Technical Note

GSM Scenario Version

MD8480C
W-CDMA Signalling Tester

MD8480C Technical Note (GSM Scenario)

1. Introduction

This technical note is about the MX848005C GSM/GPRS2 (hereafter GSM/GPRS2 software) and describes how to create scenarios (including EGPRS) required to operate GSM/GPRS software. The contents are as follows:

1. Introduction
2. General Description of GSM/GPRS
3. MD8480C GSM/GPRS Protocol Stack
4. Scenario Creation
5. Trace Analysis

The GSM/GPRS software operating instructions and scenario library definitions are described in Section E of the “Easy-to-Understand Signalling Tester” manual bundled with the MD8480C. In addition, GSM-related parameters supported by the MD8480C are described in the MD8480C “Specification and Release Schedule” document. Refer to these documents.

If you have any questions about this document or the GSM/GPRS software, contact our sales manager or send an email to the address for MD8480 support.

2. General Description of GSM/GPRS

2.1 Standard Configuration

GSM/GPRS is standardized by 3GPP. The specifications can be downloaded from the following sites.

[Word document]

http://www.3gpp.org/ftp/Specs/archive/

[PDF document]

http://webapp.etsi.org/key/queryform.asp

The main 3GPP specifications related to the GSM/GPRS air interface are listed in Table 2-1, which also includes the EGPRS-related Layer-1 and Layer-2 (GPRS RLC/MAC layer) specifications.

Table 2-1 Major 3GPP Standards for GSM/GPRS air Interface

Category	Spec Number (TS)		Contents
	Rel. 99	Rel. 4 or later	
Layer 1	05.01	45.001	Layer 1 Outline
	05.02	45.002	Logical channel <-> physical channel mapping, Logical channel combination
	05.03	45.003	Channel coding
	05.04	45.004	Modulation method (GMSK/8PSK)
	05.05	45.005	Tx Power, Frequency channel, Frequency spectrum, Time domain waveform
	05.08	45.008	Power/timing control
	05.10	45.010	Sync information
Layer 2	04.05	44.005	GSM Datalink layer general outline
	04.06	44.006	GSM Datalink layer details
	04.60	44.060	GPRS RLC/MAC layer
	04.64	44.064	GPRS LLC layer
Layer 3, SNDCP	24.008	24.008	Layer 3 (MM, CC, GMM, SM)
	04.18	44.018	Layer 3 (RR, GRR)
	04.65	44.065	GPRS SNDCP layer
Conformance Test	51.010	51.010	GSM/GPRS, InterRAT (G -> W)
	34.123	34.123	InterRAT (W -> G)
Others	23.060	23.060	GPRS in general, GPRS sequence example, etc.
	04.14	44.014	UE conformance test functions
	03.55	43.055	Dual Transfer Mode (DTM)

2.2 General Description of Specification

This section describes the protocol stack configuration, frequency channels, and GPRS throughput outlined in the GSM/GPRS specifications.

2.2.1 Protocol Stack Configuration

The GSM protocol stack configuration is shown in Fig. 2-1; the GPRS/EGPRS protocol stack configuration is shown in Fig. 2-2. Also, a general description of the layers in the two figures is described in Table 2-2.

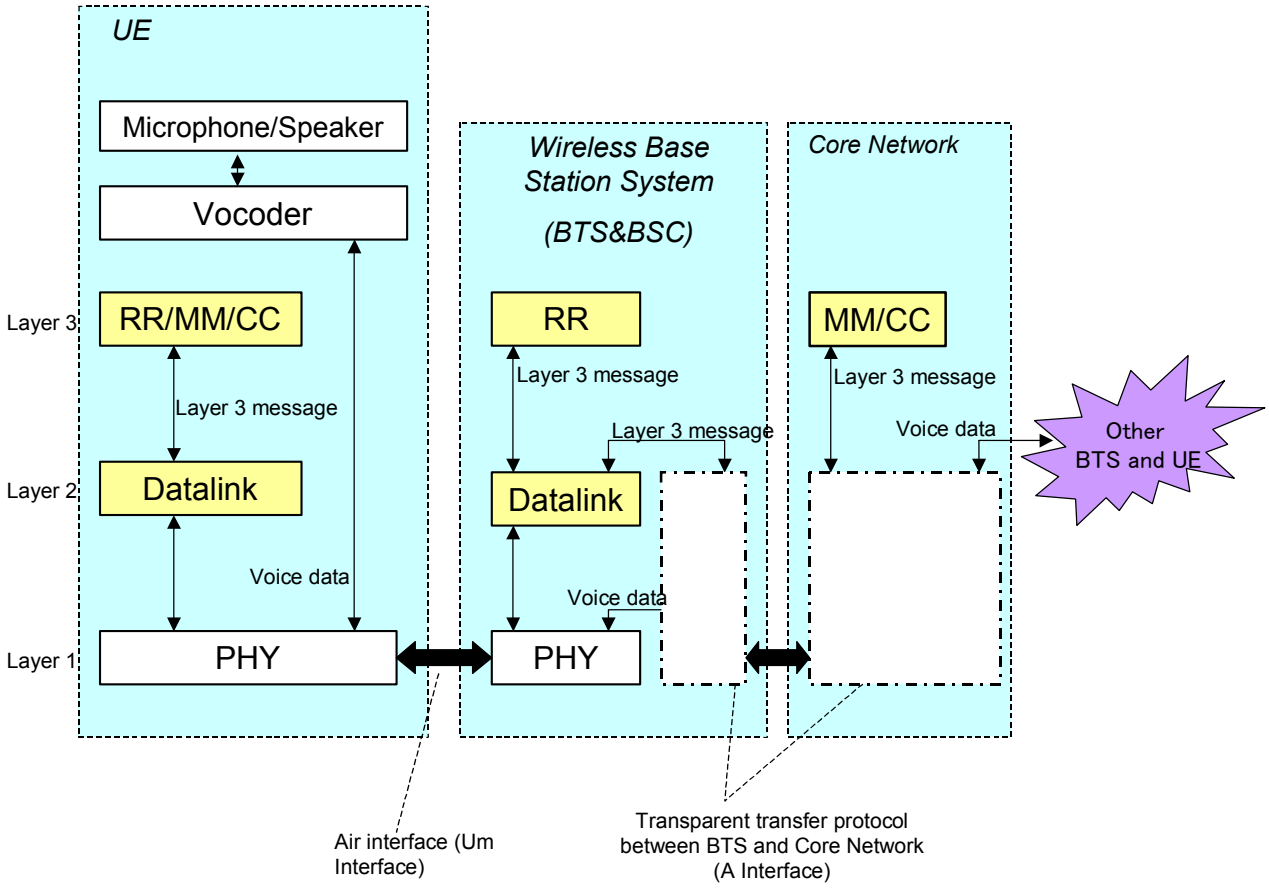

Fig. 2-1 GSM Protocol Stack Configuration

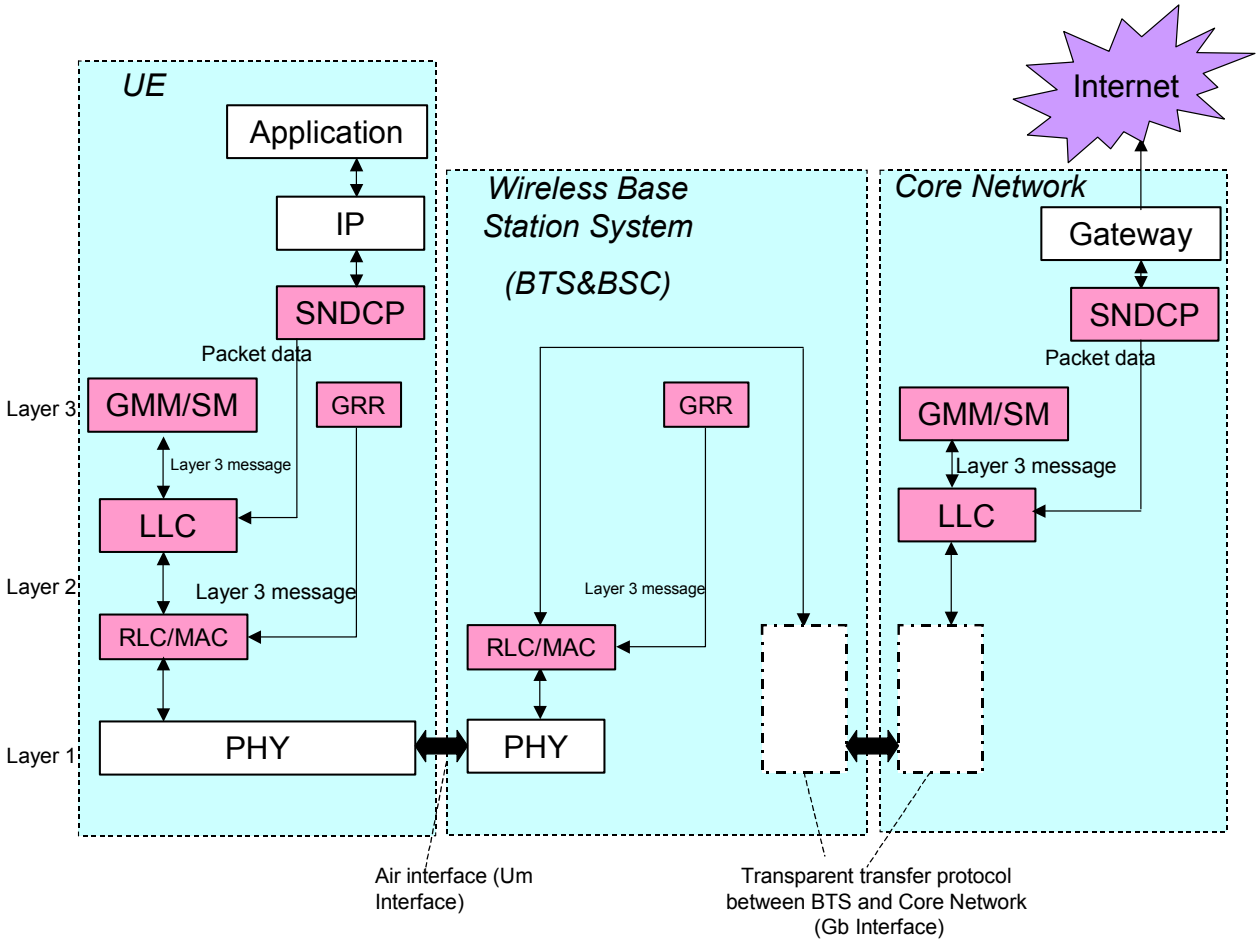

Fig. 2-2 GPRS/EGPRS Protocol Stack Configuration

Table 2-2 General Description of Each Layer

Layer Name	*General Description*
PHY	Abbreviation for Physical layer. Specifies physical layer (= wireless signal format) between UE and BS for GSM/GPRS. GSM ciphering is performed by PHY.
Datalink	Establishes link to exchange GSM Layer-3 message between UE and BTS.
RLC/MAC	Abbreviation for Radio Link Control/Medium Access Control. Establishes link/ control retransmission (RLC) for GPRS data communications between UE and BS. Also manages multiple UEs to share wireless resource (MAC).
LLC	Abbreviation for Logical Link Control. Establishes link between UE and core network. GPRS ciphering is performed by LLC.
SNDCP	Abbreviation for Sub-Network Dependent Convergence Protocol. Converts high-layer data, such as IP data, to data for GPRS. Also performs reverse conversion.
RR	Abbreviation for Radio Resource management. Manages GSM wireless resources. Typical Message: ASSIGNMENT COMMAND
CC	Abbreviation for Call Control. Manages GSM call procedure. Typical Message: CALL SETUP
MM	Mobility Management. Manages GSM UE location information. Typical Procedure: GSM Location Updating
GRR	Abbreviation for GPRS Radio Resource management. Manages wireless resources for GPRS data communications (Temporary Block Flow). Typical Procedure: Downlink TBF establishment
GMM	Abbreviation for GPRS Mobility Management. Manages UE location information for GPRS data communications. Typical Procedure: GPRS Routing Area Update
SM	Abbreviation for Session Management. Manages session for GPRS data communications. Typical Procedure: PDP Context Activation

2.2.2 Frequency Channels

The GSM/GPRS specifications define multiple frequency bands and the relationship between the frequency and channel (= ARFCN: channel number used by Layer-3 message, etc.) is different in each band. Table 2-3 describes the relationship between frequency and ARFCN in each band. For details, refer to Chapter 2 of TS05.05 (TS45.005).

Table 2-3 Frequency and ARFCN in Each Band (n: ARFCN, Fl = up, Fu = down) [Units: MHz]

P-GSM 900	Fl(n) = 890 + 0.2*n	1 ≤ n ≤ 124	Fu(n) = Fl(n) + 45
E-GSM 900	Fl(n) = 890 + 0.2*n Fl(n) = 890 + 0.2*(n-1024)	0 ≤ n ≤ 124 975 ≤ n ≤ 1 023	Fu(n) = Fl(n) + 45
R-GSM 900	Fl(n) = 890 + 0.2*n Fl(n) = 890 + 0.2*(n-1024)	0 ≤ n ≤ 124 955 ≤ n ≤ 1023	Fu(n) = Fl(n) + 45
DCS 1 800	Fl(n) = 1710.2 + 0.2*(n-512)	512 ≤ n ≤ 885	Fu(n) = Fl(n) + 95
PCS 1 900	Fl(n) = 1850.2 + .2*(n-512)	512 ≤ n ≤ 810	Fu(n) = Fl(n) + 80
GSM 450	Fl(n) = 450.6 + 0.2*(n-259)	259 ≤ n ≤ 293	Fu(n) = Fl(n) + 10
GSM 480	Fl(n) = 479 + 0.2*(n-306)	306 ≤ n ≤ 340	Fu(n) = Fl(n) + 10
GSM 850	Fl(n) = 824.2 + 0.2*(n-128)	128 ≤ n ≤ 251	Fu(n) = Fl(n) + 45

2.2.3 UE Tx Power

Table 2-4 describes the definition of the maximum UE Tx power in GSM/GPRS. In addition, Tables 2-5 to 2-7 describe the definitions of the UE Tx power control parameters. For more details, refer to Chapter 4.1.1 of TS05.05.

Table 2-4 UE Maximum Tx Power

For GMSK modulation

Power class	GSM 400 & GSM 900 & GSM 850 Nominal Maximum output power	DCS 1 800 Nominal Maximum output power	PCS 1 900 Nominal Maximum output power	Tolerance (dB) for conditions	
				normal	extreme
1	- - - - - -	1 W (30 dBm)	1 W (30 dBm)	±2	±2,5
2	8 W (39 dBm)	0,25 W (24 dBm)	0,25 W (24 dBm)	±2	±2,5
3	5 W (37 dBm)	4 W (36 dBm)	2 W (33 dBm)	±2	±2,5
4	2 W (33 dBm)			±2	±2,5
5	0,8 W (29 dBm)			±2	±2,5

For 8-PSK modulation

Power class	GSM 400 and GSM 900 & GSM 850 Nominal Maximum output Power	GSM 400 and GSM 900 & GSM 850 Tolerance (dB) for conditions		DCS 1 800 Nominal Maximum output power	PCS 1 900 Nominal Maximum output power	DCS 1 800 & PCS 1 900 Tolerance (dB) for conditions	
		normal	extreme			normal	extreme
E1	33 dBm	±2	±2,5	30 dBm	30 dBm	±2	±2,5
E2	27 dBm	±3	±4	26 dBm	26 dBm	-4/+3	-4,5/+4
E3	23 dBm	±3	±4	22 dBm	22 dBm	±3	±4

Table 2-5 GSM400, GSM900, GSM850 UE Tx Power

Power control level	Nominal Output power (dBm)	Tolerance (dB) for conditions	
		normal	extreme
0-2	39	±2	±2,5
3	37	±3	±4
4	35	±3	±4
5	33	±3	±4
6	31	±3	±4
7	29	±3	±4
8	27	±3	±4
9	25	±3	±4
10	23	±3	±4
11	21	±3	±4
12	19	±3	±4
13	17	±3	±4
14	15	±3	±4
15	13	±3	±4
16	11	±5	±6
17	9	±5	±6
18	7	±5	±6
19-31	5	±5	±6

Table 2-6 DCS1800UE Tx Power

Power control level	Nominal Output power (dBm)	Tolerance (dB) for conditions	
		normal	extreme
29	36	±2	±2,5
30	34	±3	±4
31	32	±3	±4
0	30	±3	±4
1	28	±3	±4
2	26	±3	±4
3	24	±3	±4
4	22	±3	±4
5	20	±3	±4
6	18	±3	±4
7	16	±3	±4
8	14	±3	±4
9	12	±4	±5
10	10	±4	±5
11	8	±4	±5
12	6	±4	±5
13	4	±4	±5
14	2	±5	±6
15-28	0	±5	±6

Table 2-7 PCS1900UE Tx Power Control

Power Control Level	Output Power (dBm)	Tolerance (dB) for conditions	
		Normal	Extreme
22-29	Reserved	Reserved	Reserved
30	33	±2 dB	±2,5 dB
31	32	±2 dB	±2,5 dB
0	30	±3 dB[1]	±4 dB[1]
1	28	±3 dB	±4 dB
2	26	±3 dB	±4 dB
3	24	±3 dB[1]	±4 dB[1]
4	22	±3 dB	±4 dB
5	20	±3 dB	±4 dB
6	18	±3 dB	±4 dB
7	16	±3 dB	±4 dB
8	14	±3 dB	±4 dB
9	12	±4 dB	±5 dB
10	10	±4 dB	±5 dB
11	8	±4 dB	±5 dB
12	6	±4 dB	±5 dB
13	4	±4 dB	±5 dB
14	2	±5 dB	±6 dB
15	0	±5 dB	±6 dB
16-21	Reserved	Reserved	Reserved
NOTE: Tolerance for MS Power Classes 1 and 2 is ±2 dB normal and ±2,5 dB extreme at Power Control Levels 0 and 3 respectively.			

2.2.3 GPRS/EGPRS Throughput

Table 2-8 describes the theoretical throughput values for GPRS/EGPRS (in-house calculation). These theoretical value do not include time for establishing TBF (Transport Block Flow), so the actual value may be about 70% to 80% of the theoretical value. We confirmed that the MD8480C can perform at about 80% of the following theoretical values by adjusting server and client PC parameters (tested under environment described in Chapter E.5.2.1 of “Easy-to-Understand Signalling Tester” document).

Table 2-8 GPRS/EGPRS Throughput Theoretical Values (RLC/MAC Level, Unit: kbps)

[Note: In-house calculations for reference only]

	Modulation	Coding Scheme	Multislot Configuration				
			1 slot	2 slot	3 slot	4 slot	5 slot
GPRS	GMSK	CS-1	8.79	17.58	26.37	35.16	43.95
		CS-2	12.79	25.58	38.37	51.16	63.95
		CS-3	15.18	30.36	45.54	60.72	75.9
		CS-4	20.78	41.56	62.34	83.12	103.9
EGPRS		MCS-1	8.79	17.58	26.37	35.16	43.95
		MCS-2	11.19	22.38	33.57	44.76	55.95
		MCS-3	14.79	29.58	44.37	59.16	73.95
		MCS-4	17.58	35.16	52.74	70.32	87.9
	8PSK	MCS-5	22.38	44.76	67.14	89.52	111.9
		MCS-6	29.57	59.14	88.71	118.28	147.85
		MCS-7	44.76	89.52	134.28	179.04	223.8
		MCS-8	54.35	108.7	163.05	217.4	271.75
		MCS-9	59.14	118.28	177.42	236.56	295.7

(Note: Calculated as shown below)

$$Throughput = (\text{Data Rate}) \times (\text{Data Ratio in 26 Multiframe}) \times (\text{Ratio of Slot})$$

$$= \frac{\text{RLC Data Size}}{4 \times 4.62} \times \frac{24}{26} \times \frac{\text{Number of Slot}}{8}$$

3. MD8480C GSM/GPRS Software Protocol Stack

3.1 Protocol Stack Configuration

Figure 3-1 describes the MD8480C GSM/GPRS protocol stack (GSM 1-cell configuration). When two TDMA2 boards are installed, the MD8480C can be used to configure a two-cell GSM environment using the protocol stack configuration shown in Fig. 3-2.

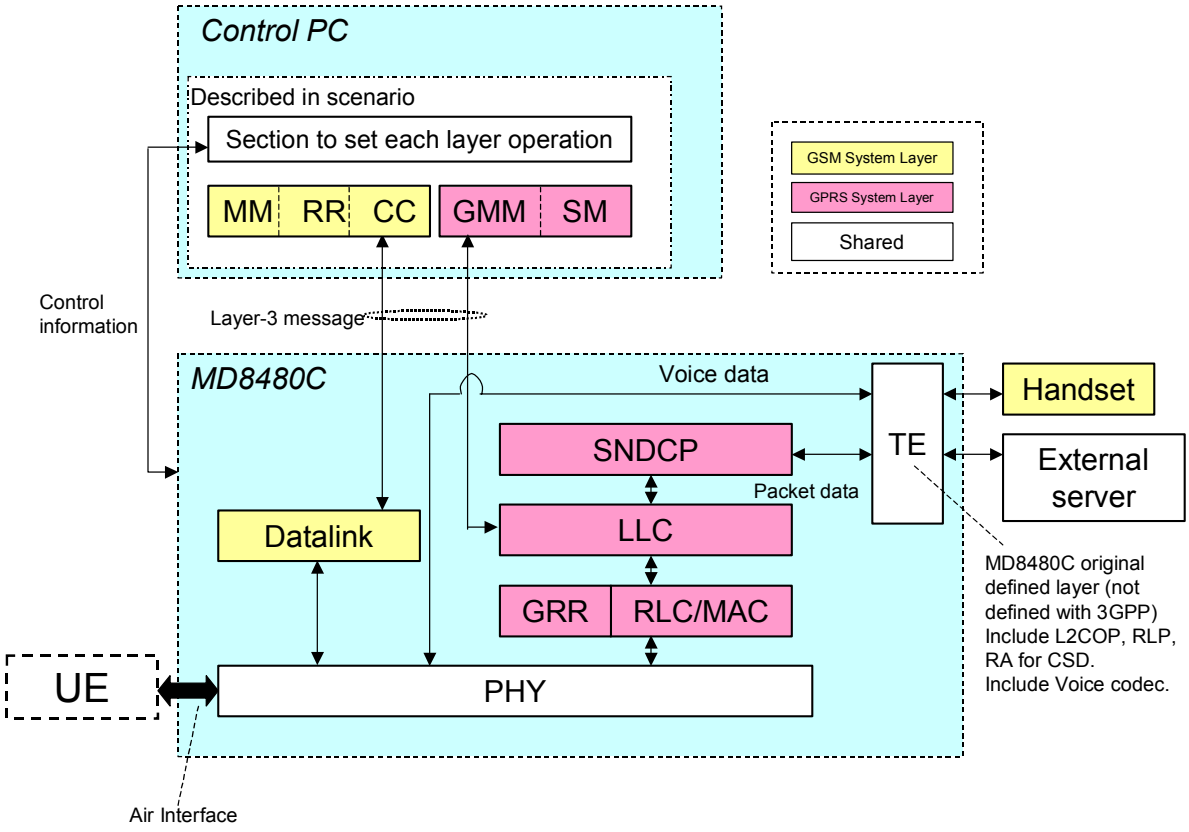

Fig. 3-1 MD8480C GSM/GPRS Protocol Stack Configuration (one-cell GSM)

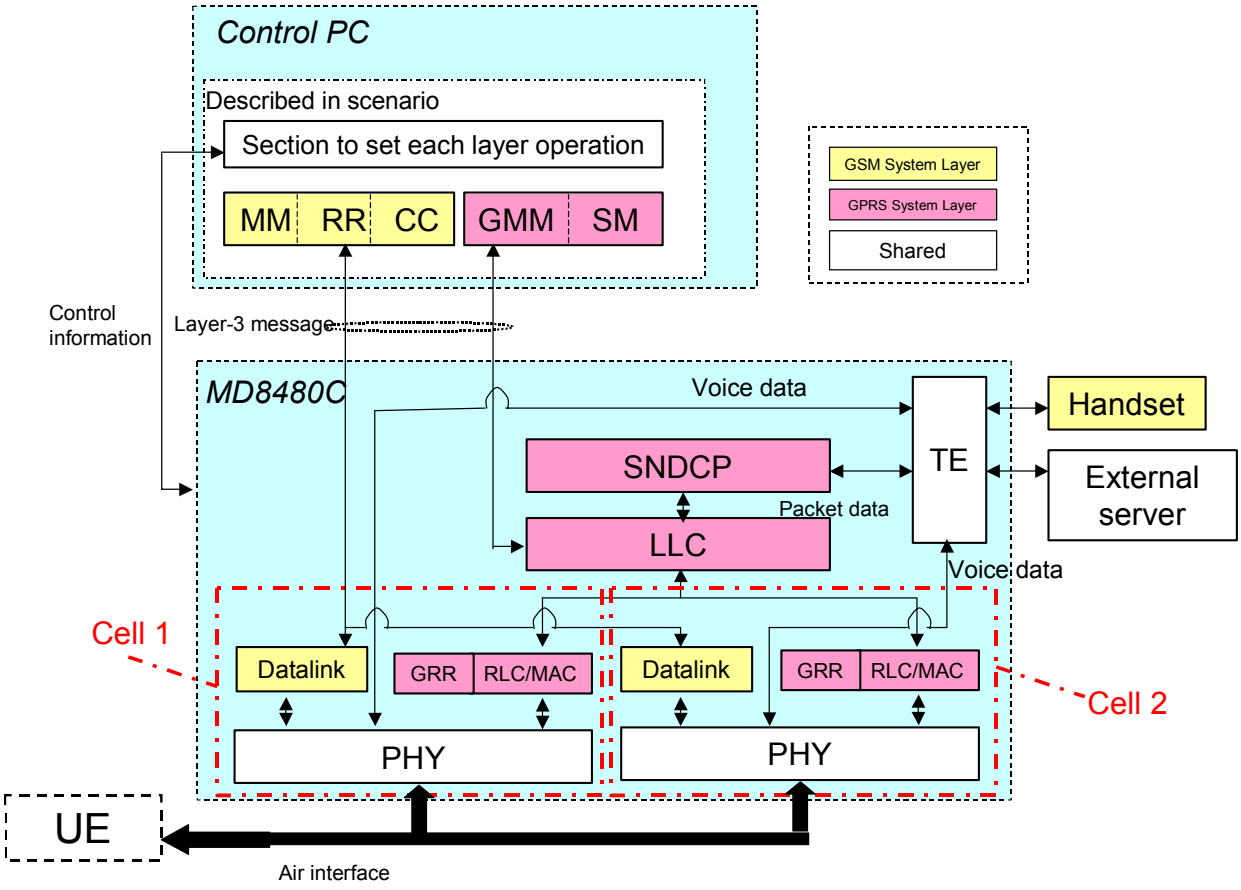

Fig. 3-2 MD8480C GSM/GPRS Protocol Stack Configuration (two-cell GSM 2)

3.2 Features of Protocol Stack

The MD8480C GSM/GPRS protocol stack has the following features:

- Parameters and operation mode settings for each layer described in scenario
- Layer-3 messages described in scenario
- GRR of Layer 3 built-into MD8480C, so GPRS resource assignment performed automatically in MD8480C
- GRR messages preset by calling GsmRrMsgset () library in scenario
- MD8480C TE layer in charge of data exchange with handset and server

4. Scenario Creation

4.1 Changing Parameters

GSM/GPRS-related parameters and how to change parameters using the MD8480C are described in Table 3-1. A sample scenario parameter setting is described for reference. Refer to these and the sample scenarios bundled with the MX848000C Control Software (hereafter Control Software).

Table 3-1 Changing GSM/GPRS Related Parameters

Classification	Items	MD8480C Setting Method	Example of Related Layer-3 Message	(Reference) Setting in Sample Scenario
Layer-1 basic parameters	Frequency	Set Frequency using Frequency of GsmRfchConfig ()	•Assignment messages (Assignment command, Immediate Assignment, etc.) •System Information (Neighbor cell information, etc.)	GSM_Idle.c: Set Downlink CCH to 936 MHz, and Uplink CCH to 891 MHz.
	Downlink Tx Power	Set baseband power of each channel using Tx Power of GsmRfchConfig () and magnitude of RF attenuation using BtsAttenuator (). In addition, baseband power can be increased/decreased using BtsPower (). RF attenuation can also be set at the Control Software SETUP screen.	None	GSM_Idle.c: Set baseband Power to 0 dBm. The output power from the RF connector is determined by the RF Attenuator value specified at the Control Software Setup screen. (For example, when the attenuator is 45 dB, the RF output is –45 dBm.)
	Uplink Tx Power	GSM: Set using MsPowerLevel of GsmRfchConfig () GPRS: Setting not required	GSM: Set using MS Power Level of Assignment messages (Immediate Assignment, Assignment Command etc.). GPRS: Set using GAMMA value of Assignment messages (Immediate Assignment, Packet Uplink Assignment etc.)	GSM_Orig_Voice (EFS).c: Set to MS Power Level = 8 GPRS_Idle_Loca_Attach_PDP.c: Set to GAMMA = 8

	Uplink Reference Level (setting MD8480C Rx wait level)	Set using RxRefPower of BtsAttenuator (). RF attenuation can be set at the Control Software Setup Screen. Modify related Layer-3 message.	Refer to Uplink Tx Power.	GSM_Idle.c: Because the BtsAttenuator () function is not described, setting at the Setup screen is enabled. There is a description for setting RxRefPower to 0 dB using BtsAttenuator (). But this is commented out (disabled).
	Timeslot Number	Set using Timeslot of GsmRfchConfig ().	•Assignment messages (Assignment command, Immediate Assignment etc.)	GSM_Orig_Voice (EFS).c: Set to TIMESLOT=5 during call processing (SDCCH8 and to TIMESLOT4 after call processing (TCH)
	Timing Advance	Set using TimingAdvance of GsmRfchConfig ()	•Assignment messages (Assignment command, Immediate Assignment etc.) •Handover Message	GSM_Orig_Voice (EFS).c: Set to TimingAdvance=0
	Frequency Hopping (CA, MA, MAIO, HSN)	Set using MAIO, HSN of GsmRfchConfig ().	•Assignment messages (Assignment command, Immediate Assignment, etc.) •System Information (Neighbour cell information, etc.)	GSM_Idle_FH.c: CA: Sets CA of each band to ARFCN below: PGSM900: 1, 2, 3, 4, 5, 6, 7, 8, 117, 118, 119, 120, 121, 122, 123, 124 EGSM900: 0, 1, 2, 3, 121, 122, 123, 124, 975, 976, 977, 978, 1020, 1021, 1022, 1023 RGSM900: 0, 1, 2, 3, 121, 122, 123, 124, 955, 956, 957, 958, 1020, 1021, 1022, 1023 DCS1800: 512, 513, 514, 515, 516, 517, 518, 519, 878, 879, 880, 881, 882, 883, 884, 885 PCS1900: 512, 513, 514, 515, 516, 517, 518, 519, 803, 804, 805, 806, 807, 808, 809, 810 GSM_Voice (EFS)_FH.c: MA: Sets MA of each band to same ARFCN as CA MAIO, HSN: Choose with button appearing when scenario executed
GSM TCH Parameter	Voice Codec	Set using TeType of CteConfig ().	•ASSIGNMENT COMMAND •HANDOVER COMMAND etc.	Sample scenarios are prepared for EFS, FS, HS, AFS, and AHS. Examples: GSM_Orig_Voice (EFS).c GSM_Orig_Voice (FS).c GSM_Orig_Voice (HS).c

				GSM_Orig_Voice (AFS).c GSM_Orig_Voice (AHS).c
GPRS PDTCH Parameter	Coding Scheme	Set using DL_DATA_SIZE and UL_DATA_SIZE of GsmRlcConfig ()	•Assignment messages	GPRS_Idle_Loca_Attach_PDP.c: Coding Scheme selected with button displayed when scenario executed
	Multislot configuration	Set using SLOT_TYPE of GsmRrConfig (), SLOT_VALUE of GsmRlcConfig (), Timeslot of GsmRfchConfig ().	•Assignment messages	GPRS_Idle_Loca_Attach_PDP.c: Multislot scheme selected with button displayed when scenario executed
BCH Setup and parameters	PBCCH on or off	Set LochCombination of GsmRfchConfig () to COMB_X_PCCCH or COMB_X_PCCCH_PDTCH, and activate PBCCH.	•Sets PBCCH on/off at SYSTEM INFORMATION TYPE13 At PBCCH On, requires sending PACKET SYSTEM INFORMATION messages	GPRS_Idle_Loca_Attach_PDP.c: PBCCH off scenario GPRS_PBCCH_Idle_Loca_Attach_PDP.c: PBCCH on scenario
	PRACH length of 8 or 11	Setting not required	•PACKET SYSTEM INFORMATION TYPE1	GPRS_PBCCH_Idle_Loca_Attach_PDP.c: Sets PRACH length to 8 bits GPRS_PBCCH_comb11_PRACH11bit.c: Sets PRACH length to 11 bits
	Band indication DCS or PCS	See Section 4.2.	See Section 4.2.	GPRS_Idle_Loca_Attach_PDP.c: Sets Band indication to DCS
	MSC/SGSN revision	Setting not required	•SYSTEM INFORMATION •PACKET SYSTEM INFORAMTION	GSM_Idle.c: Sample scenario bundled with Control Software V5.70 or earlier sets MSC revision to "R98 or older" and sample scenario bundled after v5.70a sets it to "R99 onwards". GPRS_Idle_Loca_Attach_PDP.c: Sample scenario bundled with Control Software V5.70 or earlier sets MSC revision to "R98 or older" and sample scenario bundled after v5.70a sets it to "R99 onwards".
Cell parameters	MCC, MNC, LAC, RAC	Setting not required	•SYSTEM INFORMATION •ATTACH ACCEPT •LOCATION UPDATING ACCEPT	GSM_Idle.c Sets to MCC=MNC=LAC=0 (Set as Define value) RAC not set because not GPRS cell GPRS_Idle_Loca_Attach_PDP.c: Sets to MCC=MNC=LAC=1 (Set as Define value) Set to RAC=3
	NCC and BCC	Set BSIC, Training Sequence Code of GsmRfchConfig () •BSIC higher bits are NCC (3 bits), and BSIC lower bits are BCC (3 bits) •TSC must be same as BCC.	•Sets BSIC at System Information •Sets TSC allocated to UE by Assignment messages	GSM_Idle.c, GSM_Orig_Voice (EFS).c Sets to BSIC=0 (NCC=BCC=0)

	IMEI Acquisition	Setting not required	•Sets to send IMEI from UE with IDENTITY REQUEST, and gets IMEI with IDENTITY RESPONSE	GSM_Loca.c Extracts IMEI from IDENTITY RESPONSE, and displays extracted IMEI with Control Software.
	Paging Multiframes	•Set using BS_AG_BLKS_REQ and BS_PA_MFRMS of GsmRfchConfig ()	•SYSTEM INFORMATION TYPE3	GSM_Idle.c Set to BS_AG_BLKS_RES=0, BS_PA_MFRMS=2

4.2 Changing Frequency Band

4.2.1 GSM

Adding the following modifications to the GSM 900 Band sample scenarios, such as GSM_Idle.c, GSM_Loca.c, and GSM_Orig_Voice (XXX) bundled with the Control Software, to support the operation in the GSM850, DCS1800, and PCS1900 bands.

- Change GsmRfChConfig Frequency.
- Change Layer-3 message parameter ARFCN, such as Immediate Assignment, Assignment Command.
- When the band is GSM850 or PCS1900, change BAND INDICATOR included in the SI1 and SI6 messages from DCS1800 to PCS1900.

The test procedure is equivalent to the standard attached sample scenario; refer Chapter E.5.1 of the “Easy-to-Understand Signalling Tester” manual.

4.2.2 GPRS

The changes are the same as GSM above. Adding the following modifications to GSM 900 band sample scenarios such as GPRS_Idle_Loca_Attach_PDP.c bundled with the Control Software, to support the operation in the GSM850, DCS1800, and PCS1900 bands.

- Change GsmRfChConfig Frequency.
- Change Layer-3 messages parameter ARFCN, such as Immediate Assignment, Assignment Command.
- When the band is GSM850 or PCS1900, change BAND INDICATOR included in the SI1 and SI6 messages from DCS1800 to PCS1900.

The test procedure is equivalent to the standard attached sample scenario; refer Chapter E.5.2 of the “Easy-to-Understand Signalling Tester” manual.

4.3 InterRAT

To create a scenario for InterRAT, describe the InterRAT sequence, such as Handover, Cell Selection, Cell Reselection, and Cell Change, describing configurations for both GSM and WCDMA cells in the same scenario. Refer to the InterRAT sample scenario bundled with the Control Software.

An example of the InterRAT Cell Reselection scenario sequence is shown in Fig. 4-1 for reference.

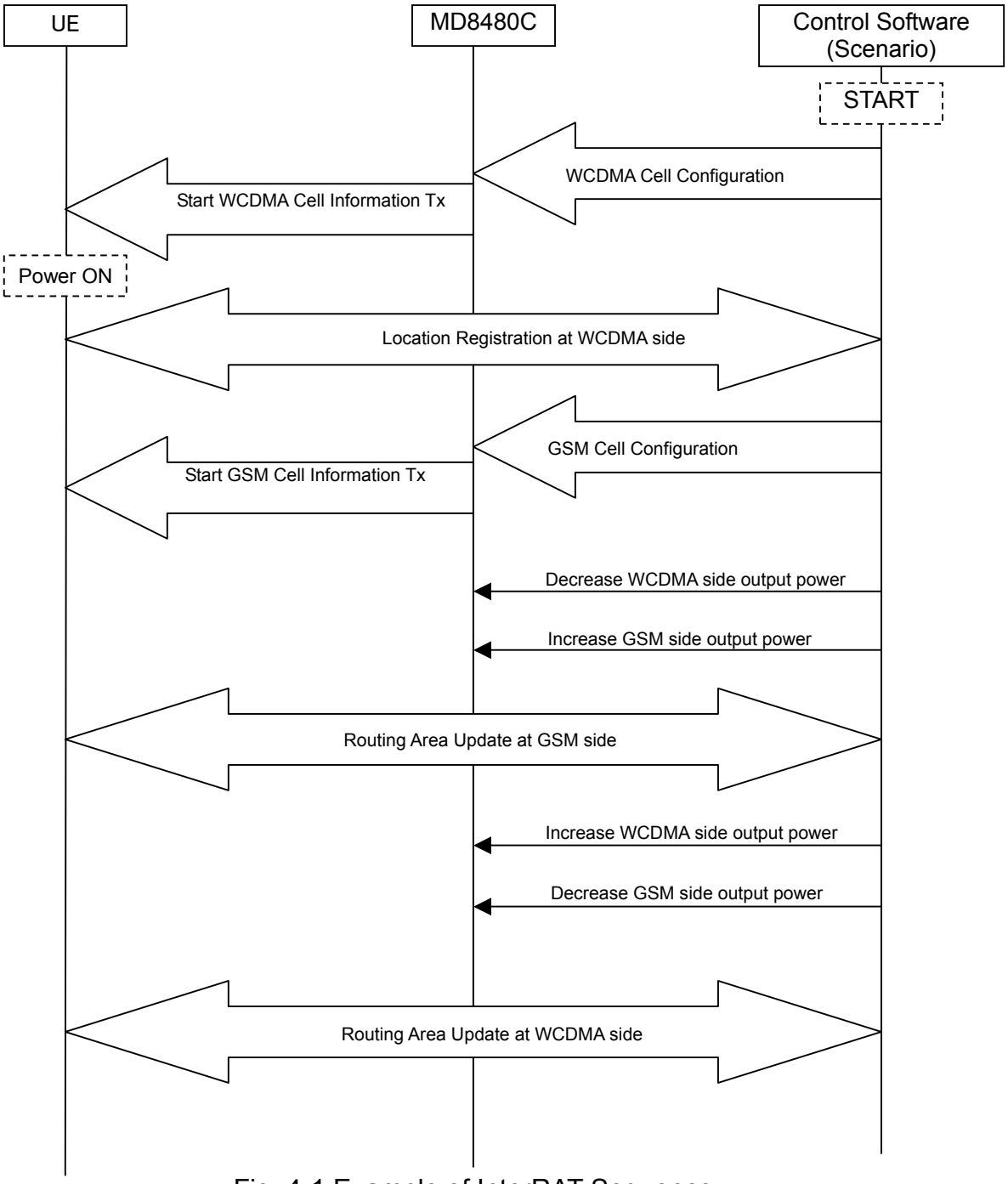

Fig. 4-1 Example of InterRAT Sequence
(InterRAT Cell Reselection)

4.4 Quasi-normal/Abnormal System Test

A quasi-normal test can be performed at the Layer-3 level by describing a quasi-normal/abnormal sequence in the scenario. Some test items can be performed in the Layer-2 level test. If the test method is required, send an email to the address for MD8480 support.

(Note) Quasi-normal test: Tests exceptional sequence described in specifications at normal test sequence, such as Voice Call Processing -> Calling -> Disconnecting

4.5 Message Coder Software

This supports encoding of Layer-3 messages and RLC/MAC Control Message using the Message Coder Software bundled with the Control Software.

4.6 Convenient Scenario Library

This section describes useful libraries that can be used in scenarios. Refer to Chapter A.1 of the “Easy-to-Understand Signalling Tester” manual for library definitions.

4.6.1 Scenario Sequence Control Library

The scenario sequence (branching, etc.) can be controlled using the following libraries.

SequenceBtn ()
Outputs selection button window at PC monitor when selecting parameter or sequence branch

SequenceStr ()
Displays character-string input window for inputting any character string to set parameters, etc.

SequenceDisp ()
Displays any text on trace screen for recording sequence progress

SequenceMessageBox ()
Displays Message Box with OK and Cancel buttons to control sequence progress

WaitTime ()
Sets scenario execution wait time

4.6.2 Information Element Operation Library

The following libraries are used to capture numeric strings and change the format, which is useful for capturing and processing Layer-3 message parts.

ReplaceIE ()
Overwrites data in bit units

ExtractIE ()
Captures data in bit units

Int2MsbIE ()
Converts INT (32-bit) data to MSB-packed data

Short2MsbIE ()
Converts USHORT (16-bit) data to MSB-packed data

Msb2IntIE ()
Converts MSB-packed data to INT (32-bit) data

Msb2ShortIE ()
Converts MSB-packed data to USHORT (16 bit) data

4.6.3 Message Encoder/Decoder Library

The MX848001A-07 Message Encoder/Decoder option offers libraries for encoding and decoding Layer-3 messages (RR, CC, MM, GMM, SM) and RLC/MAC control messages. Changing or extracting data parts is easy using these libraries. Moreover, the libraries can be used to evaluate scenario condition branch processing and received messages. For more details, refer to Section F of the Easy-to-Understand Signalling Tester.

(Note) This library is sold separately.

4.7 Battery Life Test

The battery life test is described in GSM Association Official Document DG.09 (old ECTEL Document). Anritsu can provide a reference sample scenario for this test. If required, send an email to the address for MD8480 support.

5. Trace Analysis

5.1 Message Coder Software

Layer-3 messages and RLC/MAC Control Messages can be analyzed by using this software bundled with the Control Software.

5.2 TDMA Frame Number

The TDMA frame number can be acquired using the following methods:

(1) GsmLochConfig () Library

The TDMA frame number for BCCH, PCH, AGCH, SDCCH, FACCH, SACCH, CBCH, PBCCH, PPCH, PAGCH, PDTCH, and PACCH is displayed on the trace by setting ShowUpFN to GSM_FNTRACE_ON using this library.

(2) GsmReadFN () Library

The MD8480C TDMA frame number when this library is called can be captured at the scenario.

(3) Opt Information for Each Message

The TDMA frame number in Opt1/Opt2 of PH_DATA_REQ (down) and PH_DATA_IND (Up) on the trace is displayed at PDTCH or PACCH.

Anritsu

Specifications are subject to change without notice.

Anritsu Corporation
5-1-1 Onna, Atsugi-shi, Kanagawa, 243-8555 Japan
Phone: +81-46-223-1111
Fax: +81-46-296-1264

• **U.S.A.**
Anritsu Company
1155 East Collins Blvd., Suite 100, Richardson,
TX 75081, U.S.A.
Toll Free: 1-800-267-4878
Phone: +1-972-644-1777
Fax: +1-972-671-1877

• **Canada**
Anritsu Electronics Ltd.
700 Silver Seven Road, Suite 120, Kanata,
Ontario K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

• **Brazil**
Anritsu Eletrônica Ltda.
Praca Amadeu Amaral, 27 - 1 Andar
01327-010-Paraiso-São Paulo-Brazil
Phone: +55-11-3283-2511
Fax: +55-11-3288-6940

• **Mexico**
Anritsu Company, S.A. de C.V.
Av. Ejército Nacional No. 579 Piso 9, Col. Granada
11520 México, D.F., México
Phone: +52-55-1101-2370
Fax: +52-55-5254-3147

• **U.K.**
Anritsu EMEA Ltd.
200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K.
Phone: +44-1582-433200
Fax: +44-1582-731303

• **France**
Anritsu S.A.
16/18 avenue du Québec-SILIC 720
91961 COURTABOEUF CEDEX, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

• **Germany**
Anritsu GmbH
Nemetschek Haus, Konrad-Zuse-Platz 1
81829 München, Germany
Phone: +49-89-442308-0
Fax: +49-89-442308-55

• **Italy**
Anritsu S.p.A.
Via Elio Vittorini 129, 00144 Roma, Italy
Phone: +39-6-509-9711
Fax: +39-6-502-2425

• **Sweden**
Anritsu AB
Borgafjordsgatan 13, 164 40 KISTA, Sweden
Phone: +46-8-534-707-00
Fax: +46-8-534-707-30

• **Finland**
Anritsu AB
Teknobulevardi 3-5, FI-01530 VANTAA, Finland
Phone: +358-20-741-8100
Fax: +358-20-741-8111

• **Denmark**
Anritsu A/S
Kirkebjerg Allé 90, DK-2605 Brøndby, Denmark
Phone: +45-72112200
Fax: +45-72112210

• **Spain**
Anritsu EMEA Ltd.
Oficina de Representación en España
Edificio Veganova
Avda de la Vega, n° 1 (edf 8, pl 1, of 8)
28108 ALCOBENDAS - Madrid, Spain
Phone: +34-914905761
Fax: +34-914905762

• **United Arab Emirates**
Anritsu EMEA Ltd.
Dubai Liaison Office
P O Box 500413 - Dubai Internet City
Al Thuraya Building, Tower 1, Suit 701, 7th Floor
Dubai, United Arab Emirates
Phone: +971-4-3670352
Fax: +971-4-3688460

• **Singapore**
Anritsu Pte. Ltd.
60 Alexandra Terrace, #02-08, The Comtech (Lobby A)
Singapore 118502
Phone: +65-6282-2400
Fax: +65-6282-2533

• **India**
Anritsu Pte. Ltd.
India Branch Office
Unit No. S-3, Second Floor, Esteem Red Cross Bhavan,
No. 26, Race Course Road, Bangalore 560 001, India
Phone: +91-80-32944707
Fax: +91-80-22356648

• **P.R. China (Hong Kong)**
Anritsu Company Ltd.
Units 4 & 5, 28th Floor, Greenfield Tower, Concordia Plaza,
No. 1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong
Phone: +852-2301-4980
Fax: +852-2301-3545

• **P.R. China (Beijing)**
Anritsu Company Ltd.
Beijing Representative Office
Room 1515, Beijing Fortune Building,
No. 5, Dong-San-Huan Bei Road,
Chao-Yang District, Beijing 10004, P.R. China
Phone: +86-10-6590-9230
Fax: +86-10-6590-9235

• **Korea**
Anritsu Corporation, Ltd.
8F Hyunjuk Building, 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 21/270 Ferntree Gully Road, Notting Hill,
Victoria 3168, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

• **Taiwan**
Anritsu Company Inc.
7F, No. 316, Sec. 1, Neihu Rd., Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817

Please Contact:

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