 1b 0c 00 08 00 00 96 9b 1 80 00 00 00 00 00 00 00 00 00 00 00 00

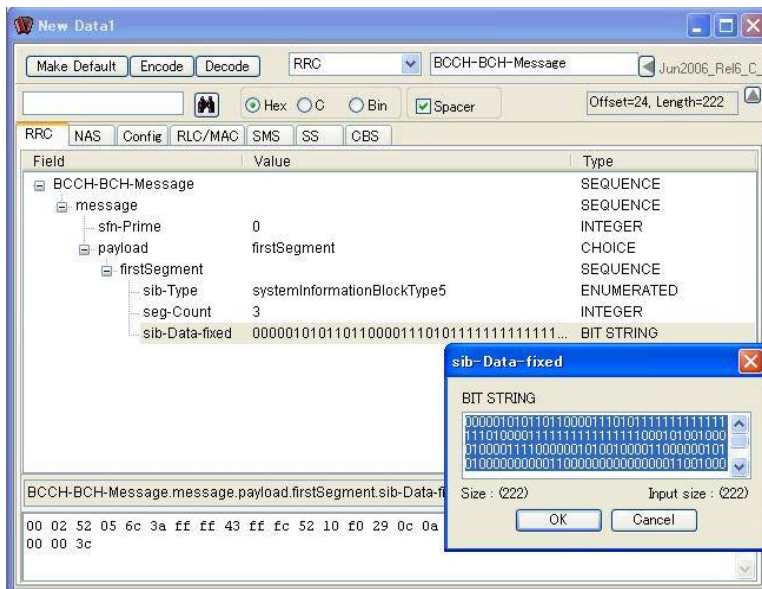
- Select **SYSTEM INFORMATION-BCH**.
- Right-click and select **Copy data only**.

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Message Coder: RRC (BCCH-BCH-Message) SystemInformationBlockType5 firstSegment



New Data1
 Make Default Encode Decode RRC BCCH-BCH-Message Jun2006_Rel6_C
 Hex Bin Spacer Offset=24, Length=222

RRC NAS Config RLC/MAC SMS SS CBS

Field	Value	Type
BCCH-BCH-Message		SEQUENCE
message		SEQUENCE
sfn-Prime	0	INTEGER
payload	firstSegment	CHOICE
firstSegment		SEQUENCE
sib-Type	systemInformationBlockType5	ENUMERATED
seg-Count	3	INTEGER
sib-Data-fixed	00000101011011000011101011111111111111...	BIT STRING

BCCH-BCH-Message.message.payload.firstSegment.sib-Data-fixed
 00 02 52 05 6c 3a ff ff 43 ff fc 52 10 f0 29 0c 0a 00 00 3c

sib-Data-fixed
 BIT STRING
 00000101011011000011101011111111111111...
 11101000011111111111111111000101001000
 010000111100000010100100001100000101
 0100000000001100000000000000011001000
 Size: (222) Input size: (222)

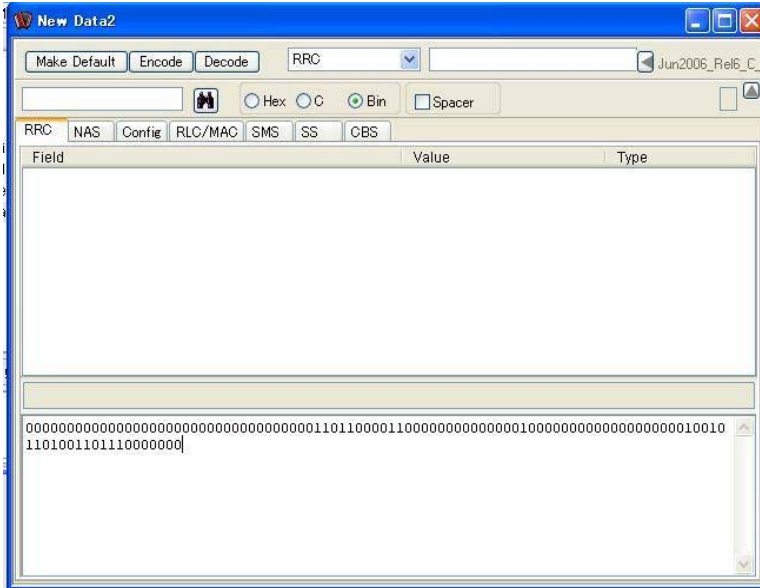
- Setup:
RRC
BCCH-BCH-Message
Hex
Spacer
- Paste the data.
- Press **Decode**.
- Double-click the **sib-Data-variable**.
- Copy the entire **BIT STRING** data.
- Press **Cancel**.

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Message Coder: RRC SystemInformationBlockType5 firstSegment



- Open a new MDI window.
- Setup:
RRC
Bin
No Spacer
- Paste the data.

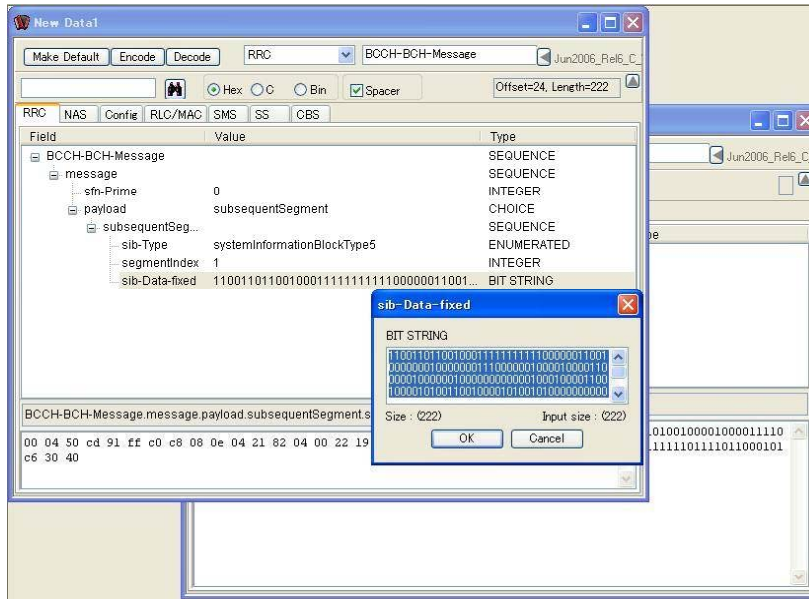
Trace: D_BCCH (SYSTEM INFORMATION-BCH) SystemInformationBlockType5 subsequentSegment

PHY	MAC	RLC	TE	RRR	NAS	BTS	Primitive	Channel	Message	Real Time
						1	CPHY_RL_SETUP_CNF	D PICH		018:04:06.53
						1	CRCL_CONFIG_CNF	D PCCH		018:04:06.54
						1	CRCL_CONFIG_CNF	D PCCH		018:04:06.54
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.61
						1	MAC_DATA_REQ	D BCCH		018:04:06.61
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.62
						1	MAC_DATA_REQ	D BCCH		018:04:06.62
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.63
						1	PHY_DATA_REQ	D BCH		018:04:06.63
						1	MAC_DATA_REQ	D BCCH		018:04:06.63
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.64
						1	MAC_DATA_REQ	D BCCH		018:04:06.64
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.65
						1	PHY_DATA_REQ	D BCH		018:04:06.65
						1	MAC_DATA_REQ	D BCCH		018:04:06.65

Message Data (Length=31)
Sender:060 Receiver:050 Type:00500033 Channel:02000002 CH_No:0000 Opt0:00000000 Opt1:00200006 Opt2:00000000
00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
0000 | 00 02 52 05 8c 3a f1 ff 43 ff fc 52 10 f0 29 0c | 0a 20 18 00 0c 8f f7 b1 7e e1 0f f0 00 00 3c

- Select **SYSTEM INFORMATION-BCH**.
- Right-click and select **Copy data only**.

Message Coder: RRC (BCCH-BCH-Message) SystemInformationBlockType5 subsequentSegment

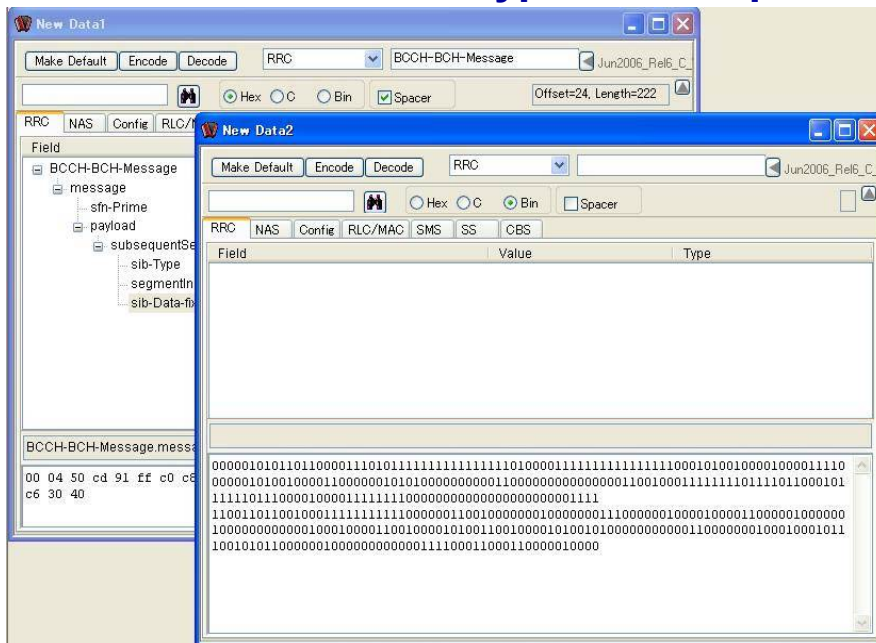


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Message Coder: RRC SystemInformationBlockType5 subsequentSegment



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Trace: D_BCCH (SYSTEM INFORMATION-BCH) SystemInformationBlockType5 lastSegmentShort

PHY	MAC	RLC	TE	RRC	NAS	BTS	Primitive	Channel	Message	Real Time
						1	CPHY_RL_SETUP_CNF	D PICH		018:04:06.53
						1	CRCL_CONFIG_REQ	D PCCH		018:04:06.54
						1	CRCL_CONFIG_CNF	D PCCH		018:04:06.54
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.61
						1	MAC_DATA_REQ	D BCCH		018:04:06.61
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.62
						1	MAC_DATA_REQ	D BCCH		018:04:06.62
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.63
						1	PHY_DATA_REQ	D BCH		018:04:06.63
						1	MAC_DATA_REQ	D BCCH		018:04:06.63
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.64
						1	MAC_DATA_REQ	D BCCH		018:04:06.64
						1	RLC_TR_DATA_REQ	D BCCH	SYSTEM INFORMATION-BCH	018:04:06.65
						1	PHY_DATA_REQ	D BCH		018:04:06.65
						1	MAC_DATA_REQ	D BCCH		018:04:06.65

Message Data (Length=31)
 Sender:060 Receiver:050 Type:00500033 Channel:02000002 CH_No:0000 Opt0:00000000 Opt1:0020000A Opt2:00000000
 0000 | 00 04 30 cd 91 1f c0 c8 0e 04 21 82 04 00 22 | 19 0a 64 29 40 06 02 22 a5 60 40 03 c6 30 40

- Select **SYSTEM INFORMATION-BCH**.
- Right-click and select **Copy data only**.

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Message Coder: RRC (BCCH-BCH-Message) SystemInformationBlockType5 lastSegmentShort

Field Value Type

- BCCH-BCH-Message SEQUENCE
- message SEQUENCE
- sfn-Prime 0 INTEGER
- payload CHOICE
 - lastSegmentShort SEQUENCE
 - sib-Type systeminformationBlockType5 ENUMERATED
 - segmentIndex 2 INTEGER
 - sib-Data-variable BIT STRING

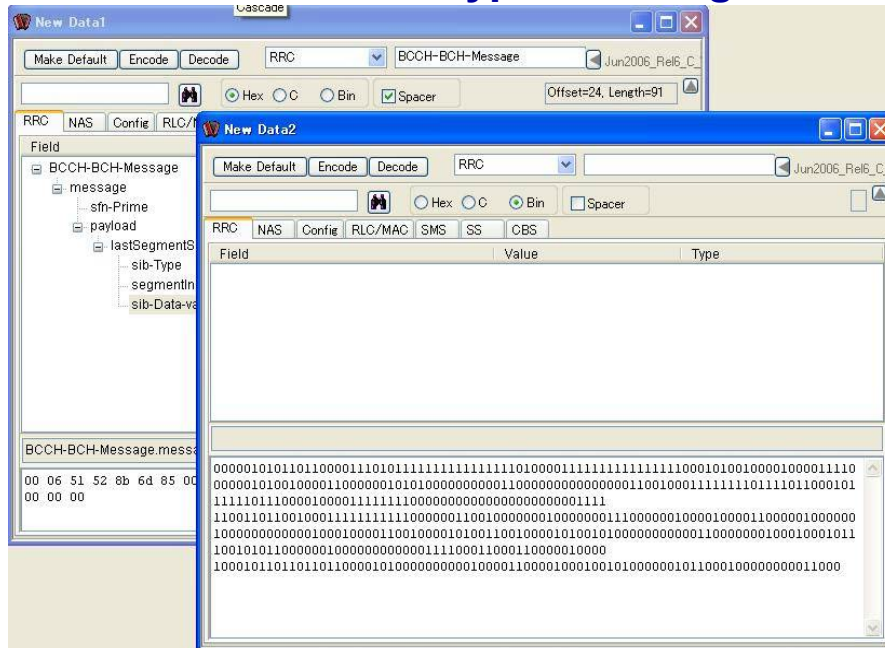
BIT STRING
 100010110110110110000101000000000100...
 0011000010001001010000001011000100000
 1000110000

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Message Coder: RRC SystemInformationBlockType5 lastSegmentShort

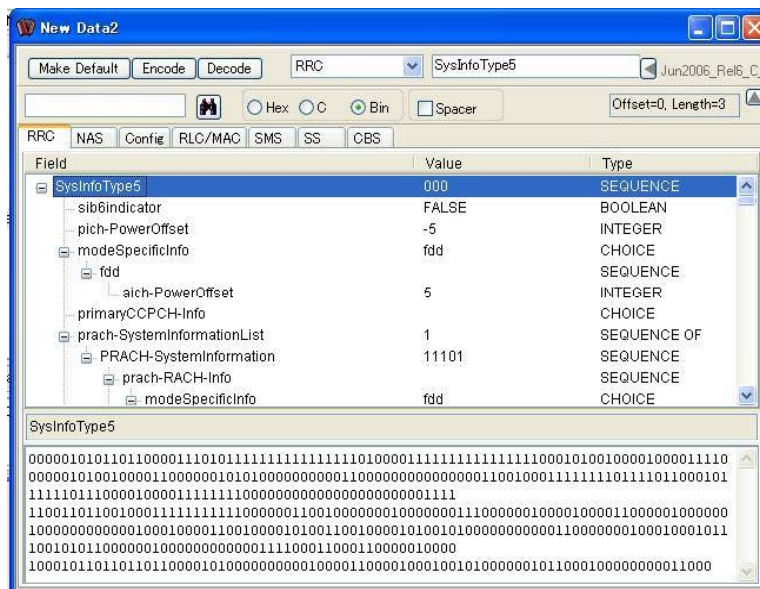


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Message Coder: RRC SystemInformationBlockType5



Press Decode.

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Checking and Modifying Byte Array Message in C-Scenario

Checking and Modifying Byte Array Message in C-Scenario

Steps:

- Copy the byte array message from the C-Scenario
- Paste it into Message Coder
- Decode
- Check the Value, Offset, and Length message items
- Modify the message items
- Encode
- Copy the message data to the C-Scenario

Visual Studio: Copy byte array message radioBearerSetup

```

W01_voice_MD8480.c W01_packet_MD8480.c
/* Send Message: Radio Bearer Setup */
{
    UCHAR SndData[] = {
        0x38, 0x20, 0x4A, 0xAF, 0x04, 0x00, 0x01, 0x70, 0x23, 0x3C,
        0xB4, 0x9C, 0x93, 0x4F, 0x05, 0xE2, 0x71, 0x85, 0xDE, 0x17,
        0x20, 0x40, 0x98, 0x24, 0x52, 0x49, 0x34, 0xA2, 0x55, 0x2C,
        0x97, 0x4C, 0x26, 0x4A, 0x3C, 0x0B, 0xC4, 0x09, 0x00, 0x88,
        0xE7, 0xDA, 0xE2, 0x0A, 0x11, 0x08, 0x08, 0x62, 0x28, 0xE8,
        0x40, 0x81, 0x60, 0x08, 0x86, 0x42, 0x98, 0xE8, 0x4A, 0x96,
        0x19, 0xEB, 0xD5, 0xCB, 0x80, 0x14, 0x22, 0x8C, 0x11, 0x4D,
        0x51, 0x36, 0xBA, 0xE9, 0xA0, 0x00, 0x0A, 0x00, 0x00, 0x00,
        0x17, 0x89, 0x00, 0x3A, 0x00, 0x01, 0x00, 0x48, 0x00, 0x00,
        0x68
    };

    CHAR buff[4];

    CFN = ( ( BtsReadCFN( UNIT_BTS1, NO_TIMEOUT ) + 150 ) % 256 ) & ( short )(

    Int2MsbIE( CFN, buff, 8 );
    ReplaceIE( SndData, buff, 34, 8 );
    Int2MsbIE( Nsap1, buff, 8 );
    ReplaceIE( SndData, buff, 50, 8 );

    RlcMUI = 1;
    RlcCNF = 1;

    SndMessageIntegrity( UNIT_BTS1, RLC_AM_DATA_REQ, D_DCCH, 1, SndData, 728 );

    RlcCNF = 0;
    SequenceDisp( " send 'Radio Bearer Setup'" );
}

```

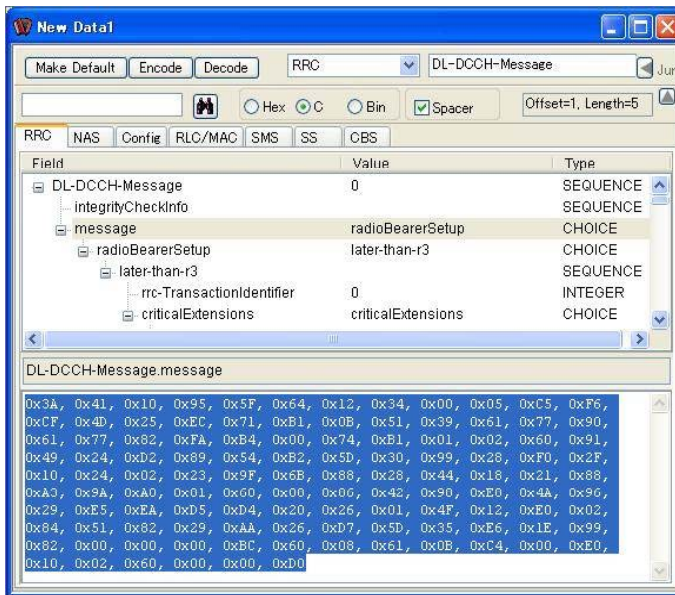
- Select the entire byte array message.
- Copy it.

Message Coder: RRC (DL-DCCH-Message) radioBearerSetup

The screenshot shows the 'New Data1' window in the Message Coder software. The 'RRC' tab is active, and the 'DL-DCCH-Message' is selected. The 'radioBearerSetup-r3' field is highlighted, and its value is displayed as a hexadecimal string: 0010000001001010101111. Below the field list, the full hexadecimal representation of the message is shown: 0x38, 0x20, 0x4A, 0xAF, 0x04, 0x00, 0x01, 0x70, 0x23, 0x3C, 0xB4, 0x9C, 0x93, 0x4F, 0x05, 0xE2, 0x71, 0x85, 0xDE, 0x17, 0x20, 0x40, 0x98, 0x24, 0x52, 0x49, 0x34, 0xA2, 0x55, 0x2C, 0x97, 0x4C, 0x26, 0x4A, 0x3C, 0x0B, 0xC4, 0x09, 0x00, 0x88, 0xE7, 0xDA, 0xE2, 0x0A, 0x11, 0x06, 0x08, 0x62, 0x28, 0xE6, 0x40, 0x81, 0x60, 0x08, 0x86, 0x42, 0x98, 0xE8, 0x4A, 0x96, 0x19, 0xEB, 0xD5, 0xCB, 0x80, 0x14, 0x22, 0x8C, 0x11, 0x4D, 0x51, 0x36, 0xBA, 0xE9, 0xA0, 0x00, 0x0A, 0x00, 0x00, 0x00, 0x17, 0x89, 0x00, 0x3A, 0x00, 0x01, 0x00, 0x48, 0x00, 0x00, 0x68.

- Setup:
RRC
DL-DCCH-Message
C
Spacer
- Paste the data.
- Press **Decode**.

Message Coder: Encode radioBearerSetup



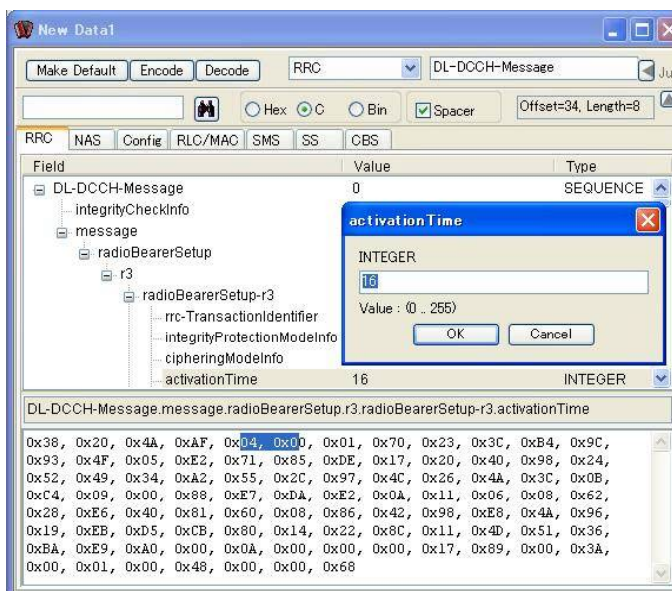
Press **Encode**.

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Message Coder: Check activationTime Offset and Length radioBearerSetup



Check the source code.

- Offset = **34**
- Length = **8**

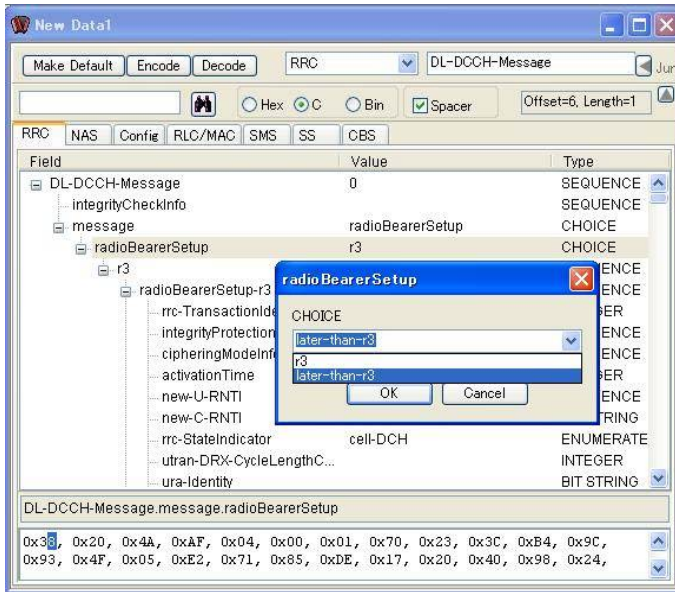
Overwritten by following codes.
Int2MsbIE(CFN, buff, 8);
ReplaceIE(SndData, buff, **34**, **8**);

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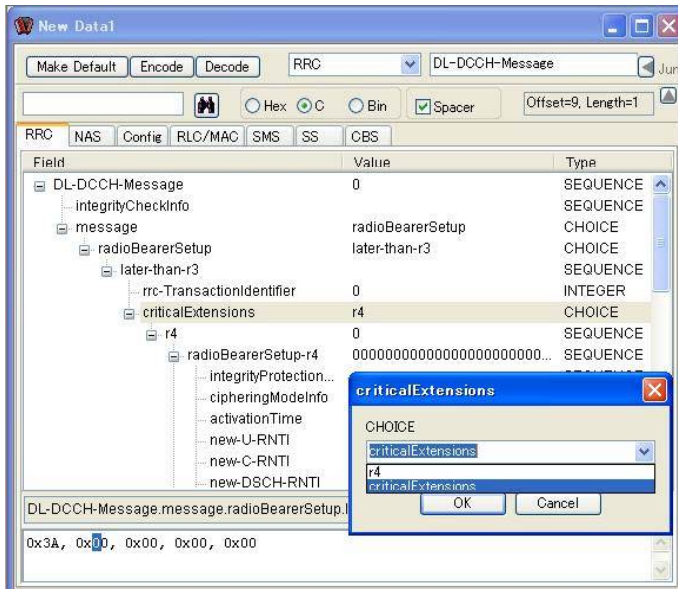
Message Coder: Modify 1 radioBearerSetup



Modify the message item.

Example:
CHOICE type item

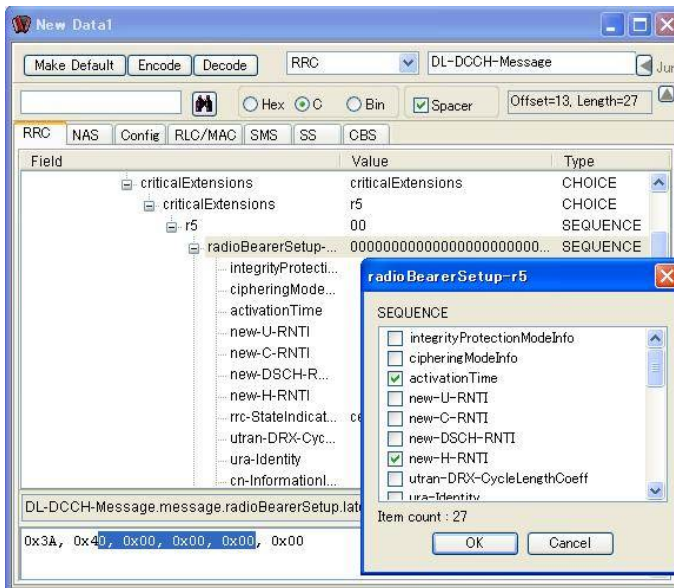
Message Coder: Modify 2 radioBearerSetup



Modify the message item.

Example:
CHOICE type item

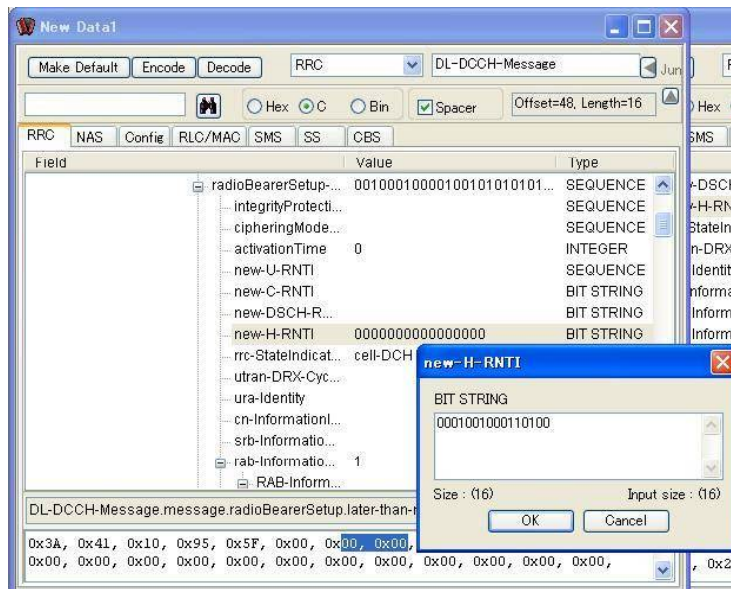
Message Coder: Modify 3 radioBearerSetup



Modify the message item.

Example:
SEQUENCE type item

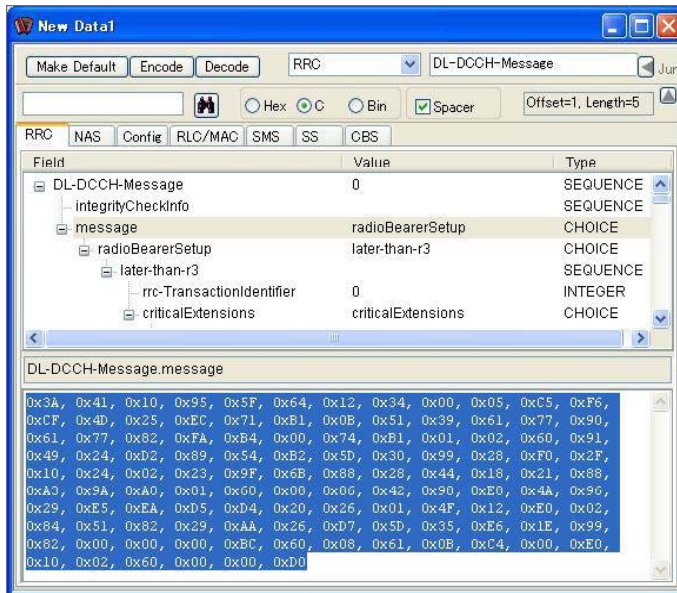
Message Coder: Modify 4 radioBearerSetup



Modify the message item.

Example:
BIT STRING type item

Message Coder: Final Encode and Copy radioBearerSetup



After all modifications:

- Press **Encode**.
- Copy the entire message data.

Visual Studio: Paste and Replace byte array radioBearerSetup

```
W01_voice_MD8480.c W01_packet_MD8480.c*
/* Send Message: Radio Bearer Setup */
{
    UCHAR SndData[] = {
        0x3A, 0x41, 0x10, 0x95, 0x5F, 0x64, 0x12, 0x34, 0x00, 0x05, 0xC5, 0xF6, 0xCF, 0x4D, 0x25,
    };
    CHAR buff[4];

    CFN = ( ( BtsReadCFN( UNIT_BTS1, NO_TIMEOUT ) + 150 ) % 256 ) & ( short )( ~

    Int2MsbIE( CFN, buff, 8 );
    ReplaceIE( SndData, buff, 34, 8 );
    Int2MsbIE( NsapI, buff, 8 );
    ReplaceIE( SndData, buff, 50, 8 );

    RicMUI = 1;
    RicCNF = 1;

    SndMessageIntegrity( UNIT_BTS1, RLC_AM_DATA_REQ, D_DCCH, 1, SndData, 728 );

    RicCNF = 0;
    SequenceDisp( " send 'Radio Bearer Setup' " );
}
```

- Paste and replace.

Visual Studio: Reformat radioBearerSetup

```
DCH_HSDPA.cpp  W01_voice_MD8480.c  W01_packet_MD8480.c*
/* Send Message: Radio Bearer Setup */
{
    UCHAR SndData[] = {
        0x3A, 0x41, 0x10, 0x95, 0x5F, 0x64, 0x12, 0x84, 0x00, 0x05,
        0xC8, 0xF6, 0xCF, 0x4D, 0x25, 0xEC, 0x71, 0xB1, 0x0B, 0x51,
        0x39, 0x61, 0x77, 0x90, 0x61, 0x77, 0x82, 0xFA, 0xB4, 0x00,
        0x74, 0xB1, 0x01, 0x02, 0x60, 0x91, 0x49, 0x24, 0xD2, 0x89,
        0x64, 0xB2, 0x5D, 0x30, 0x93, 0x28, 0xF0, 0x2F, 0x10, 0x24,
        0x02, 0x29, 0x9F, 0x6B, 0x88, 0x28, 0x44, 0x18, 0x21, 0x88,
        0xA3, 0x9A, 0xA0, 0x81, 0x60, 0x08, 0x86, 0x42, 0x98, 0xE8,
        0x4A, 0x96, 0x28, 0xE5, 0xEA, 0x05, 0xD4, 0x20, 0x26, 0x01,
        0x4F, 0x12, 0xE0, 0x02, 0x84, 0x51, 0x82, 0x29, 0xA4, 0x26,
        0xD7, 0x5D, 0x35, 0xE8, 0x1E, 0x99, 0x82, 0x00, 0x00, 0x00,
        0xBC, 0x80, 0x08, 0x61, 0x0B, 0xC4, 0x00, 0xE0, 0x10, 0x02,
        0x80, 0x00, 0x00, 0x00
    };
}

CHAR buff[4];

CFN = ( ( BtsReadCFN( UNIT_BTS1, NO_TIMEOUT ) + 150 ) % 256 ) & ( short )( ^

Int2MsbIE( CFN, buff, 8 );
ReplaceIE( SndData, buff, 40, 8 ); // 34->40
Int2MsbIE( NsapI, buff, 8 );
ReplaceIE( SndData, buff, 72, 8 ); // 50->72

RlcMUI = 1;
RlcCNF = 1;

SndMessageIntegrity( UNIT_BTS1, RLC_AM_DATA_REQ, D_DCCH, 1, SndData, 812 );
// 728->812

RlcCNF = 0;
SequenceDisp( " send 'Radio Bearer Setup'" );
```

- Reformat.
- Adjust the message length in bits (SndMessageIntegrity).
- Adjust the **Offset** and **Length** message items if necessary.

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Appendix

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Analyzing MD8480C Configuration Primitive from Trace Window

D S_CCPCH channel: CPHY_RL_SETUP_REQ primitive
 D S_CCPCH channel: CPHY_TRCH_SETUP_REQ primitive
 D S_CCPCH channel: CMAC_CONFIG_REQ primitive

Analyzing the MD8480C configuration primitive is the same as analyzing the RRC message.

Trace: CPHY_RL_SETUP_REQ (D S_CCPCH)

PHY	MAC	RLC	TE	RRC	NAS	BTS	Primitive	Channel	Message	Real Time
						1	CPHY_RL_SETUP_REQ	D S_SCH	0	018:04:06.25
						1	CPHY_RL_SETUP_CNF	D P_SCH	0	018:04:06.26
						1	CPHY_RL_SETUP_REQ	D P_CCPCH	0	018:04:06.27
						1	CPHY_RL_SETUP_CNF	D S_SCH	0	018:04:06.28
						1	CPHY_TRCH_CONFIG_REQ	D P_CCPCH	0	018:04:06.29
						1	CPHY_RL_SETUP_CNF	D P_CCPCH	0	018:04:06.30
						1	CMAC_CONFIG_REQ	D P_CCPCH	0	018:04:06.31
						1	CMAC_CONFIG_CNF	D P_CCPCH	0	018:04:06.32
						1	CPHY_TRCH_CONFIG_CNF	D P_CCPCH	0	018:04:06.32
						1	CPHY_RL_SETUP_REQ	D P_CCPCH	0	018:04:06.33
						1	CPHY_RL_SETUP_REQ	D S_CCPCH	0	018:04:06.35
						1	CPHY_RL_SETUP_CNF	D P_CCPCH	0	018:04:06.36
						1	CPHY_TRCH_CONFIG_REQ	D S_CCPCH	0	018:04:06.37
						1	CPHY_RL_SETUP_CNF	D S_CCPCH	0	018:04:06.39
						1	CMAC_CONFIG_REQ	D S_CCPCH	0	018:04:06.39

Message Data (Length=97)

Sender:060 Receiver:030 Type:10300024 Channel:00000006 CH_No:0000 Opt0:00000000 Opt1:00000000 Opt2:FFFFFFFF

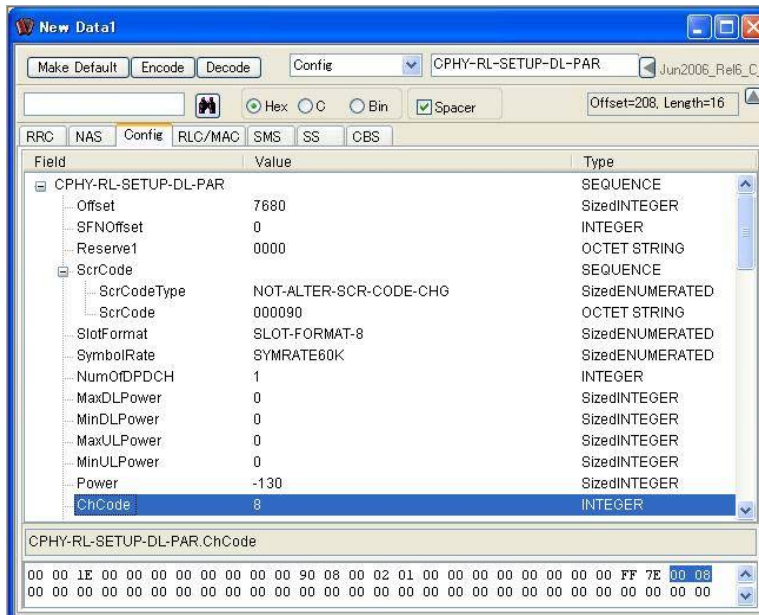
```

0000 | 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F | 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
0020 | 00 00 14 00 00 00 00 00 00 00 00 00 00 02 01 | 00 00 00 00 00 00 00 00 00 00 00 00 ff 74 00 00 00 00 00
0040 | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  
```

Copy data only
Copy all

- Select **CPHY_RL_SETUP_REQ** and **D S_CCPCH**.
- Right-click and select **Copy data only**.

Message Coder: Config CPHY-RL-SETUP-DL-PAR



- Setup: **Config**
CPHY-RL-SETUP-DL-PAR
Hex
Spacer

• Paste the data.

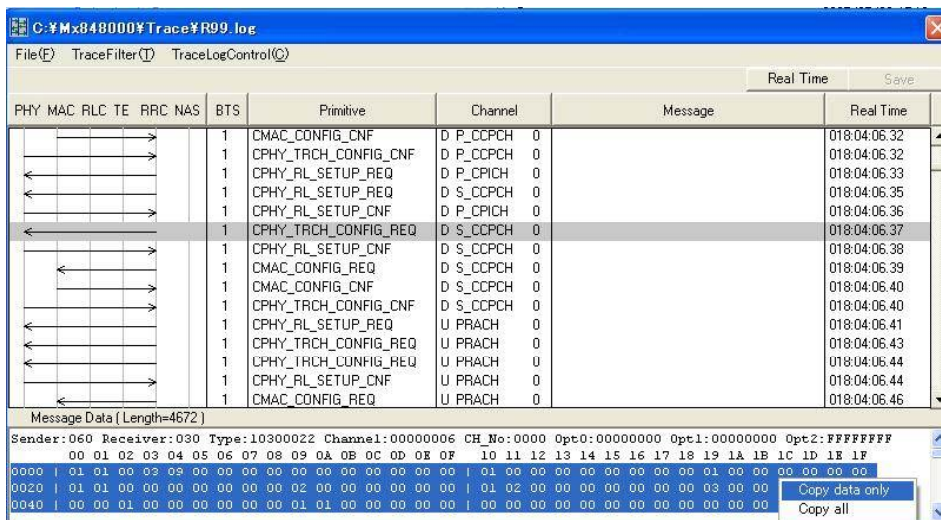
• Press **Decode**.

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Trace: CPHY_TRCH_SETUP_REQ (D S_CCPCH)



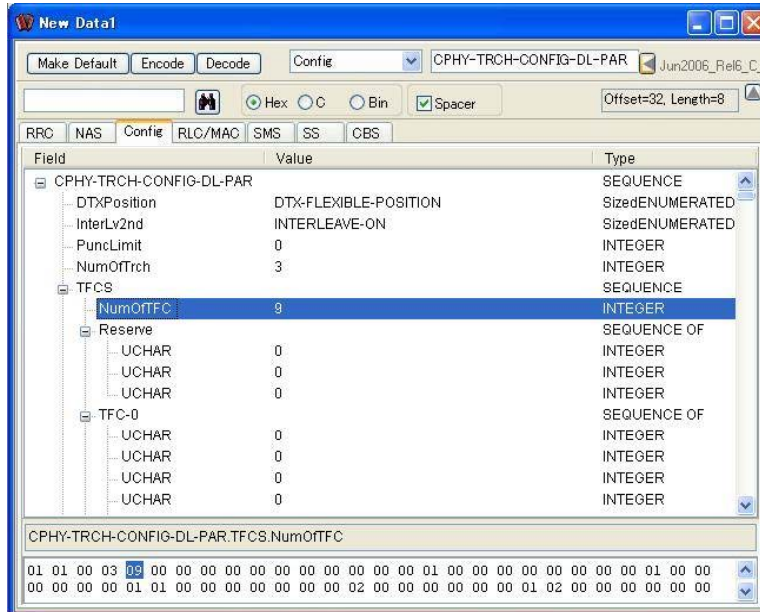
- Select **CPHY_TRCH_SETUP_REQ** and **D S_CCPCH**.
- Right-click and select **Copy data only**.

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Message Coder: Config CPHY-TRCH-SETUP-DL-PAR



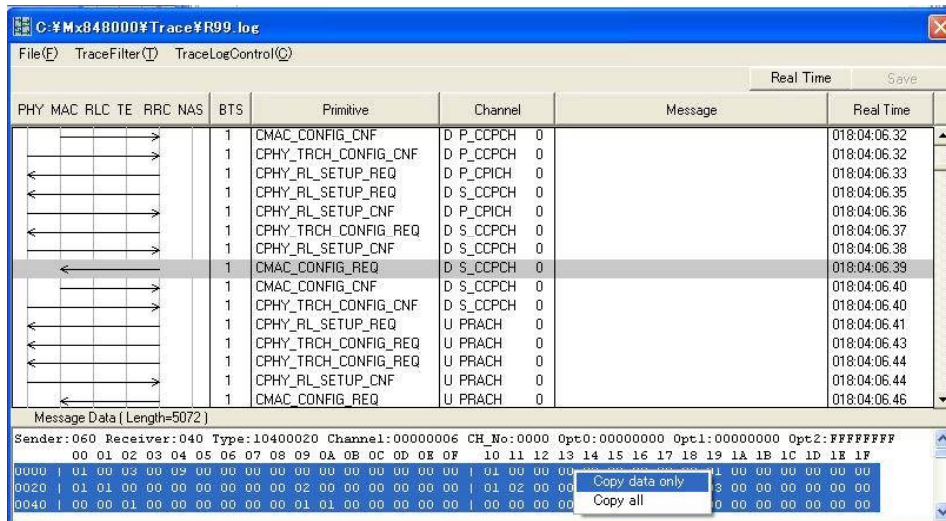
- Setup: **Config CPHY-TRCH-SETUP-DL-PAR Hex Spacer**
- Paste the data.
- Press **Decode**.

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Trace: CMAC_CONFIG_REQ (D S_CCPCH)



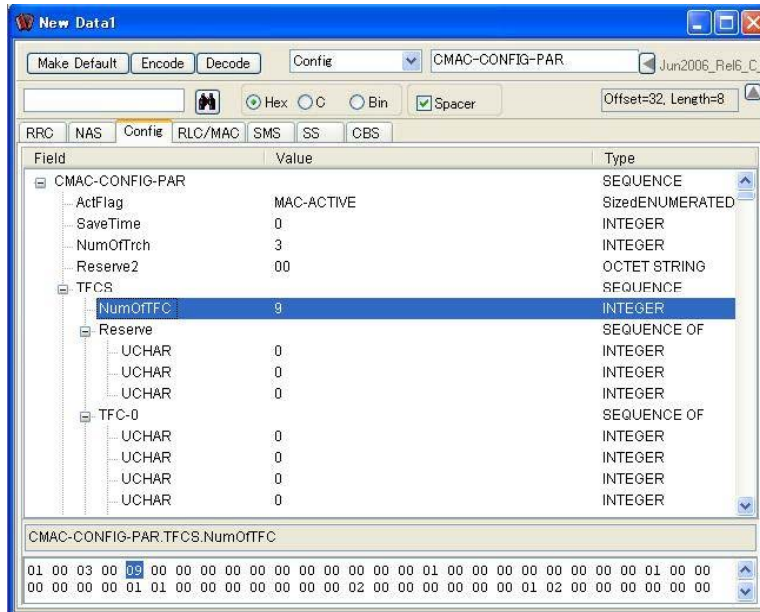
- Select **CMAC_CONFIG_REQ** and **D S_CCPCH**.
- Right-click and select **Copy data only**.

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Message Coder: Config CMAC-CONFIG-DL-PAR



- Setup:
Config
CMAC-CONFIG-DL-PAR
Hex
Spacer
- Paste the data.
- Press **Decode**.

Definitions Setup

Message Coder requires matching versions for target message and Definitions Setup.

Correct:

Rel. 5 HSDPA radioBearerSetup message with Rel. 6 Definitions Setup.

Incorrect:

Rel. 5 HSDPA radioBearerSetup message with Rel. 99 Definitions Setup.

Correct:

Rel. 99 radioBearerSetup message with Rel. 99 Definitions Setup.

Trace: Rel. 5 HSDPA radioBearerSetup message

PHY	MAC	RLC	TE	RRC	NAS	BTS	Primitive	Channel	Message	Real Time
						1	PHY_DATA_IND	U DCH		019.40:03.11
						1	MAC_DATA_IND	U DCCH		019.40:03.11
						1	RLC_AM_DATA_IND	U DCCH	SM: ACTIVATE PDP CONTEXT REQ	019.40:03.11
						1	MAC_DATA_REQ	D DCCH		019.40:03.11
						1	PHY_DATA_REQ	D DCH		019.40:03.12
						1	RLC_AM_DATA_REQ	D DCCH	RADIO BEARER SETUP	019.40:03.15
							MAC_DATA_REQ	D DCCH		019.40:03.15
							MAC_DATA_REQ	D DCCH		019.40:03.15
							MAC_DATA_REQ	D DCCH		019.40:03.15
							MAC_DATA_REQ	D DCCH		019.40:03.15
							MAC_DATA_REQ	D DCCH		019.40:03.15
							MAC_DATA_REQ	D DCCH		019.40:03.15
							MAC_DATA_REQ	D DCCH		019.40:03.15
							MAC_DATA_REQ	D DCCH		019.40:03.15

Message Data (Length=119)

Sender: 060 Receiver: 050 Type: 00500031 Channel: 02000005 CH_No: 0001 Opt0: 00000000 Opt1: 00008001 Opt2: 00000000

```

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
0000 | b0 c6 d4 e8 8b a4 11 09 55 f8 c1 23 40 00 5c 5f | 6c f4 d2 5e c7 1b 10 b5 13 96 17 79 06 17 78 2f
0020 | ab 40 07 4b 10 10 26 09 14 92 4d 28 95 4b 25 d3 | 09 92 8f 02 f1 02 40 22 39 fe b8 82 84 41 82 18
0040 | 8a 39 aa 08 16 00 88 64 29 8e 84 a9 62 9e 5e ad | 5d 42 02 60 14 f1 2e 00 28 45 18 22 9a a2 6d 75
0060 | d3 5e 61 e9 98 20 00 00 0b c6 00 86 10 bc 40 0e | 01 00 26 00 00 0d 00
    
```

- Select **RADIO BEARER SETUP**.
- Right-click and select **Copy data only**.

Message Coder: Rel. 5 HSDPA radioBearerSetup message with Rel. 6 Definitions Setup 1

DL-DCCH-Message

integrityCheckInfo

messageAuthenticationCode

rrc-MessageSequenceNumber

message

radioBearerSetup

later-than-r3

rrc-TransactionIdentifier

criticalExtensions

criticalExtensions

r5

radioBearerSetup

integrityProtection

ciphering

DL-DCCH-Message.message.radioBearerSetup

8a 39 aa 08 16 00 88 64 29 8e 84
9a a2 6d 75
d3 5e 61 e9 98 20 00 00 0b c6 00

Definitions Setup

Reference Standard Version:

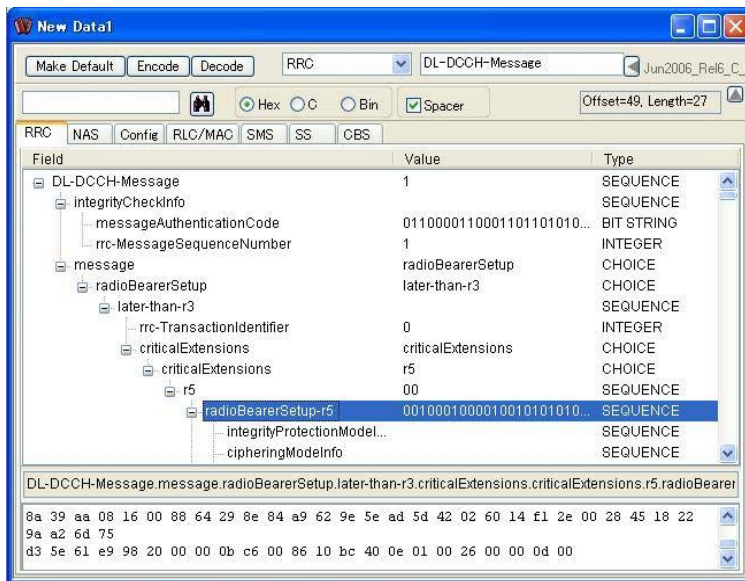
Selected Version:
Jun2006_Rel6_C_V560

Version Name

- Mar2002_AB_V560
- Jun2001_AB_V560
- Dec2002_AB_V560
- W02_AB_V560
- Mar2002_C_V560
- Jun2001_C_V560
- Dec2002_C_V560
- W02_C_V560
- Dec2005_Rel5_AB_V560
- Dec2005_Rel5_C_V560
- Jun2006_Rel6_C_V560

- Select **Jun2006_Rel6_C_V560**.

Message Coder: Rel. 5 HSDPA radioBearerSetup message with Rel. 6 Definitions Setup 2



Decode the Rel5-HSDPA radioBearerSetup message.

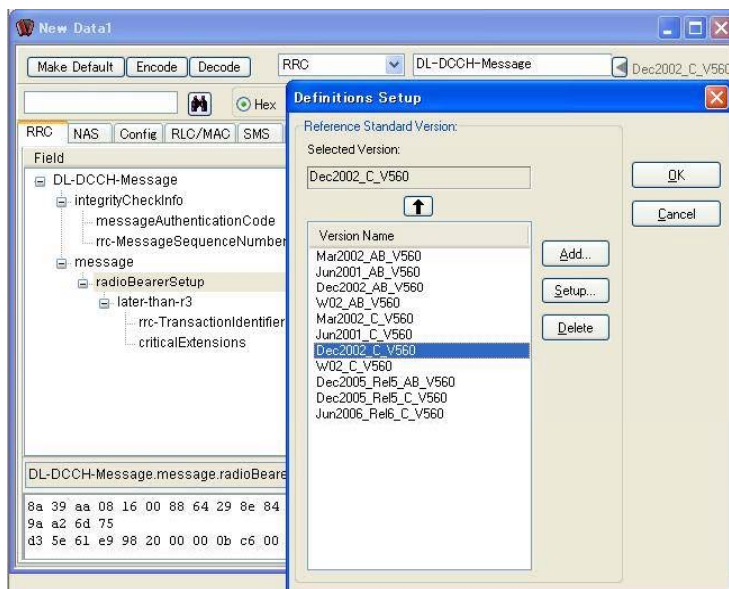
It is correct

Discover What's Possible™
MD8480C-E-E-5

Slide 63

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Message Coder: Rel. 5 HSDPA radioBearerSetup message with Rel. 99 Definitions Setup 1



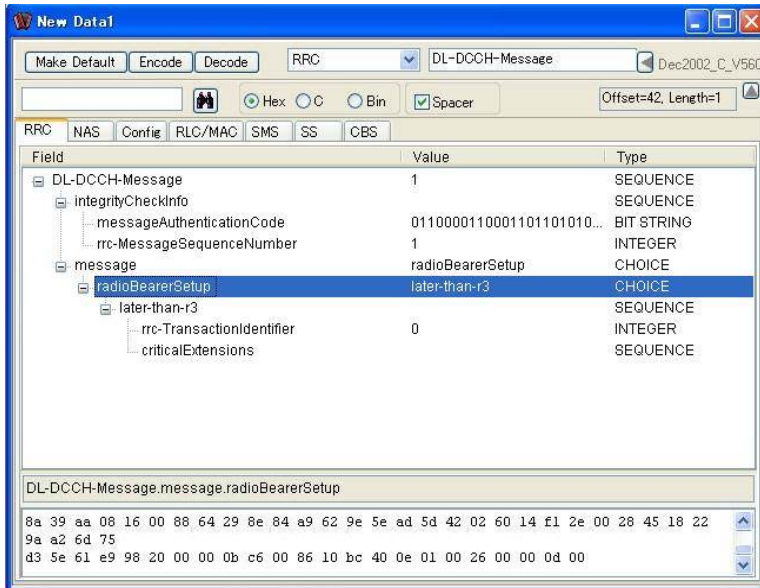
Select Dec2002_C_V560.

Discover What's Possible™
MD8480C-E-E-5

Slide 64

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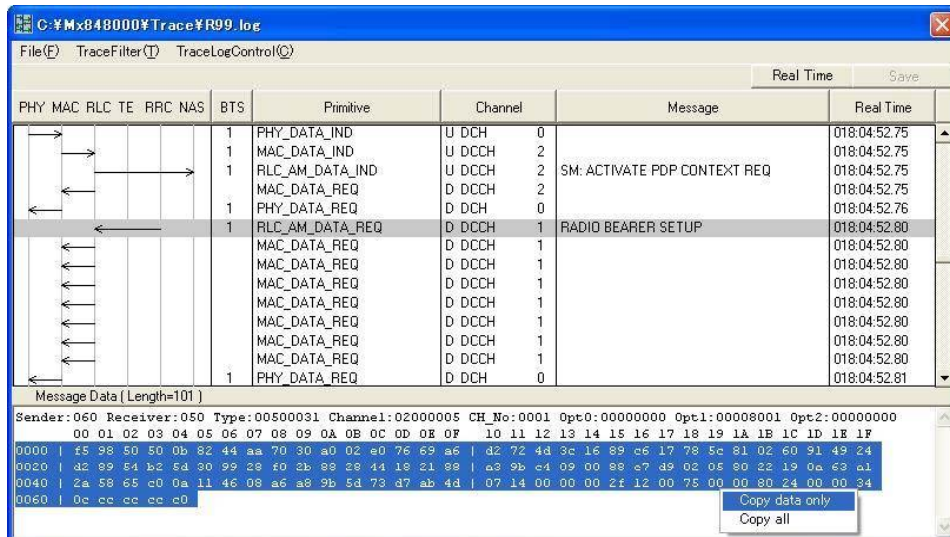
Message Coder: Rel. 5 HSDPA radioBearerSetup message with Rel. 99 Definitions Setup 2



Decode the Rel5-HSDPA radioBearerSetup message.

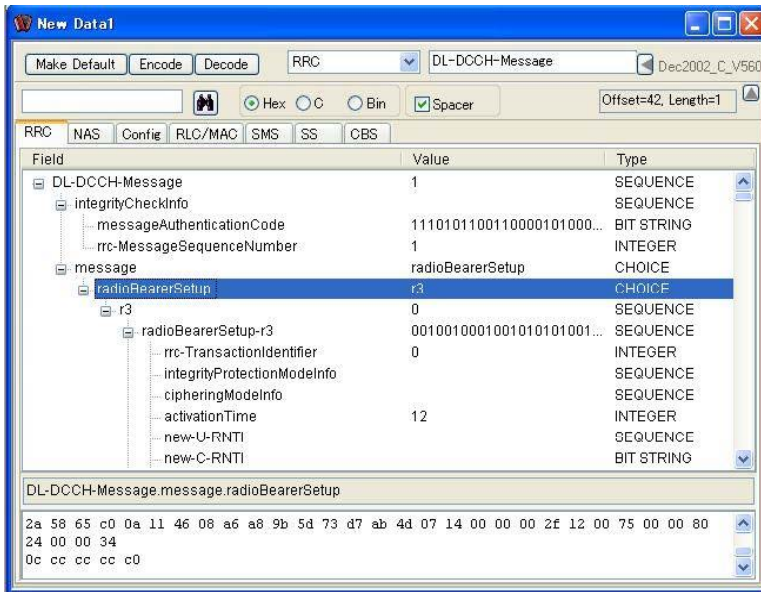
It is **incorrect**

Trace: Rel. 99 radioBearerSetup message



- Select **RADIO BEARER SETUP**.
- Right click and select **Copy data only**.

Message Coder: Rel. 99 radioBearerSetup message with Rel. 99 Definitions Setup



Decode the Rel99 radioBearerSetup message.

It is correct

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