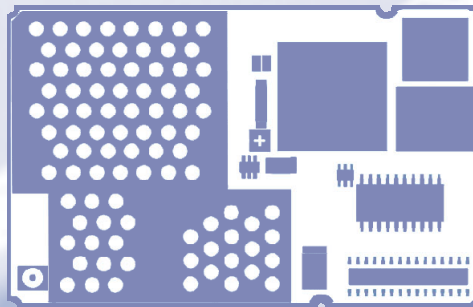


**SIEMENS**



# Application Developer's Guide

**Siemens Cellular Engines**

**Version:** v06  
**DocID:** wm\_an\_24\_dev\_guide\_v06

Application Note 24

Application Note 24: **Application Developer's Guide**

Version: **v06**

Date: **September 09, 2005**

DocId: **wm\_an\_24\_dev\_guide\_v06**

Status: **Confidential / Preliminary**

**General note**

Product is deemed accepted by Recipient and is provided without interface to Recipient's products. The Product constitutes pre-release version and code and may be changed substantially before commercial release. The Product is provided on an "as is" basis only and may contain deficiencies or inadequacies. The Product is provided without warranty of any kind, express or implied. To the maximum extent permitted by applicable law, Siemens further disclaims all warranties, including without limitation any implied warranties of merchantability, fitness for a particular purpose and noninfringement of third-party rights. The entire risk arising out of the use or performance of the Product and documentation remains with Recipient. This Product is not intended for use in life support appliances, devices or systems where a malfunction of the product can reasonably be expected to result in personal injury. Applications incorporating the described product must be designed to be in accordance with the technical specifications provided in these guidelines. Failure to comply with any of the required procedures can result in malfunctions or serious discrepancies in results. Furthermore, all safety instructions regarding the use of mobile technical systems, including GSM products, which also apply to cellular phones, must be followed. Siemens AG customers using or selling this product for use in any applications do so at their own risk and agree to fully indemnify Siemens for any damages resulting from illegal use or resale. To the maximum extent permitted by applicable law, in no event shall Siemens or its suppliers be liable for any consequential, incidental, direct, indirect, punitive or other damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information or data, or other pecuniary loss) arising out of the use of or inability to use the Product, even if Siemens has been advised of the possibility of such damages. Subject to change without notice at any time.

**Copyright**

Transmittal, reproduction, dissemination and/or editing of this document as well as utilization of its contents and communication thereof to others without express authorization are prohibited. Offenders will be held liable for payment of damages. All rights created by patent grant or registration of a utility model or design patent are reserved.

Copyright © Siemens AG 2005

**Trademark notice**

MS Windows® is a registered trademark of Microsoft Corporation.

## Contents

<b>0</b>	<b>Document history .....</b>	<b>14</b>
<b>1</b>	<b>Introduction .....</b>	<b>16</b>
1.1	Related documents .....	16
1.2	Differences between supported products .....	16
1.3	Abbreviations .....	17
1.4	Conventions and definitions .....	18
1.4.1	Conventions .....	18
1.4.2	Definitions .....	18
1.4.3	Flow chart symbols .....	19
<b>2</b>	<b>Scenarios .....</b>	<b>21</b>
2.1	Emergency call .....	23
2.1.1	Making an emergency call .....	23
2.1.1.1	Description .....	23
2.1.1.2	Used AT commands .....	23
2.1.1.3	Flow chart .....	23
2.1.1.4	Hints .....	24
2.1.1.5	Example .....	24
2.2	Basic initialization .....	25
2.2.1	Restore profile .....	25
2.2.1.1	Description .....	25
2.2.1.2	Used AT commands .....	25
2.2.1.3	Flow chart .....	26
2.2.1.4	Hints .....	27
2.2.1.5	Example .....	27
2.2.2	Recommended basic initialization .....	28
2.2.2.1	Description .....	28
2.2.2.2	Used AT commands .....	28
2.2.2.3	Flow chart .....	29
2.2.2.4	Hints .....	30
2.2.2.5	Example .....	30
2.2.3	Network initialization .....	31
2.2.3.1	Description .....	31
2.2.3.2	Used AT commands .....	31
2.2.3.3	Flow Chart .....	32
2.2.3.4	Hints .....	32
2.2.3.5	Example .....	33
2.2.4	Initialization of serial interface .....	34
2.2.4.1	Description .....	34
2.2.4.2	Used AT commands .....	34
2.2.4.3	Flow Chart .....	35
2.2.4.4	Hints .....	36
2.2.4.5	Example .....	36
2.2.5	Storing settings to user profile .....	37
2.2.5.1	Description .....	37
2.2.5.2	Used AT commands .....	37
2.2.5.3	Flow chart .....	37
2.2.5.4	Hints .....	37
2.2.5.5	Example .....	37
2.3	Device information .....	38
2.3.1	Getting IMEI .....	39
2.3.1.1	Description .....	39
2.3.1.2	Used AT commands .....	39

2.3.1.3	Flow chart .....	39
2.3.1.4	Hints.....	39
2.3.1.5	Example .....	40
2.3.2	Getting hardware and software information.....	41
2.3.2.1	Description.....	41
2.3.2.2	Used AT commands .....	41
2.3.2.3	Flow chart .....	42
2.3.2.4	Hints.....	42
2.3.2.5	Example .....	43
2.3.3	Getting SIM card ID .....	45
2.3.3.1	Description.....	45
2.3.3.2	Used AT commands .....	45
2.3.3.3	Flow chart .....	45
2.3.3.4	Hints.....	45
2.3.3.5	Example .....	46
2.4	Power saving.....	47
2.4.1	CYCLIC and NON-CYCLIC SLEEP mode .....	47
2.4.1.1	Description.....	47
2.4.1.2	Used AT commands .....	47
2.4.1.3	Flow chart .....	48
2.4.1.4	Hints.....	50
2.4.1.5	Example .....	51
2.5	Entering PIN .....	55
2.5.1	Entering SIM PIN .....	56
2.5.1.1	Description.....	56
2.5.1.2	Used AT commands .....	56
2.5.1.3	Flow chart .....	57
2.5.1.4	Hints.....	57
2.5.1.5	Example .....	58
2.5.2	Entering SIM PUK.....	60
2.5.2.1	Description.....	60
2.5.2.2	Used AT commands .....	60
2.5.2.3	Flow chart .....	61
2.5.2.4	Hints.....	61
2.5.2.5	Example .....	62
2.5.3	Entering PH SIM PIN .....	64
2.5.3.1	Description.....	64
2.5.3.2	Used AT commands .....	64
2.5.3.3	Flow chart .....	65
2.5.3.4	Hints.....	65
2.5.3.5	Example .....	66
2.5.4	Entering PH SIM PUK.....	68
2.5.4.1	Description.....	68
2.5.4.2	Used AT commands .....	68
2.5.4.3	Flow chart .....	69
2.5.4.4	Hints.....	69
2.5.4.5	Example .....	70
2.5.5	Entering SIM PIN2 .....	72
2.5.5.1	Description.....	72
2.5.5.2	Used AT commands .....	72
2.5.5.3	Flow chart .....	73
2.5.5.4	Hints.....	74
2.5.5.5	Example .....	74
2.5.6	Entering SIM PUK2.....	76
2.5.6.1	Description.....	76
2.5.6.2	Used AT commands .....	76
2.5.6.3	Flow chart .....	77
2.5.6.4	Hints.....	78
2.5.6.5	Example .....	79
2.5.7	CME ERROR handling .....	82

2.5.7.1	Description .....	82
2.5.7.2	Used AT commands .....	82
2.5.7.3	Flow Chart .....	82
2.5.7.4	Hints .....	82
2.5.7.5	Example .....	82
2.6	Monitoring .....	83
2.6.1	Initialization of monitor functions .....	84
2.6.1.1	Description .....	84
2.6.1.2	Used AT commands .....	84
2.6.1.3	Flow chart .....	85
2.6.1.4	Hints .....	85
2.6.1.5	Example .....	86
2.6.2	Cyclic monitoring .....	88
2.6.2.1	Description .....	88
2.6.2.2	Used AT commands .....	88
2.6.2.3	Flow chart .....	88
2.6.2.4	Hints .....	89
2.6.2.5	Example .....	89
2.6.3	Event monitoring .....	90
2.6.3.1	Description .....	90
2.6.3.2	Used AT commands .....	90
2.6.3.3	Flow chart .....	90
2.6.3.4	Hints .....	90
2.6.3.5	Example .....	91
2.7	Supplementary services .....	92
2.7.1	Call barring – all outgoing calls .....	92
2.7.1.1	Description .....	92
2.7.1.2	Used AT commands .....	92
2.7.1.3	Flow Chart .....	93
2.7.1.4	Hints .....	94
2.7.1.5	Example .....	94
2.7.2	Call forwarding unconditional for voice calls .....	96
2.7.2.1	Description .....	96
2.7.2.2	Used AT commands .....	96
2.7.2.3	Flow chart .....	97
2.7.2.4	Hints .....	98
2.7.2.5	Example .....	98
2.7.3	Multiparty .....	100
2.7.3.1	Multiparty initialization .....	100
2.7.3.1.1	Description .....	100
2.7.3.1.2	Used AT commands .....	100
2.7.3.1.3	Flow chart .....	101
2.7.3.1.4	Hints .....	102
2.7.3.1.5	Example .....	102
2.7.3.2	Multiparty – call waiting during voice calls .....	105
2.7.3.2.1	Description .....	105
2.7.3.2.2	Used AT commands .....	105
2.7.3.2.3	Flowchart .....	106
2.7.3.2.4	Hints .....	108
2.7.3.2.5	Example .....	108
2.7.3.3	Multiparty – conference call .....	111
2.7.3.3.1	Description .....	111
2.7.3.3.2	Used AT commands .....	111
2.7.3.3.3	Flow chart .....	112
2.7.3.3.4	Hints .....	116
2.7.3.3.5	Example .....	116
2.7.3.4	Multiparty - call reject .....	121
2.7.3.4.1	Description .....	121
2.7.3.4.2	Used AT commands .....	121
2.7.3.4.3	Flowchart .....	122

2.7.3.4.4	Hints .....	124
2.7.3.4.5	Example .....	124
2.7.4	Calling line identification presentation (CLIP) .....	127
2.7.4.1	Description .....	127
2.7.4.2	Used AT commands .....	127
2.7.4.3	Flow Chart .....	128
2.7.4.4	Hints .....	128
2.7.4.5	Example .....	129
2.7.5	Calling line identification restriction (CLIR) .....	132
2.7.5.1	Description .....	132
2.7.5.2	Used AT commands .....	132
2.7.5.3	Flow Chart .....	133
2.7.5.4	Hints .....	134
2.7.5.5	Example .....	134
2.8	Voice call handling .....	138
2.8.1	Voice call handling initialization .....	139
2.8.1.1	Description .....	139
2.8.1.2	Used AT commands .....	139
2.8.1.3	Flow chart .....	140
2.8.1.4	Hints .....	141
2.8.1.5	Example .....	141
2.8.2	Voice call handling – incoming calls .....	142
2.8.2.1	Description .....	142
2.8.2.2	Used AT commands .....	142
2.8.2.3	Flow chart .....	143
2.8.2.4	Hints .....	144
2.8.2.5	Example .....	144
2.8.3	Voice call handling – outgoing calls .....	146
2.8.3.1	Description .....	146
2.8.3.2	Used AT commands .....	146
2.8.3.3	Flow chart .....	147
2.8.3.4	Hints .....	148
2.8.3.5	Example .....	148
2.8.4	Further scenarios of outgoing voice calls .....	150
2.8.4.1	Description .....	150
2.8.4.2	Used AT commands .....	150
2.8.4.3	Flow chart .....	151
2.8.4.4	Hints .....	152
2.8.4.5	Example .....	152
2.9	CSD .....	154
2.9.1	CSD initialization .....	154
2.9.1.1	Description .....	154
2.9.1.2	Used AT commands .....	155
2.9.1.3	Flow chart .....	156
2.9.1.4	Hints .....	159
2.9.1.5	Example .....	159
2.9.2	CSD call handling – general instructions .....	161
2.9.3	CSD call handling – incoming calls .....	162
2.9.3.1	Description .....	162
2.9.3.2	Used AT commands .....	162
2.9.3.3	Flow chart .....	163
2.9.3.4	Hints .....	165
2.9.3.5	Example .....	165
2.9.4	CSD call handling – outgoing CSD calls .....	168
2.9.4.1	Description .....	168
2.9.4.2	Used AT commands .....	168
2.9.4.3	Flow chart .....	169
2.9.4.4	Hints .....	169
2.9.4.5	Example .....	170
2.9.5	Further scenarios for outgoing CSD calls .....	172

	2.9.5.1	Description .....	172
	2.9.5.2	Used AT commands .....	172
	2.9.5.3	Flow chart .....	173
	2.9.5.4	Hints.....	175
	2.9.5.5	Example .....	175
2.10	GPRS .....		178
	2.10.1	GPRS initialization .....	179
	2.10.1.1	Description .....	179
	2.10.1.2	Used AT commands .....	179
	2.10.1.3	Flow chart .....	180
	2.10.1.4	Hints.....	181
	2.10.1.5	Example .....	181
	2.10.2	GPRS attach / detach .....	184
	2.10.2.1	Description .....	184
	2.10.2.2	Used AT commands .....	184
	2.10.2.3	Flow chart .....	185
	2.10.2.4	Hints.....	186
	2.10.2.5	Example .....	187
	2.10.3	GPRS context definition.....	188
	2.10.3.1	Description .....	188
	2.10.3.2	Used AT commands .....	188
	2.10.3.3	Flow chart .....	189
	2.10.3.4	Hints.....	190
	2.10.3.5	Example .....	190
	2.10.4	GPRS PDP Context activation/ deactivation .....	192
	2.10.4.1	Description .....	192
	2.10.4.2	Used AT commands .....	192
	2.10.4.3	Flow Chart .....	193
	2.10.4.4	Hints.....	193
	2.10.4.5	Example .....	194
	2.10.5	Entering GPRS data mode .....	197
	2.10.5.1	Description .....	197
	2.10.5.2	Used AT commands .....	197
	2.10.5.3	Flow chart .....	198
	2.10.5.4	Hints.....	198
	2.10.5.5	Example .....	199
2.11	SMS.....		200
	2.11.1	SMS initialization.....	201
	2.11.1.1	Description .....	201
	2.11.1.2	Used AT commands .....	202
	2.11.1.3	Flow chart .....	203
	2.11.1.4	Hints.....	209
	2.11.1.5	Example .....	209
	2.11.2	Writing SMS .....	213
	2.11.2.1	Description .....	213
	2.11.2.2	Used AT commands .....	213
	2.11.2.3	Flow chart .....	214
	2.11.2.4	Hints.....	215
	2.11.2.5	Example .....	215
	2.11.3	Deleting SMS .....	217
	2.11.3.1	Description .....	217
	2.11.3.2	Used AT commands .....	217
	2.11.3.3	Flow chart .....	218
	2.11.3.4	Hints.....	218
	2.11.3.5	Example .....	219
	2.11.4	Sending SMS .....	220
	2.11.4.1	Description .....	220
	2.11.4.2	Used AT commands .....	220
	2.11.4.3	Flow Chart .....	221
	2.11.4.4	Hints.....	221

2.11.4.5	Example .....	222
2.11.5	Reading SMS .....	223
2.11.5.1	Description .....	223
2.11.5.2	Used AT commands .....	223
2.11.5.3	Flow Chart .....	224
2.11.5.4	Hints .....	225
2.11.5.5	Example .....	225
2.11.6	Receiving SMS .....	227
2.11.6.1	Description .....	227
2.11.6.2	Used AT commands .....	227
2.11.6.3	Flow Chart .....	228
2.11.6.4	Hints .....	228
2.11.6.5	Example .....	228
2.11.7	Receiving status report .....	231
2.11.7.1	Description .....	231
2.11.7.2	Used AT commands .....	231
2.11.7.3	Flow Chart .....	232
2.11.7.4	Hints .....	232
2.11.7.5	Example .....	233
2.11.8	Receiving cell broadcast message .....	235
2.11.8.1	Description .....	235
2.11.8.2	Used AT commands .....	235
2.11.8.3	Flow Chart .....	235
2.11.8.4	Hints .....	236
2.11.8.5	Example .....	236
2.12	Phonebook .....	237
2.12.1	Phonebook initialization .....	237
2.12.1.1	Description .....	237
2.12.1.2	Used AT commands .....	237
2.12.1.3	Flow chart .....	238
2.12.1.4	Hints .....	239
2.12.1.5	Example .....	239
2.12.2	Reading phonebook entries .....	240
2.12.2.1	Description .....	240
2.12.2.2	Used AT commands .....	240
2.12.2.3	Flow Chart .....	241
2.12.2.4	Hints .....	242
2.12.2.5	Example .....	242
2.12.3	Searching phonebook entries by scrolling up and down .....	244
2.12.3.1	Description .....	244
2.12.3.2	Used AT commands .....	244
2.12.3.3	Flow chart .....	245
2.12.3.4	Hints .....	245
2.12.3.5	Example .....	246
2.12.4	Searching phonebook entries by first letter of name .....	248
2.12.4.1	Description .....	248
2.12.4.2	Used AT commands .....	248
2.12.4.3	Flow Chart .....	249
2.12.4.4	Hints .....	249
2.12.4.5	Example .....	250
2.12.5	Deleting phonebook or phonebook entries .....	251
2.12.5.1	Description .....	251
2.12.5.2	Used AT commands .....	251
2.12.5.3	Flow chart .....	252
2.12.5.4	Hints .....	253
2.12.5.5	Example .....	253
2.12.6	Writing phonebook entries .....	255
2.12.6.1	Description .....	255
2.12.6.2	Used AT commands .....	255
2.12.6.3	Flow chart .....	256



2.12.6.4	Hints.....	256
2.12.6.5	Example .....	257
2.12.7	Writing entries to SIM fixdialing phonebook .....	259
2.12.7.1	Description.....	259
2.12.7.2	Used AT commands .....	259
2.12.7.3	Flow chart .....	260
2.12.7.4	Hints.....	260
2.12.7.5	Example .....	261
2.13	Security.....	263
2.13.1	Changing SIM PIN .....	264
2.13.1.1	Description.....	264
2.13.1.2	Used AT commands .....	264
2.13.1.3	Flow chart .....	264
2.13.1.4	Hints.....	265
2.13.1.5	Example .....	266
2.13.2	Changing SIM PIN2 .....	270
2.13.2.1	Description.....	270
2.13.2.2	Used AT commands .....	270
2.13.2.3	Flow chart .....	271
2.13.2.4	Hints.....	272
2.13.2.5	Example .....	273
2.13.3	Changing password for phonelock ("PS") .....	277
2.13.3.1	Description.....	277
2.13.3.2	Used AT commands .....	277
2.13.3.3	Flow chart .....	278
2.13.3.4	Hints.....	280
2.13.3.5	Example .....	280
2.13.4	Changing net password for call barring .....	284
2.13.4.1	Description.....	284
2.13.4.2	Used AT commands .....	284
2.13.4.3	Flow chart .....	284
2.13.4.4	Hints.....	284
2.13.4.5	Example .....	285
2.13.5	Configuring SIM card lock ("SC").....	286
2.13.5.1	Description.....	286
2.13.5.2	Used AT commands .....	286
2.13.5.3	Flow chart .....	287
2.13.5.4	Hints.....	288
2.13.5.5	Example .....	289
2.14	SIM .....	291
2.14.1	SIM access .....	291
2.14.1.1	Description.....	291
2.14.1.2	Used AT commands .....	292
2.14.1.3	Flow chart .....	292
2.14.1.4	Hints.....	295
2.14.1.5	Example .....	295
2.15	Internet Services .....	298
2.15.1.1	Description.....	298
2.15.2	Connection Initialization .....	299
2.15.2.1	Description.....	299
2.15.2.2	Used AT commands .....	299
2.15.2.3	Flow chart – CSD and GPRS0 Initialization .....	300
2.15.2.4	Hints.....	302
2.15.2.5	Example – CSD and GPRS0 Initialization .....	302
2.15.3	Service Initialization .....	303
2.15.3.1	Description.....	303
2.15.3.2	Used AT commands .....	303
2.15.3.3	Flow chart .....	304
2.15.3.3.1	FTP Initialization .....	304
2.15.3.3.2	SMTP Initialization.....	306

2.15.3.3.3	POP3 Initialization .....	307
2.15.3.3.4	Socket Initialization .....	308
2.15.3.3.5	HTTP Initialization .....	309
2.15.3.4	Hints .....	309
2.15.3.5	Examples .....	310
2.15.3.5.1	FTP Initialization .....	310
2.15.3.5.2	SMTP Initialization .....	310
2.15.3.5.3	POP3 Initialization .....	311
2.15.3.5.4	Socket Initialization .....	312
2.15.3.5.5	HTTP Initialization .....	312
2.15.4	Open Internet Service .....	314
2.15.4.1	Description .....	314
2.15.4.2	Used AT commands .....	314
2.15.4.3	Flow chart .....	314
2.15.4.4	Examples .....	314
2.15.5	Read/Write Data .....	315
2.15.5.1	Description .....	315
2.15.5.2	Used AT commands .....	315
2.15.5.3	Flow chart .....	316
2.15.5.3.1	FTP .....	317
2.15.5.3.2	SMTP .....	318
2.15.5.3.3	POP3 .....	319
2.15.5.3.4	Socket .....	320
2.15.5.3.5	HTTP .....	322
2.15.5.4	Hints .....	324
2.15.5.5	Examples .....	324
2.15.5.5.1	FTP .....	324
2.15.5.5.2	SMTP .....	325
2.15.5.5.3	POP3 .....	326
2.15.5.5.4	Socket .....	327
2.15.5.5.5	HTTP .....	328
2.15.6	Close Internet Service .....	329
2.15.6.1	Description .....	329
2.15.6.2	Used AT commands .....	329
2.15.6.3	Examples .....	330
2.16	Remote SIM Access .....	331
2.16.1	Initialization of RSA .....	332
2.16.1.1	Description .....	332
2.16.1.2	Used AT commands .....	332
2.16.1.3	Flow chart .....	333
2.16.1.4	Hints .....	334
2.16.1.5	Example .....	334
2.16.2	RSA Connection via Bluetooth .....	336
2.16.2.1	Description .....	336
2.16.2.2	Used AT commands .....	336
2.16.2.3	Flow chart .....	337
2.16.2.4	Hints .....	338
2.16.2.5	Example .....	339
2.16.3	RSA connection via serial interface .....	342
2.16.3.1	Description .....	342
2.16.3.2	Used AT commands .....	343
2.16.3.3	Flow chart .....	344
2.16.3.4	Hints .....	346
2.16.3.5	Example .....	346
2.17	Switch off the ME .....	350
2.17.1	Power down the ME .....	350
2.17.1.1	Description .....	350
2.17.1.2	Used AT commands .....	350
2.17.1.3	Flow chart .....	351
2.17.1.4	Hints .....	351

2.17.1.5	Example .....	351
2.18	Restart ME .....	352
2.18.1	Manual restart .....	352
2.18.1.1	Description .....	352
2.18.1.2	Used AT commands .....	352
2.18.1.3	Flow chart .....	353
2.18.1.4	Hints .....	353
2.18.1.5	Example .....	353
2.18.2	Cyclic restart .....	354
2.18.2.1	Description .....	354
2.18.2.2	Used AT commands .....	354
2.18.2.3	Flow chart .....	355
2.18.2.4	Hints .....	356
2.18.2.5	Example .....	356
2.18.3	Restart via Ignition / Key 7 .....	358
2.18.3.1	Description .....	358
2.18.3.2	Used AT commands .....	358
2.18.3.3	Flow chart .....	358
2.18.3.4	Hints .....	358
2.18.3.5	Example .....	358

## Figures

Figure 1: Flow chart symbols .....	20
Figure 2: Overview ME – part 1 .....	21
Figure 3: Overview ME – part 2 .....	22
Figure 4: Making an emergency call .....	23
Figure 5: Basic initialization .....	25
Figure 6: Restore profile .....	26
Figure 7: Recommended basic initialization .....	29
Figure 8: Network initialization .....	32
Figure 9: Initialization of serial interface .....	35
Figure 10: Storing settings to user profile .....	37
Figure 11: Getting device information .....	38
Figure 12: Getting IMEI .....	39
Figure 13: Getting hardware and software information .....	42
Figure 14: Getting SIM card ID .....	45
Figure 15: CYCLIC SLEEP mode .....	48
Figure 16: NON-CYCLIC SLEEP mode .....	49
Figure 17: Configuration CYCLIC SLEEP mode 9 .....	50
Figure 18: Entering PIN .....	55
Figure 19: Entering SIM PIN .....	57
Figure 20: Entering SIM PUK .....	61
Figure 21: Entering PH-SIM PIN .....	65
Figure 22: Entering PH-SIM PUK .....	69
Figure 23: Entering SIM PIN2 .....	73
Figure 24: Entering SIM PUK2 - part 1 .....	77
Figure 25: Entering SIM PUK2 - part 2 .....	78
Figure 26: CME ERROR handling .....	82
Figure 27: Monitoring .....	83
Figure 28: Initialization of monitoring functions .....	85
Figure 29: Cyclic monitoring .....	88
Figure 30: Event monitoring .....	90
Figure 31: Supplementary services .....	92
Figure 32: Call barring – all outgoing calls .....	93
Figure 33: Call forwarding unconditional for voice call (class 1) .....	97
Figure 34: Multiparty .....	100
Figure 35: Multiparty initialization .....	101
Figure 36: Multiparty - call waiting during voice calls - part 1 .....	106

Figure 37: Multiparty - call waiting during voice calls- part 2 .....	107
Figure 38: Multiparty - conference call - part 1 .....	112
Figure 39: Multiparty - conference call - part 2 .....	113
Figure 40: Multiparty - conference call - part 3 .....	114
Figure 41: Multiparty - conference call - part 4 .....	115
Figure 42: Multiparty - call reject - alternative 1 .....	122
Figure 43: Multiparty - call reject - alternative 2 .....	123
Figure 44: CLIP .....	128
Figure 45: CLIR .....	133
Figure 46: Voice call handling .....	138
Figure 47: Voice call handling initialization .....	140
Figure 48: Voice call handling - incoming calls .....	143
Figure 49: Voice call handling - outgoing calls .....	147
Figure 50: Further scenarios of outgoing calls 1- part 1 .....	151
Figure 51: Further scenarios of outgoing voice calls 1- part 2 .....	152
Figure 52: CSD .....	154
Figure 53: CSD initialization - part 1 .....	156
Figure 54: CSD initialization - part 2 .....	157
Figure 55: CSD initialization - part 3 .....	158
Figure 56: CSD call handling - incoming calls – part 1 .....	163
Figure 57: CSD call handling - incoming calls – part 2 .....	164
Figure 58: CSD call handling - outgoing calls .....	169
Figure 59: Call handling for CSD – part 1 .....	173
Figure 60: Call handling for CSD - part 2 .....	174
Figure 61: Call handling for CSD - part 3 .....	175
Figure 62: GPRS .....	178
Figure 63: GPRS initialization - part 1 .....	180
Figure 64: GPRS initialization - part 2 .....	181
Figure 65: GPRS attach .....	185
Figure 66: GPRS detach .....	186
Figure 67: GPRS context definition .....	189
Figure 68: GPRS PDP context activation / deactivation .....	193
Figure 69: Entering GPRS data mode .....	198
Figure 70: SMS .....	200
Figure 71: PDU example .....	201
Figure 72: SMS initialization - part 1 .....	203
Figure 73: SMS initialization - part 2 .....	204
Figure 74: SMS initialization - part 3 .....	205
Figure 75: SMS initialization - part 4 .....	206
Figure 76: SMS initialization (cell broadcast) .....	207
Figure 77: SMS initialization (status report) .....	208
Figure 78: Writing SMS (text mode) .....	214
Figure 79: Writing SMS (PDU mode) .....	215
Figure 80: Deleting SMS .....	218
Figure 81: Sending SMS .....	221
Figure 82: Reading SMS – 1 .....	224
Figure 83: Reading SMS - 2 .....	225
Figure 84: Receiving SMS .....	228
Figure 85: Receiving status report .....	232
Figure 86: Receiving cell broadcast message .....	235
Figure 87: Phonebook .....	237
Figure 88: Phonebook initialization .....	238
Figure 89: Reading phonebook entries – part 1 .....	241
Figure 90: Reading phonebook entries – part 2 .....	242
Figure 91: Searching phonebook entries by scrolling up and down .....	245
Figure 92: Searching phonebook entries by first letter of name .....	249
Figure 93: Deleting phonebook entries .....	252
Figure 94: Writing phonebook entries .....	256
Figure 95: Writing entries to SIM fixdialing phonebook .....	260
Figure 96: Security .....	263

Figure 97: Changing SIM PIN .....	264
Figure 98: Changing SIM PIN and retrieving PIN counter with write command AT^SPIC=<facility> .	265
Figure 99: Changing SIM PIN2 and retrieving PIN counter with AT^SPIC exec command .....	271
Figure 100: Changing SIM PIN2 and retrieving PIN counter with write command AT^SPIC=<facility>	272
Figure 101: Changing password for phonelock .....	278
Figure 102: Changing password for phonelock and retrieving PIN counter with AT^SPIC=<facility>	279
Figure 103: Changing net password for call barring .....	284
Figure 104: Configuring SIM card lock ("SC") – part 1.....	287
Figure 105: Configuring SIM card lock ("SC") – part 2.....	288
Figure 106: READ RECORD example response .....	292
Figure 107: SIM access "GET RESPONSE" .....	292
Figure 108: SIM access "READ BINARY".....	293
Figure 109: SIM access "READ RECORD" .....	293
Figure 110: SIM access "UPDATE RECORD"- part 1 .....	294
Figure 111: SIM access "UPDATE RECORD"- part 2 .....	295
Figure 112: Internet Services .....	298
Figure 113: Connection initialization .....	299
Figure 114: CSD initialization .....	301
Figure 115: GPRS0 initialization .....	301
Figure 116: Service Initialization. ....	303
Figure 117 FTP GET Initialization .....	304
Figure 118: FTP PUT initialization.....	305
Figure 119: SMTP Initialization. ....	306
Figure 120: POP3 Initialization.....	307
Figure 121: Socket Initialization. ....	308
Figure 122: HTTP Initialization. ....	309
Figure 123: Open Internet Services .....	314
Figure 124: Read/Write Data.....	316
Figure 125: FTP GET .....	317
Figure 126 FTP PUT .....	318
Figure 127: SMTP .....	319
Figure 128: POP3.....	320
Figure 129: Socket .....	321
Figure 130: HTTP .....	323
Figure 131: Close Internet Service.....	329
Figure 132: Remote SIM Access (SAP).....	331
Figure 133: RSA initialization .....	333
Figure 134: RSA Connection via Bluetooth part 1 .....	337
Figure 135: RSA Connection via Bluetooth part 2 .....	338
Figure 136: Remote SIM Access (XSAP) .....	342
Figure 137: RSA Connection via serial interface part 1 .....	344
Figure 138: RSA Connection via serial interface part 2 .....	345
Figure 143: Power down the ME .....	351
Figure 144: Restart ME .....	352
Figure 145: Manual restart .....	353
Figure 146: Cyclic restart .....	355
Figure 147: Autoignition .....	358

## 0 Document history

Preceding document: "Application Developer's Guide" Version **v05**

New document: "Application Developer's Guide" Version **v06**

Chapter	What is new
2.15	New Chapter "Internet Services"
2.16	New Chapter "Remote SIM Access"

Preceding document: "Application Developer's Guide" Version v04

New document: "Application Developer's Guide" Version **v05**

Chapter	What is new
2	Added new functions in Figure 2, Figure 3
2.1.1.4	New Hint "GCF-Test"
2.4.1	Added example "Configure SLEEP mode 9".
2.7.3	Modified Figure 36- 43
2.8	Modified Figure 46- 51
2.9	Modified Figure 52- 61
2.9.1	Added AT commands ATV0 and ATV0
2.9.3.5	Added Example 3 with ATV0
2.10.1	Added explanations on AT^CGPADDR.
2.10.1.5	Modified example "GPRS initialization"
2.11.1.4	New Hint "GCF Test"
2.13.5	Added example and flow chart.
2.13.2.5	Added example 2
2.13.3.5	Added example 2
2.13.5.3	Modified Figure 105
2.13.5.5	Added example 2
2.14	New chapter: "SIM functions"
2.15	New chapter: "Switch off ME"
2.18	New chapter: "Restart ME"

Preceding document: "Application Developer's Guide" Version v03

New document: "Application Developer's Guide" Version v04

Chapter	What is new
2.2	Basic initialization explained in greater detail.
2.4	New chapter: "Power saving"
2.7.4	New chapter: "Calling line identification presentation (CLIP)"
2.7.5	New chapter: "Calling line identification restriction (CLIR)"
2.8	New chapter: "Voice call handling"

---

2.9	New chapter: "CSD"
2.11	Added explanations on PDU mode. Basic initialization explained in greater detail.
2.13	New chapter: "Security"

Preceding document: "Application Developer's Guide" Version v02

New document: "Application Developer's Guide" Version v03

Chapter	What is new
1.3	Added further abbreviations
2	Modified Figure 2 / Figure 3 "Overview ME"
2.2.4	New chapter: "Initialization of serial interface"
2.5.5	New chapter: "Entering SIM PIN2"
2.5.6	New chapter: "Entering SIM PUK2"
2.7	New chapter: "Supplementary services"
2.12	New chapter: "Phonebook"

## **1 Introduction**

Because of the breadth of capabilities and features of the Siemens AG GSM/GPRS Module (further referred to as the Module), it can be difficult for the customer to design interfaces and choose suitable command sequences when implementing an application e.g. the MMI of an application.

Thus, many customers have found it helpful to be provided with advice on command sequences and proposals for small implementations.

This document is intended to provide exactly this help and make the startup of an MMI implementation much easier. Examples and useful descriptions have been included and will be continuously enhanced according to the customers' requirements.

### **1.1 Related documents**

- [1] Hardware Interface Description of your Siemens Cellular Engine
- [2] AT Command Set of your Siemens Cellular Engine
- [3] Remote-SAT User's Guide
- [4] GPRS Startup User's Guide
- [5] Multiplexer User's Guide
- [6] Multiplexer Driver Developer's Guide for Windows 2000 and Windows XP
- [7] Multiplexer Driver Installation Guide for Windows 2000 and Windows XP
- [8] GSM 03.04 "Technical realization of the Short Message Service (SMS)"
- [9] GSM 07.07 "AT Command set for GSM Mobile Equipment (ME)"
- [10] GSM 11.10 "Mobile Station (MS) conformance specification"
- [11] GSM 02.07 "Mobile Stations (MS) features"
- [12] GSM 11.11 "Specification of the Subscriber Identity Module"
- [13] Remote SIM Access User's Guide
- [14] ComBridge. This program can be received from Siemens AG Com WM

### **1.2 Differences between supported products**

This document covers the entire range of Siemens Cellular Engines. All examples have been chosen to be generally applicable to most product types. Yet, the diversity of the products implies that, due to hardware or software specific properties, functional differences occur regarding the implementation of features, AT commands and parameters. Therefore, please consult the documents supplied with your module, especially [1] and [2], to make sure whether or not a described feature is supported.

If an AT command or parameter behaves differently in various modules, the described command sequence presents only a typical example, accompanied by a footnote to indicate that module specific properties shall be gathered from other related documents.



## 1.3 Abbreviations

APN	-	Access Point Name
BS	-	Basic Service
CF	-	Call Forwarding
CFU	-	Call Forwarding Unconditional
CH	-	Call Hold
CBS	-	Cell Broadcast Message
CLI	-	Calling Line Identity
CLIP	-	Calling Line Identification Presentation
CLIR	-	Calling Line Identification Restriction
CSD	-	Circuit Switched Data
DIS	-	Digital identification signal
DN	-	Directory Number
EF	-	Elementary File
GCF	-	Global Certification Forum
GPRS	-	General Packet Radio Service
HDCL	-	High Level Data Link Control
ME	-	Mobile Equipment
MMI	-	Man Machine Interface
MT	-	Mobile Terminal
MS	-	Mobile Station
MPTY	-	Multiparty
PDP Context	-	Packet Data Protocol context
PDU	-	Protocol Data Unit
PIN	-	Personal Identification Number
PUK	-	Personal Unlocking Key
PW	-	Password
QoS	-	Quality of Service
RSA	-	Remote SIM Access
SAT	-	SIM Application Toolkit
SC	-	Service Center
SIM	-	Subscriber Identity Module
SME	-	Short-Message-Entity
SMS	-	Short Message System
TE	-	Terminal Equipment
UDUB	-	User Determined User Busy
URC	-	Unsolicited Result Code

### Abbreviations related to phonebooks

SM	-	SIM phonebook
ME	-	Mobile Equipment phonebook
FD	-	SIM fixdialing phonebook
LD	-	Last dialing phonebook
MC	-	List of missed calls
RC	-	List of received calls
ON	-	List of own numbers

## 1.4 Conventions and definitions

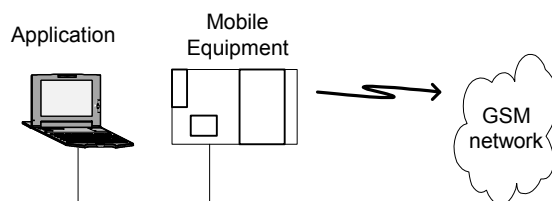
### 1.4.1 Conventions

<b>&lt;...&gt;</b>	Possible value ranges of AT command parameters.
<b>Xxxx</b>	Placeholders used for PINs, PUKs and other passwords.
<b>GCF-CC note:</b>	"Global Certification Forum - Certification Criteria". Important note regarding requirements, recommendations and/or test cases specified by GCF.

### 1.4.2 Definitions

<b>Connected</b>	When two or more parties are involved in a call this situation is referred to as "connected".
<b>Registered</b>	An ME is called "registered" when successfully logged into the GSM network.
<b>Module</b>	Siemens wireless GSM/GPRS module.

#### Mobile Equipment



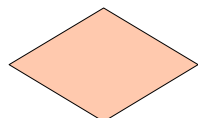
### 1.4.3 Flow chart symbols



**Start State**  
ME starts in this state.



**End State**  
ME ends in this state.



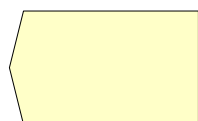
**branching**  
AT command with execution true or false.



**internal action**



**sequence**



**communication ME → network**



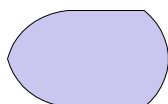
**communication network → ME**



**communication ME → TE**



**communication TE → ME**



**recommended/suggested display output**  
(if display available)

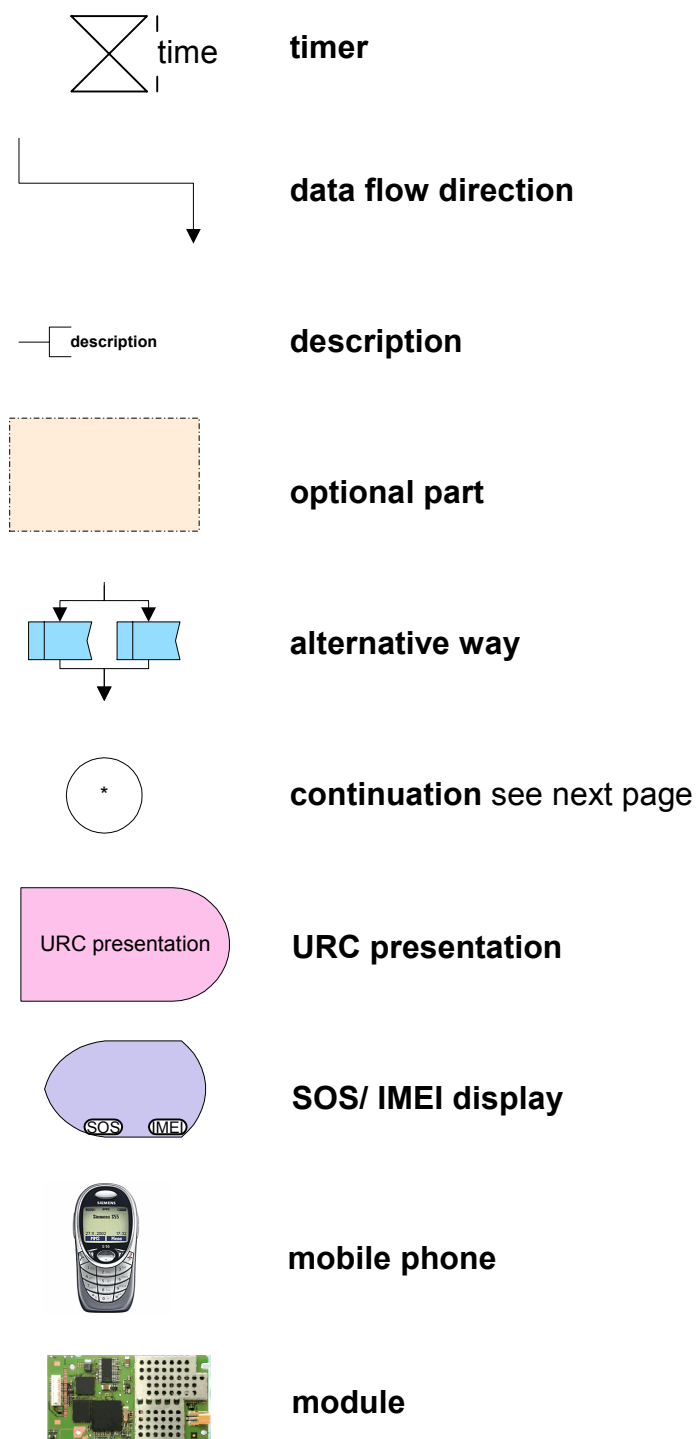


Figure 1: Flow chart symbols

2 Scenarios

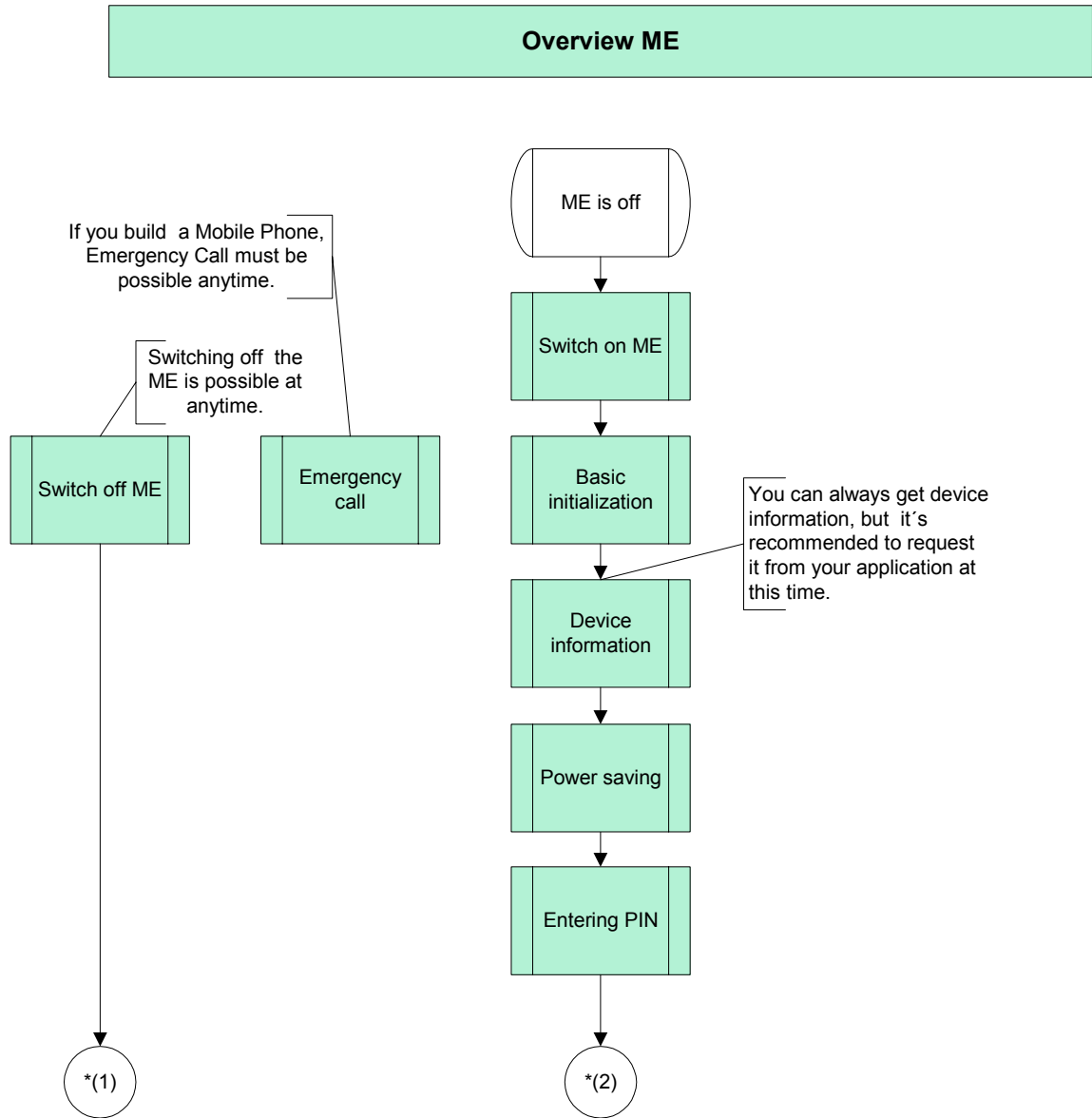


Figure 2: Overview ME – part 1

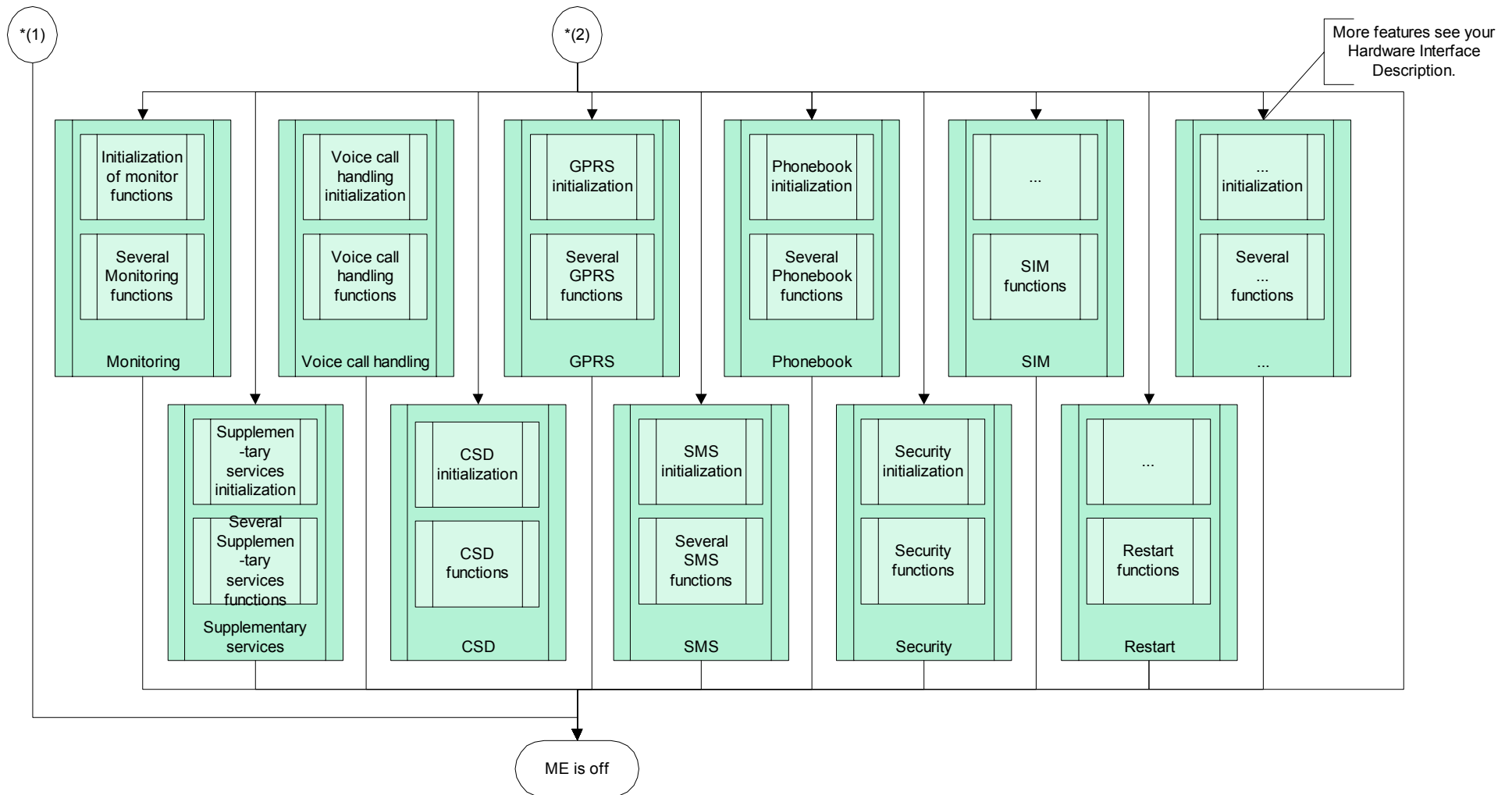


Figure 3: Overview ME – part 2

## 2.1 Emergency call

### 2.1.1 Making an emergency call

#### 2.1.1.1 Description

This chapter describes the AT commands used to make an emergency call. The emergency number for GSM 900/1800 frequency bands is 112, in GSM 850/1900 networks 911 and 08 are available. The availability of emergency numbers depends on the type of ME and the services offered according to national regulations. Siemens tri-band GSM/GPRS modules support all three numbers.

#### 2.1.1.2 Used AT commands

ATD<number>;	-	Make an emergency call
ATH	-	Disconnect existing connection

For further details about the commands see [2].

#### 2.1.1.3 Flow chart

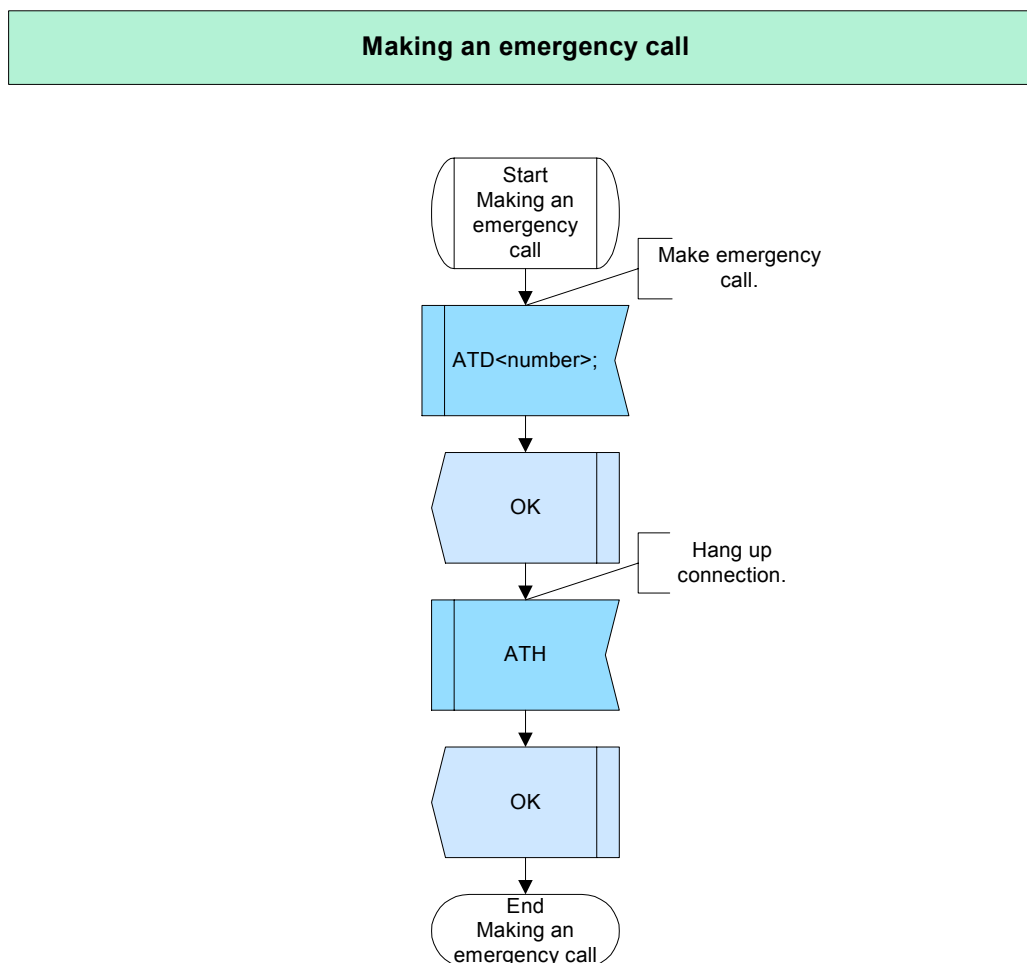


Figure 4: Making an emergency call

#### **2.1.1.4 Hints**

GCF-C note: When designing an application ensure that the following requirements be satisfied, even if no SIM card is inserted: The mobile must be able to dial emergency numbers and to activate the audio path. This ability shall be limited only to the emergency call numbers listed in Chapter 2.1.

#### **2.1.1.5 Example**

\*\*\*\*\*

Comment: Making an emergency call

\*\*\*\*\*

\*\*\*\*\*

Comment: Call 112

\*\*\*\*\*

Subscr 1 Send:ATD112;  
Subscr 1 Receive:ATD112;  
Subscr 1 Receive:  
Subscr 1 Receive:OK

\*\*\*\*\*

Comment: Hang up

\*\*\*\*\*

Subscr 1 Send:ATH  
Subscr 1 Receive:ATH  
Subscr 1 Receive:OK

\*\*\*\*\*

Comment: Dialing an emergency number not supported by the network

\*\*\*\*\*

Subscr 1 Send:ATD911;  
Subscr 1 Receive:ATD911;  
Subscr 1 Receive: +CME ERROR: operation temporary not allowed



## 2.2 Basic initialization

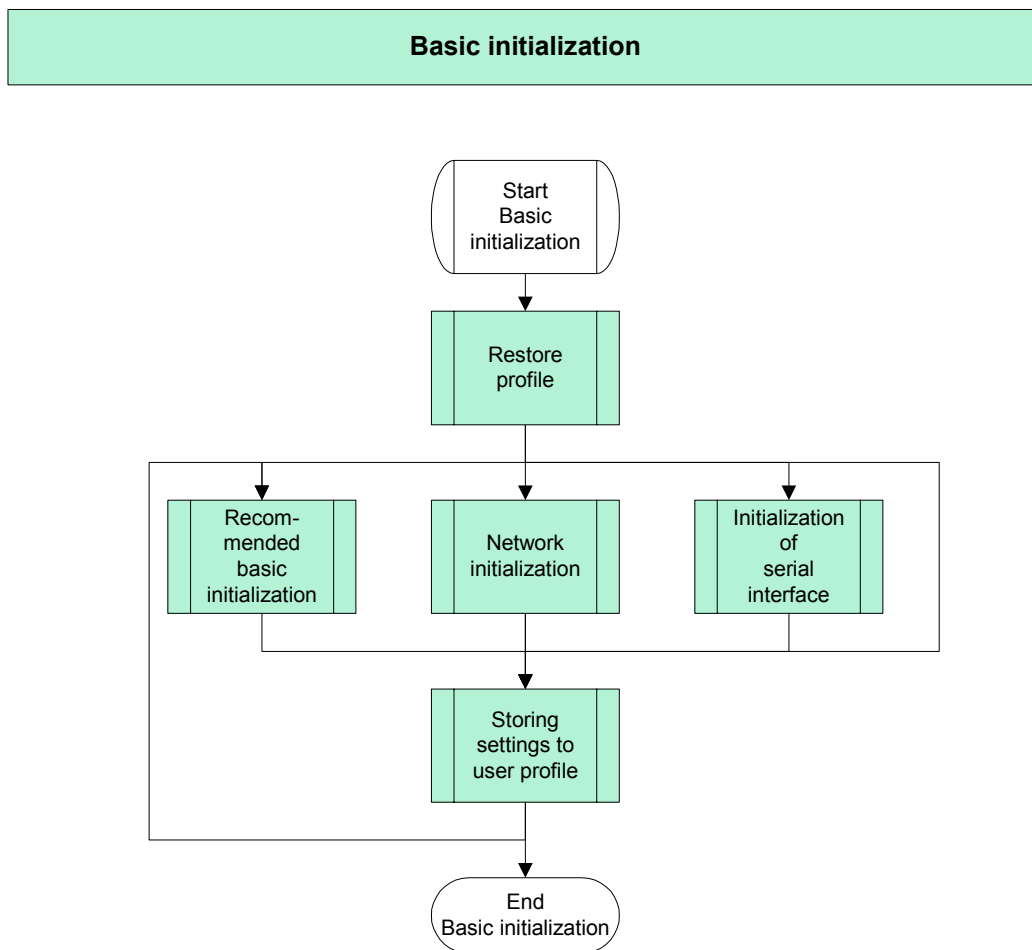


Figure 5: Basic initialization

### 2.2.1 Restore profile

#### 2.2.1.1 Description

This chapter describes all the steps required to restore a profile. Two profiles are supported. First, use AT&V to check which profile is currently active. Depending on the result, you can enter AT&F to recall the factory settings or ATZ to restore the user profile saved with AT&W.

#### 2.2.1.2 Used AT commands

AT&V	-	Display the current configuration
AT&F	-	Set all current parameters to manufacturer defaults
ATZ	-	Set all current parameters to user defined profile

For further details about the commands see [2].

2.2.1.3 Flow chart

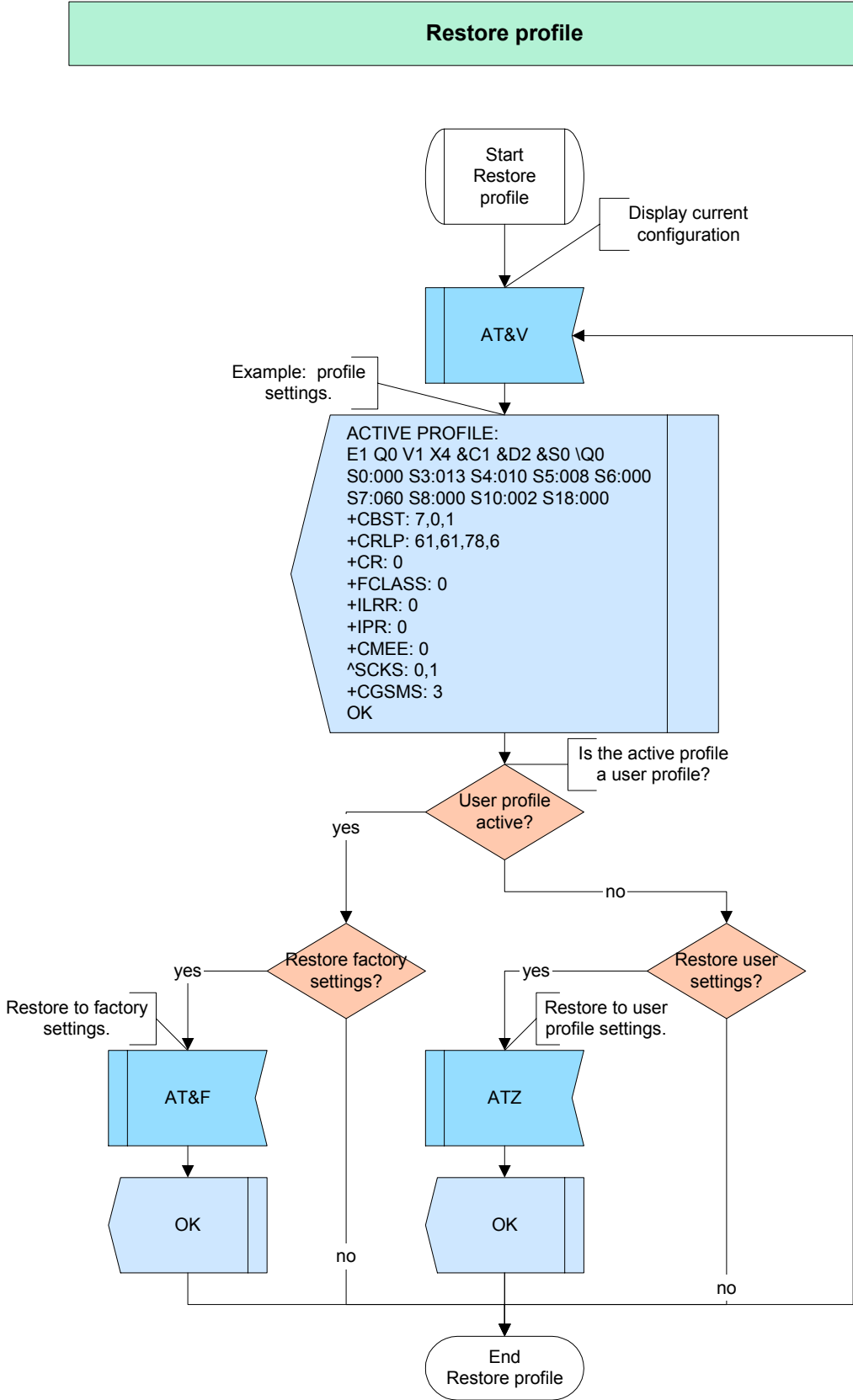


Figure 6: Restore profile

#### 2.2.1.4 Hints

- Restoring a profile is possible at any time.

#### 2.2.1.5 Example

\*\*\*\*\*

Comment: Restore profile

\*\*\*\*\*

\*\*\*\*\*

Comment: Display current configuration

\*\*\*\*\*

```
Subscr 1   Send: AT&V
Subscr 1   Receive: AT&V
Subscr 1   Receive: ACTIVE PROFILE:
Subscr 1   Receive: E1 Q0 V1 X4 &C1 &D2 &S0 \Q0
Subscr 1   Receive: S0:000 S3:013 S4:010 S5:008 S6:000 S7:060 S8:000 S10:002 S18:000
Subscr 1   Receive: +CBST: 7,0,1
Subscr 1   Receive: +CRLP: 61,61,78,6
Subscr 1   Receive: +CR: 0
Subscr 1   Receive: +FCLASS: 0
Subscr 1   Receive: +ILRR: 0
Subscr 1   Receive: +IPR: 0
Subscr 1   Receive: +CMEE: 2
Subscr 1   Receive: ^SCKS: 0,1
Subscr 1   Receive: +CGSMS: 3
Subscr 1   Receive:
Subscr 1   Receive: OK
```

\*\*\*\*\*

Comment: Restore manufacture defaults

\*\*\*\*\*

```
Subscr 1   Send: AT&F
Subscr 1   Receive: AT&F
Subscr 1   Receive: OK
```

\*\*\*\*\*

Comment: Display current configuration

\*\*\*\*\*

```
Subscr 1   Send: AT&V
Subscr 1   Receive: AT&V
Subscr 1   Receive: ACTIVE PROFILE:
Subscr 1   Receive: E1 Q0 V1 X4 &C1 &D2 &S0 \Q0
Subscr 1   Receive: S0:000 S3:013 S4:010 S5:008 S6:000 S7:060 S8:000 S10:002 S18:000
Subscr 1   Receive: +CBST: 7,0,1
Subscr 1   Receive: +CRLP: 61,61,78,6
Subscr 1   Receive: +CR: 0
Subscr 1   Receive: +FCLASS: 0
Subscr 1   Receive: +ILRR: 0
Subscr 1   Receive: +IPR: 0
Subscr 1   Receive: +CMEE: 0
Subscr 1   Receive: ^SCKS: 0,1
Subscr 1   Receive: +CGSMS: 3
Subscr 1   Receive:
Subscr 1   Receive: OK
```

## **2.2.2 Recommended basic initialization**

### **2.2.2.1 Description**

This chapter lists basic settings we recommend to initialize each time the module is restarted:

- Choose the format of result codes for mobile equipment errors. By factory default (AT+CMEE=0), simply "ERROR" will be returned. For better error detection, we recommend to select either the numeric format (AT+CMEE=1) or the extended text format (AT+CMEE=2).  
Most of the applications will rather use the numeric format since parsing numeric values is easier. For testing and debugging, at earlier stages of development, the text format might be more effective to evaluate the product design. For the same reason the examples presented in this document are based on the setting AT+CMEE=2.
- Set the format of result codes for incoming call indication. By factory default (AT+CRIC=0), each incoming call will simply be notified via "RING". AT+CRIC=1 enables the extended format of ring indication "+CRING: <text>", where <text> identifies the type of incoming call, such as VOICE, REL ASYNC, FAX or GPRS.
- Activate hardware flow control with AT\Q3. Hardware flow control is required for circuit switched data (including fax) and packet switched data (GPRS) connections, for proper operation of CYCLIC SLEEP modes and for Multiplex mode.

The settings of the three commands can be stored to the user profile with AT+W. This way the preferred settings will be loaded each time the module is restarted, eliminating the need to send each command after restart.

### **2.2.2.2 Used AT commands**

AT+CMEE	-	Report Mobile Equipment Error
AT+CRIC	-	Set Cellular Result Codes for incoming call indication
AT\Qn	-	Flow control

For further details about the commands see [2].

### 2.2.2.3 Flow chart

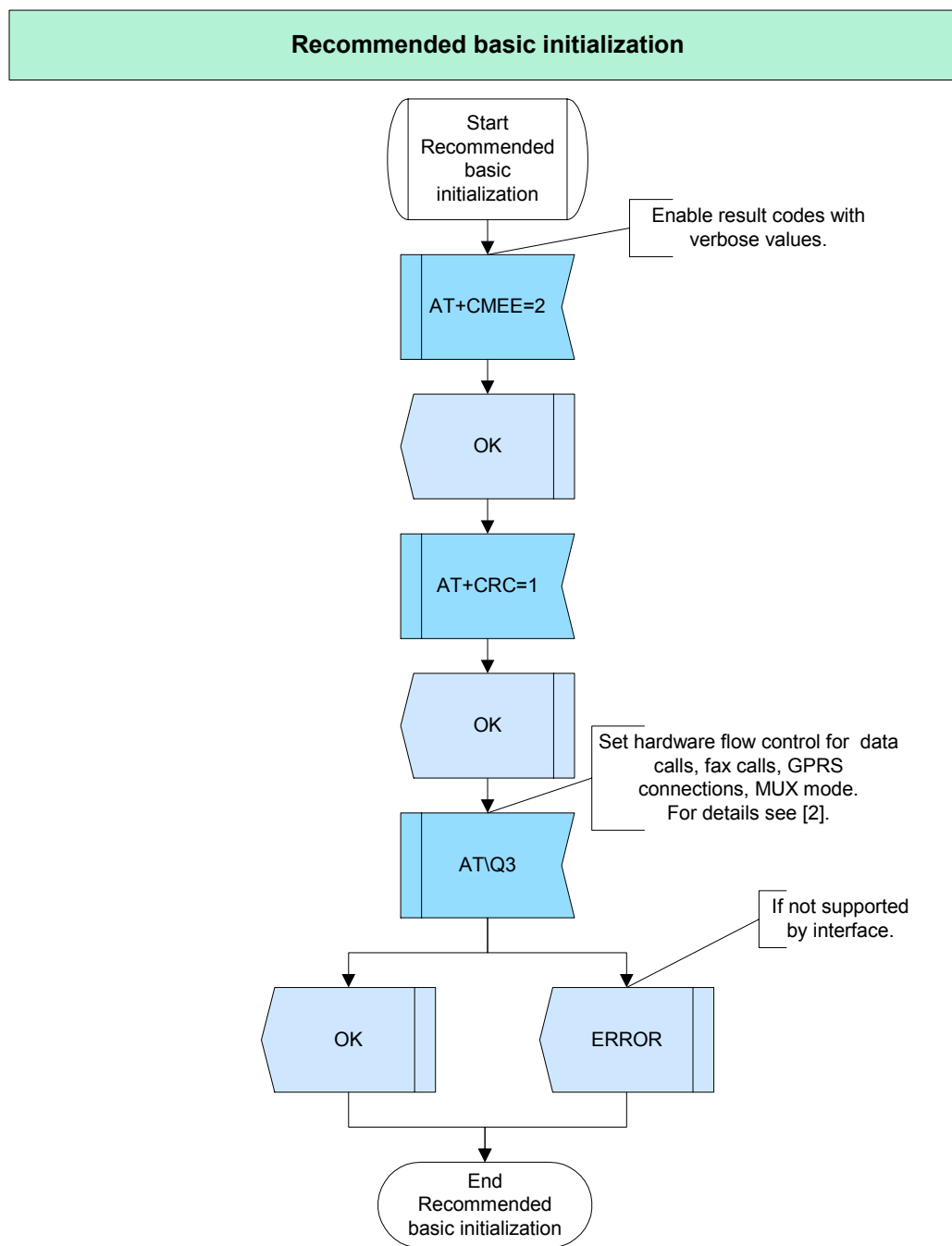


Figure 7: Recommended basic initialization

#### **2.2.2.4 Hints**

- Do not set AT+CRC=1 if you use Fax functionality with Microsoft Winfax Pro.

#### **2.2.2.5 Example**

\*\*\*\*\*

Comment: Recommended basic initialization

\*\*\*\*\*

\*\*\*\*\*

Comment: Enable the extended error result code

\*\*\*\*\*

Subscr 1 Send: AT+CMEE=2

Subscr 1 Receive: AT+CMEE=2

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set Cellular Result Codes for incoming call indication

\*\*\*\*\*

Subscr 1 Send: AT+CRC=1

Subscr 1 Receive: AT+CRC=1

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set hardware flow control for data calls, fax calls, GPRS connections, MUX mode

\*\*\*\*\*

Subscr 1 Send: AT\Q3

Subscr 1 Receive: AT\Q3

Subscr 1 Receive: OK

---

## **2.2.3 Network initialization**

### **2.2.3.1 Description**

This chapter describes options to make the network registration more transparent. It shows how to set up your ME to automatically select an operator. If you activate the presentation of the URC "+CREG:" for network registration, you will be notified each time the status of the network registration changes.

### **2.2.3.2 Used AT commands**

AT+COPS	-	Operator selection
AT+CREG	-	Network registration

For further details about the commands see [2].

### 2.2.3.3 Flow Chart

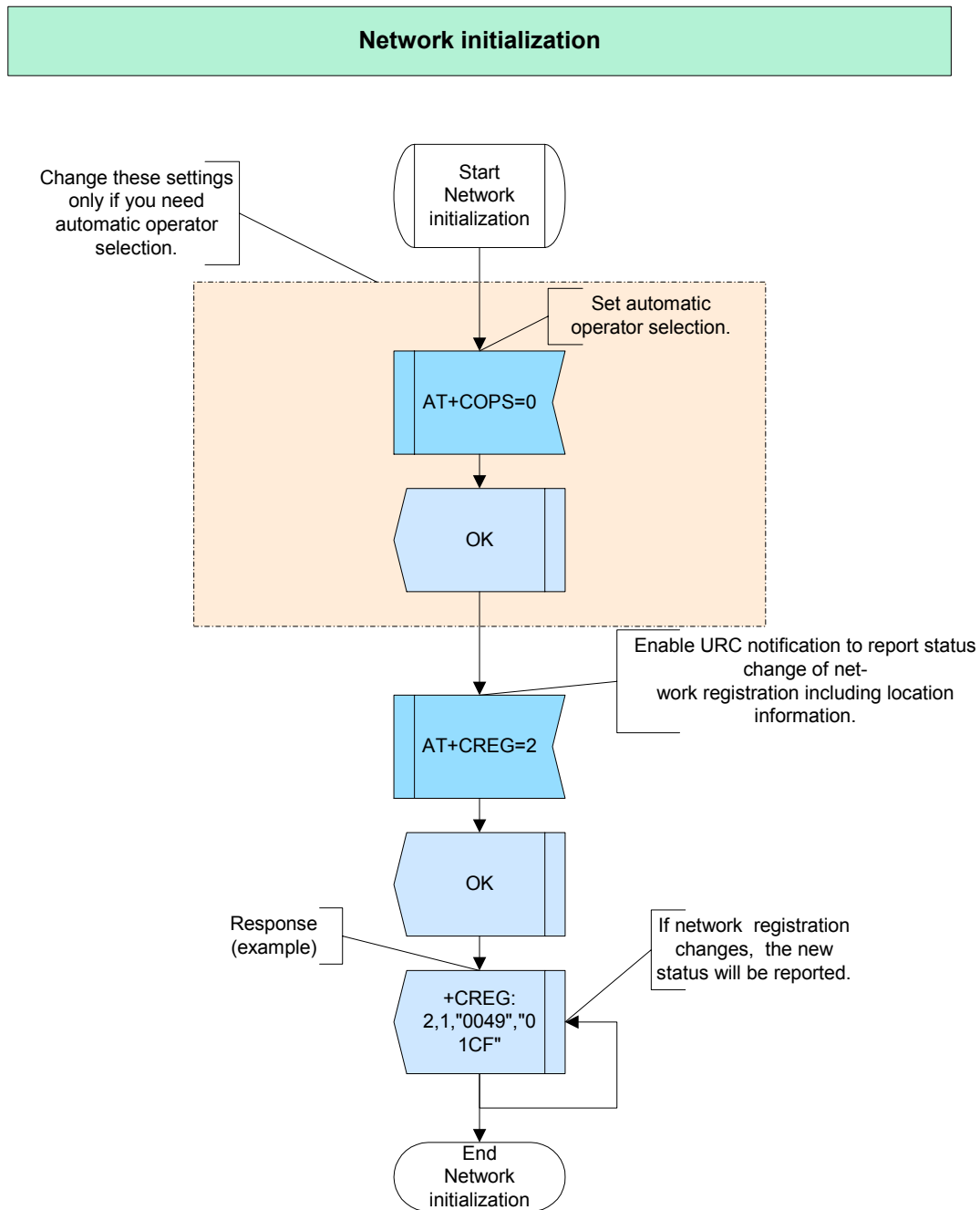


Figure 8: Network initialization

### 2.2.3.4 Hints

- Before entering the PIN, AT+COPS can only be used to set operator selection to automatic mode.



### 2.2.3.5 Example

\*\*\*\*\*

Comment: Network initialization

\*\*\*\*\*

\*\*\*\*\*

Comment: Set automatic operator selection

\*\*\*\*\*

Subscr 1 Send: AT+COPS=0

Subscr 1 Receive: AT+COPS=0

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable URC notification for network registration

\*\*\*\*\*

Subscr 1 Send: AT+CREG=2

Subscr 1 Receive: AT+CREG=2

Subscr 1 Receive: OK

## **2.2.4 Initialization of serial interface**

### **2.2.4.1 Description**

For many applications it is crucial to make settings on the serial interface to ensure reliable operation. We recommend using the following AT commands to adjust these settings:

With AT+IPR the baud rate between the application and module can be chosen. It may, depending on the application, be wise to use a higher baud rate when transmitting large amounts of data.

AT&C, AT&D and AT&S are provided to configure the behavior of the status lines (DCD, DTR, DSR). Depending on the configuration made the status of the lines will indicate different events such as: Presence of a data carrier, data mode/command mode etc.

### **2.2.4.2 Used AT commands**

AT&C	-	Set circuit Data Carrier Detect (DCD) function mode
AT&D	-	Set circuit Data Terminal Ready (DTR) function mode
AT&S	-	Set circuit Data Set Ready (DSR) function mode
AT+IPR	-	Set fixed local rate

For further details about the commands see [2].

2.2.4.3 Flow Chart

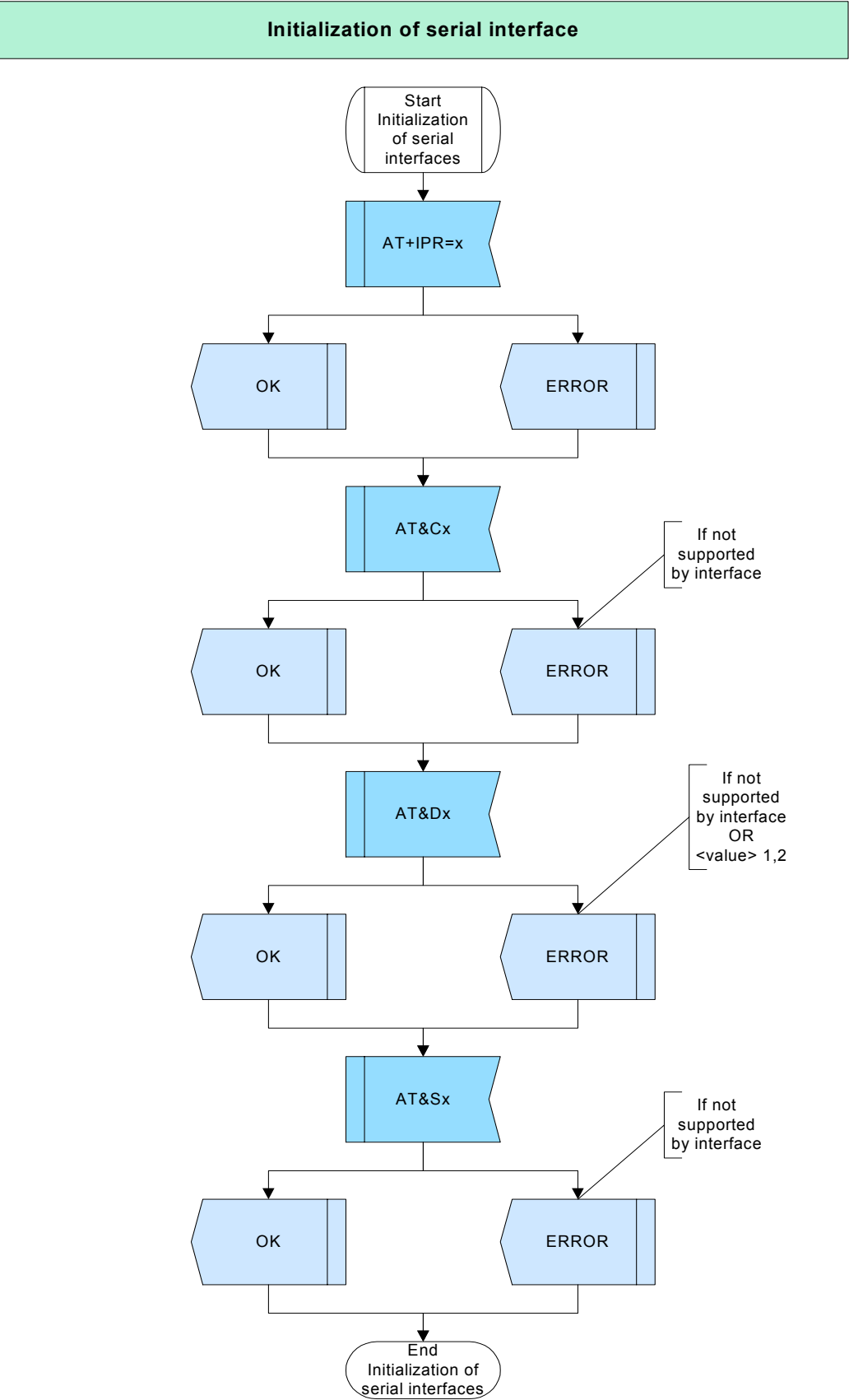


Figure 9: Initialization of serial interface

#### 2.2.4.4 Hints

- Autobauding is not compatible with Multiplexer mode.

#### 2.2.4.5 Example

\*\*\*\*\*

Comment: Initialization of serial interface

\*\*\*\*\*

\*\*\*\*\*

Comment: Query bit rate

\*\*\*\*\*

Subscr 1 Send: AT+IPR?

Subscr 1 Receive: AT+IPR?

Subscr 1 Receive: +IPR: 0

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set bit rate per second (baud) AT+IPR=0 (Autobauding)

\*\*\*\*\*

Subscr 1 Send: AT+IPR=0

Subscr 1 Receive: AT+IPR=0

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set circuit (DCD) function mode (AT&C0 default, AT&C1 presence of data carrier only))

\*\*\*\*\*

Subscr 1 Send: AT&C0

Subscr 1 Receive: AT&C0

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set circuit (DTR) function mode

\*\*\*\*\*

Subscr 1 Send: AT&D2

Subscr 1 Receive: AT&D2

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set circuit (DSR) function mode

\*\*\*\*\*

Subscr 1 Send: AT&S0

Subscr 1 Receive: AT&S0

Subscr 1 Receive: OK

## 2.2.5 Storing settings to user profile

### 2.2.5.1 Description

This chapter describes how to store the current settings to the user profile.

### 2.2.5.2 Used AT commands

AT&W - Store current configuration to user defined profile

For further details about the commands see [2].

### 2.2.5.3 Flow chart

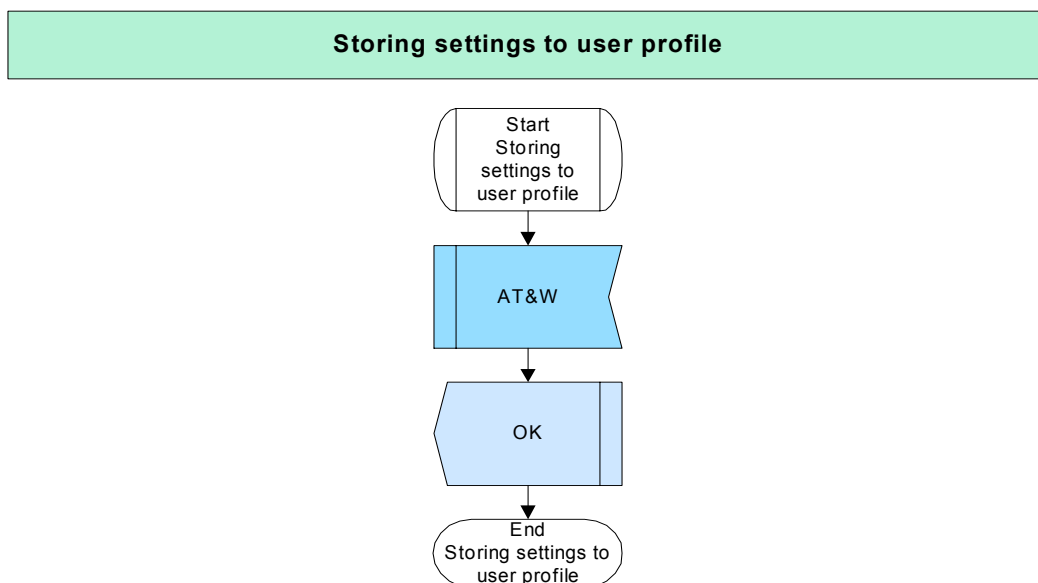


Figure 10: Storing settings to user profile

### 2.2.5.4 Hints

- Not all settings can be added to the user profile. Please refer to [2] for a list of settings storable with AT&W.

### 2.2.5.5 Example

\*\*\*\*\*

Comment: Storing settings to user profile

\*\*\*\*\*

\*\*\*\*\*

Comment: Storing settings

\*\*\*\*\*

Subscr 1 Send: AT&W

Subscr 1 Receive: AT&W

Subscr 1 Receive: OK

## 2.3 Device information

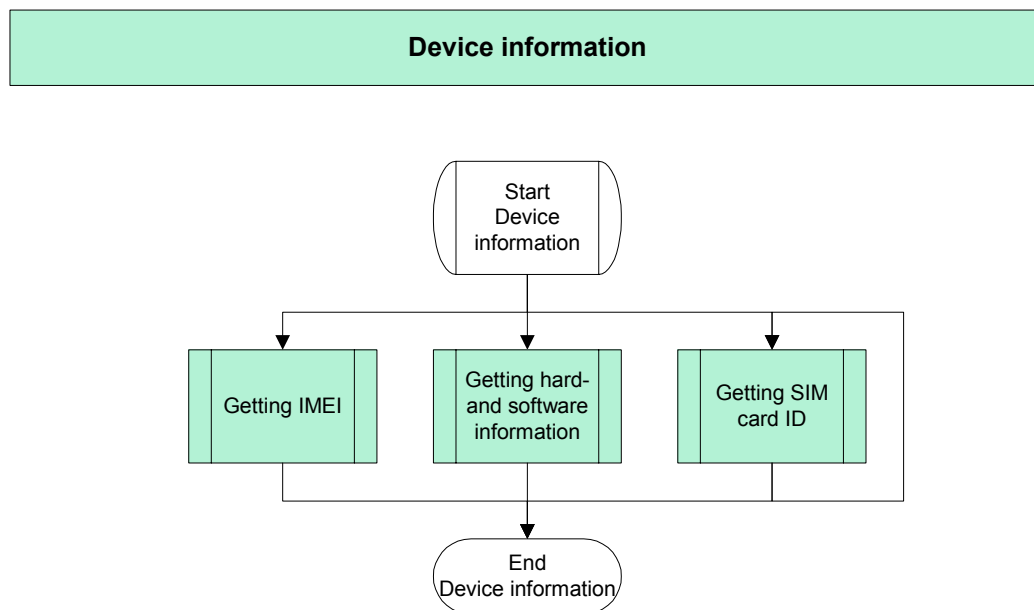


Figure 11: Getting device information

## 2.3.1 Getting IMEI

### 2.3.1.1 Description

This chapter describes how to get the IMEI of your ME. The IMEI (International Mobile Equipment Identity) is a unique 15-digit number to identify every individual mobile equipment.

### 2.3.1.2 Used AT commands

AT+GSN/ AT+CGSN - Request TA serial number identification (IMEI)  
ATD\*#06#; - GSM service code to request IMEI

For further details about the commands see [2].

### 2.3.1.3 Flow chart

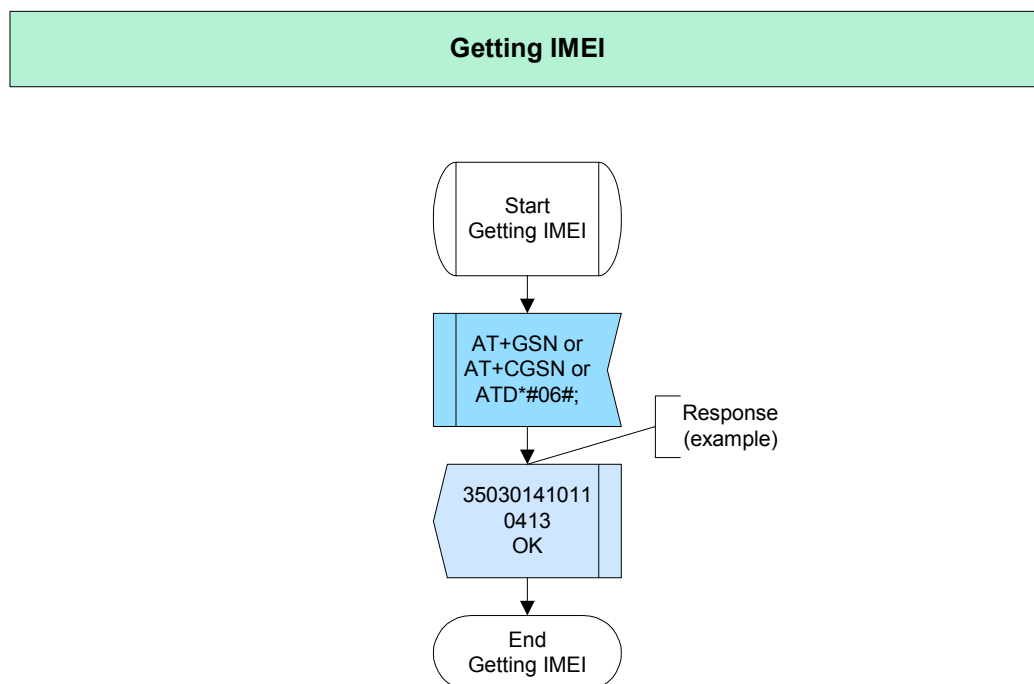


Figure 12: Getting IMEI

### 2.3.1.4 Hints

- The IMEI will be needed, for example, to request the Master Phone Code of your ME from your ME distributor.

### 2.3.1.5 Example

\*\*\*\*\*

Comment: Getting IMEI

\*\*\*\*\*

\*\*\*\*\*

Comment: Request IMEI

\*\*\*\*\*

Subscr 1 Send: AT+GSN

Subscr 1 Receive: AT+GSN

Subscr 1 Receive: 350450410105301

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request IMEI

\*\*\*\*\*

Subscr 1 Send: AT+CGSN

Subscr 1 Receive: AT+CGSN

Subscr 1 Receive: 350450410105301

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request IMEI

\*\*\*\*\*

Subscr 1 Send: ATD\*#06#;

Subscr 1 Receive: ATD\*#06#;

Subscr 1 Receive: 350450410105301

Subscr 1 Receive:

Subscr 1 Receive: OK



## **2.3.2 Getting hardware and software information**

### **2.3.2.1 Description**

This chapter describes how to get additional information about your ME.

### **2.3.2.2 Used AT commands**

ATI	-	Display product identification information
AT+GMI / AT+CGMI	-	Request manufacturer identification
AT+GMM / AT+CGMM	-	Request TA model identification
AT+GMR / AT+CGMR	-	Request TA revision identification of software status

For further details about the commands see [2].

### 2.3.2.3 Flow chart

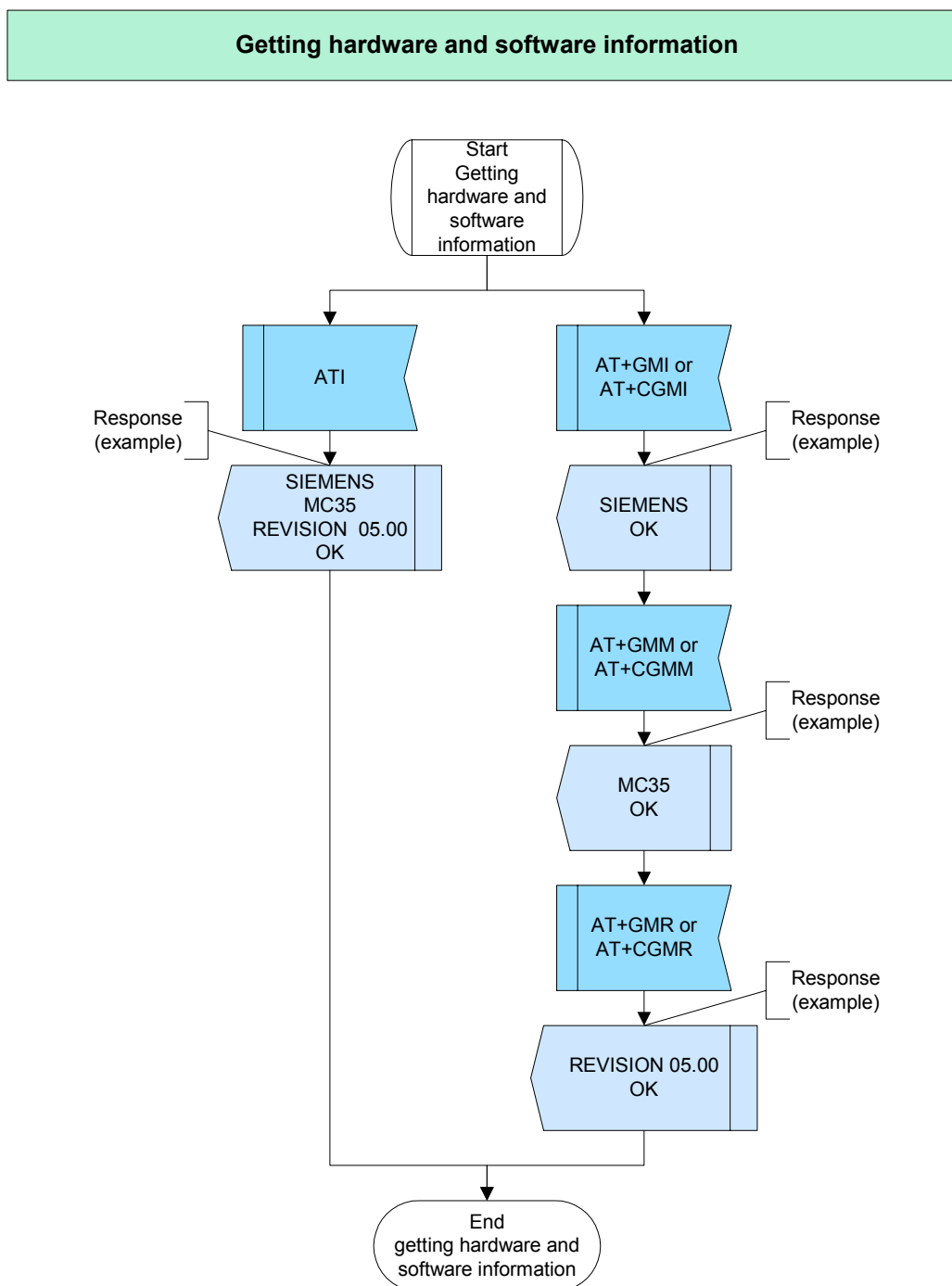


Figure 13: Getting hardware and software information

### 2.3.2.4 Hints

Not applicable.

### 2.3.2.5 Example

\*\*\*\*\*

Comment: Getting hardware and software information

\*\*\*\*\*

\*\*\*\*\*

Comment: Request product identification information

\*\*\*\*\*

Subscr 1 Send: ATI

Subscr 1 Receive: ATI

Subscr 1 Receive: SIEMENS

Subscr 1 Receive: MC45

Subscr 1 Receive: REVISION 02.04

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request manufacturer identification

\*\*\*\*\*

Subscr 1 Send: AT+GMI

Subscr 1 Receive: AT+GMI

Subscr 1 Receive: SIEMENS

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request TA model identification

\*\*\*\*\*

Subscr 1 Send: AT+GMM

Subscr 1 Receive: AT+GMM

Subscr 1 Receive: MC45

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request revision identification of software status

\*\*\*\*\*

Subscr 1 Send: AT+GMR

Subscr 1 Receive: AT+GMR

Subscr 1 Receive: REVISION 02.04

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request manufacturer identification

\*\*\*\*\*

Subscr 1 Send: AT+CGMI

Subscr 1 Receive: AT+CGMI

Subscr 1 Receive: SIEMENS

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

---

Comment: Request TA model identification

\*\*\*\*\*

Subscr 1    Send: AT+CGMM  
Subscr 1    Receive: AT+CGMM  
Subscr 1    Receive: MC45  
Subscr 1    Receive:  
Subscr 1    Receive: OK

\*\*\*\*\*

Comment: Request revision identification of software status

\*\*\*\*\*

Subscr 1    Send: AT+CGMR  
Subscr 1    Receive: AT+CGMR  
Subscr 1    Receive: REVISION 02.04  
Subscr 1    Receive:  
Subscr 1    Receive: OK

## 2.3.3 Getting SIM card ID

### 2.3.3.1 Description

This chapter describes how to get the identification number of the used SIM card.

### 2.3.3.2 Used AT commands

AT^SCID - Display SIM card identification number

For further details about the commands see [2].

### 2.3.3.3 Flow chart

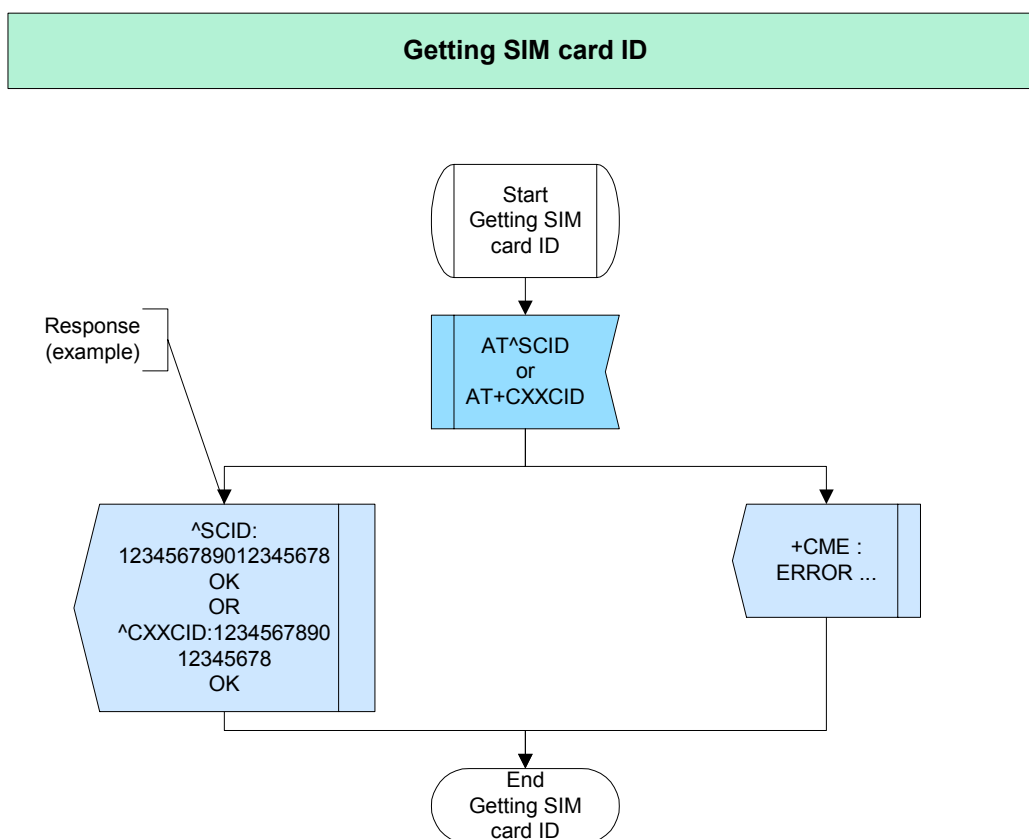


Figure 14: Getting SIM card ID

### 2.3.3.4 Hints

Not applicable.

### 2.3.3.5 Example

\*\*\*\*\*

Comment: Getting SIM card ID

\*\*\*\*\*

\*\*\*\*\*

Comment: Request SIM card ID with AT^SCID

\*\*\*\*\*

Subscr 1 Send: AT^SCID

Subscr 1 Receive: AT^SCID

Subscr 1 Receive: ^SCID: 8949222021600262149

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request SIM card ID with AT+CXXCID

\*\*\*\*\*

Subscr 1 Send: AT+CXXCID

Subscr 1 Receive: AT+CXXCID

Subscr 1 Receive: +CXXCID: 8949222021600262149

Subscr 1 Receive:

Subscr 1 Receive: OK

## **2.4 Power saving**

### **2.4.1 CYCLIC and NON-CYCLIC SLEEP mode**

#### **2.4.1.1 Description**

SLEEP mode reduces the functionality of the module to a minimum and, thus, minimizes the current consumption. Settings can be made using the AT+CFUN command. SLEEP mode falls into two categories:

- NON-CYCLIC SLEEP mode, activated with AT+CFUN=0
- CYCLIC SLEEP modes, selectable with AT+CFUN=5 or 6. Further modes 7, 8 and 9 are product dependent and specified in [1] and [2].

AT+CFUN=1 is the full functionality level, where power saving is deactivated.

What is the difference between the two SLEEP mode categories?

- In NON-CYCLIC SLEEP mode the AT interface is permanently blocked. The first wake-up event (e.g. a URC, an incoming call) will stop power saving and take the module back to full functionality AT+CFUN=1.
- CYCLIC SLEEP mode gives you greater flexibility to use the module when power saving is activated: First, the AT interface remains accessible, allowing characters to be sent or received while the module stays in the selected SLEEP mode. Second, when an event occurs (such as a call, a URC, data transfer, GPRS transfer), power saving is halted for the duration of the event and a mode-specific follow-up time, and will then be resumed.

Please consult [1] and [2] for more details on the SLEEP modes supported by your module, especially timing characteristics and different wake-up conditions depending on the selected SLEEP mode.

The command AT^SCFG can be used to configure the wake up time for power saving mode 9. The default value is 20 seconds. Note that the AT^SCFG command is not supported by all products, for details see [2].

#### **2.4.1.2 Used AT commands**

AT+CFUN	-	Set phone functionality
ATD	-	Mobile originated call to dial a number
ATA	-	Answer call
ATH	-	Disconnect existing connection
+++	-	Switch from data mode or PPP online mode to command mode
AT+CSQ	-	Signal quality
AT^SCFG	-	Extended configuration setting (not supported by all products)

For further details about the commands see [2].

### 2.4.1.3 Flow chart

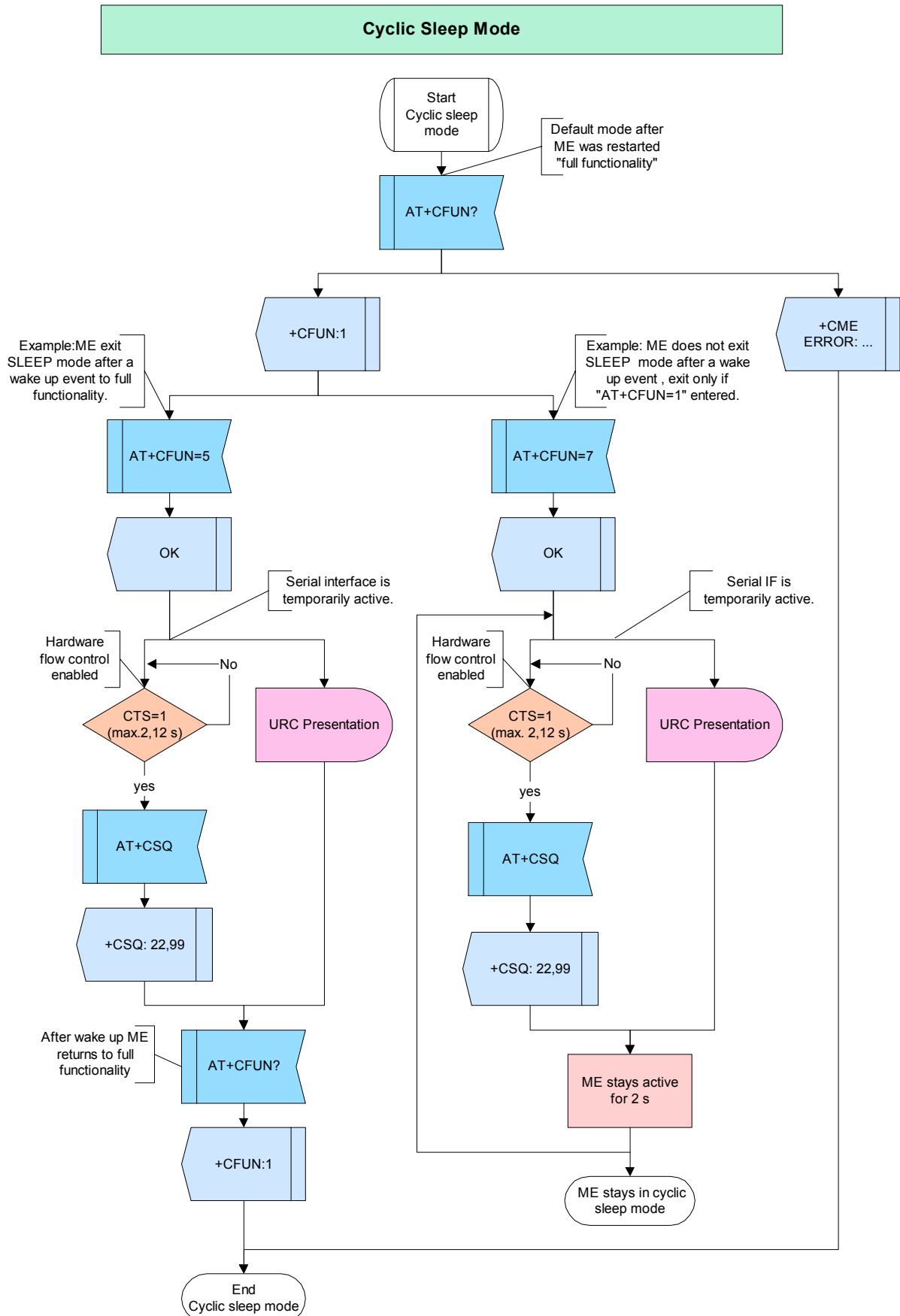


Figure 15: CYCLIC SLEEP mode



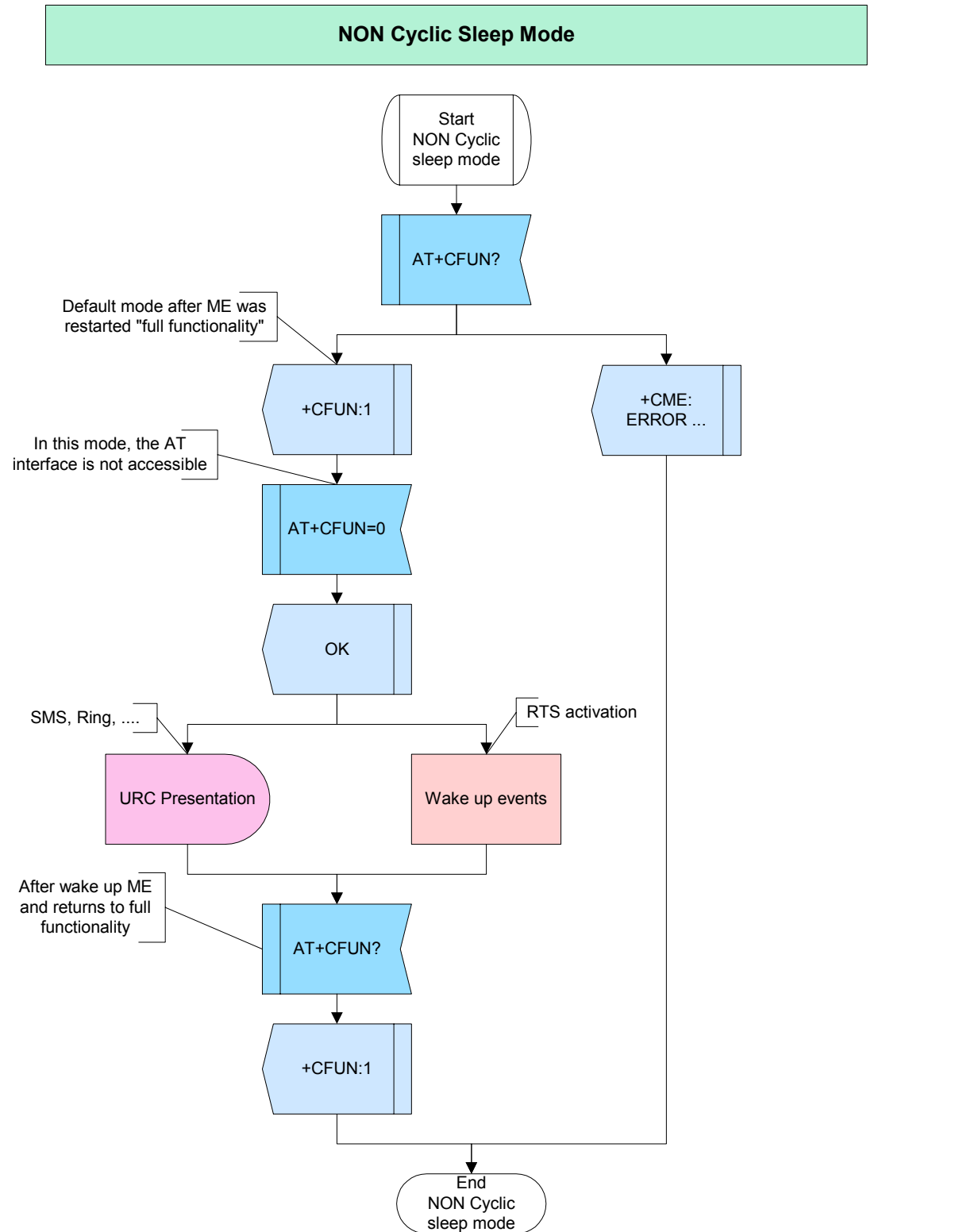


Figure 16: NON-CYCLIC SLEEP mode

**Configuration CYCLIC SLEEP mode 9**

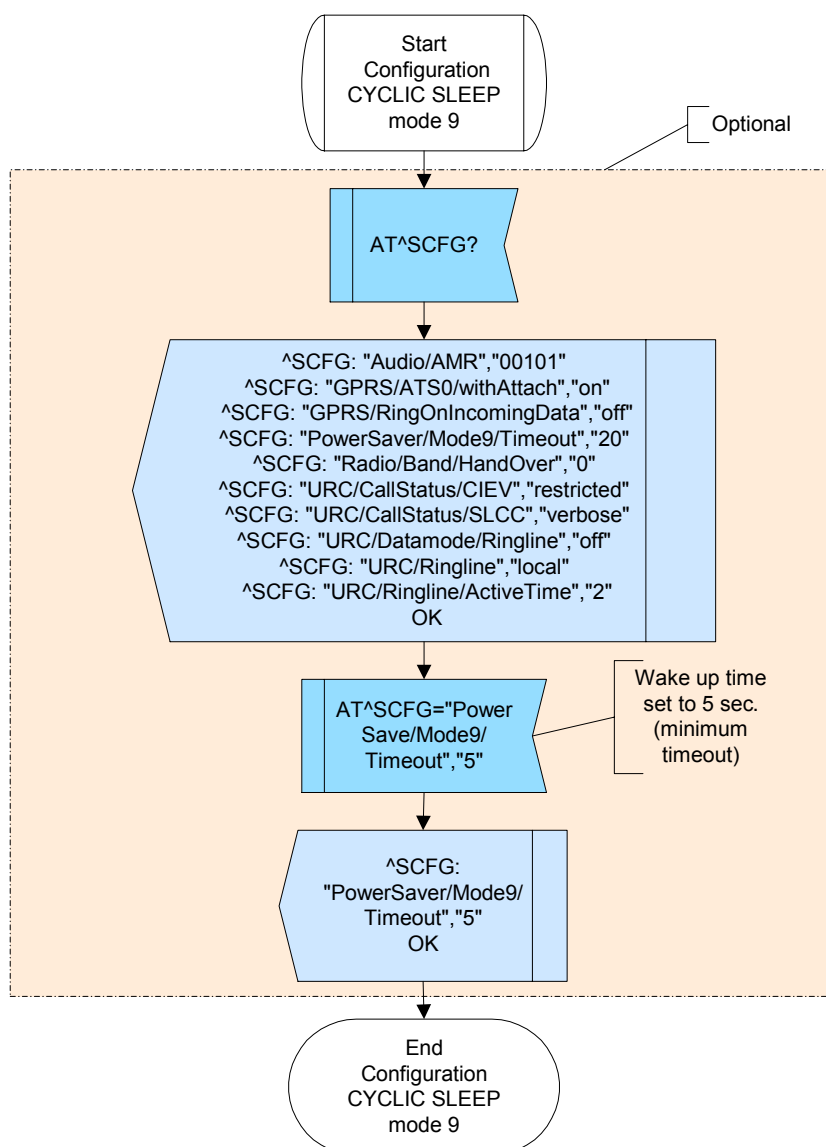


Figure 17: Configuration CYCLIC SLEEP mode 9

#### 2.4.1.4 Hints

- The AT+CFUN command can be executed before or after entering PIN1. Yet, please keep in mind that power saving works properly only when PIN authentication has been done. If you attempt to activate power saving while the SIM card is not inserted or the PIN not correctly entered, the selected <fun> level will be set, though power saving does not take effect. For the same reason, power saving cannot be used if the module operates in Alarm mode.
- To check whether power saving is on, you can query the status of AT+CFUN if you have chosen CYCLIC SLEEP mode. In all SLEEP modes, you can monitor the status LED controlled by the SYNC pin (if the LED is connected). The LED behaviour varies with the type of module, for details please refer to [1] and [2].

### 2.4.1.5 Example

#### Example 1:

\*\*\*\*\*

Comment: CYCLIC SLEEP mode

\*\*\*\*\*

\*\*\*\*\*

Comment: Query status of functionality level

\*\*\*\*\*

Subscr 2 Send: AT+CFUN?

Subscr 2 Receive: AT+CFUN?

Subscr 2 Receive: +CFUN: 1

Subscr 2 Receive:

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Set CYCLIC SLEEP mode 5

\*\*\*\*\*

Subscr 2 Send: AT+CFUN=5

Subscr 2 Receive: AT+CFUN=5

Subscr 2 Receive: OK

Subscr 2 Send: AT+CFUN?

Subscr 2 Receive: AT+CFUN?

Subscr 2 Receive: +CFUN: 5

Subscr 2 Receive:

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: CYCLIC SLEEP mode 5 is set. ME wakes up by incoming data call.

\*\*\*\*\*

Subscr 1 Send: ATD00441522400023

Subscr 1 Receive: ATD00441522400023

Subscr 2 Receive:

Subscr 2 Receive: RING

Subscr 2 Send: ATA

Subscr 2 Receive: ATA

Subscr 2 Receive:

Subscr 2 Receive: CONNECT 9600/RLP

Subscr 1 Receive:

Subscr 1 Receive: CONNECT 9600/RLP

Subscr 2 Send: +++

Subscr 1 Receive: +++

Subscr 2 Receive:

Subscr 2 Receive: OK

Subscr 2 Send: ATH

Subscr 2 Receive: ATH

Subscr 2 Receive: OK

Subscr 1 Receive:

Subscr 1 Receive: NO CARRIER

\*\*\*\*\*

Comment: Request current status of functionality level

\*\*\*\*\*

Subscr 2 Send: AT+CFUN?  
Subscr 2 Receive: AT+CFUN?  
Subscr 2 Receive: +CFUN: 1  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Set CYCLIC SLEEP mode 7

\*\*\*\*\*

Subscr 2 Send: AT+CFUN=7  
Subscr 2 Receive: AT+CFUN=7  
Subscr 2 Receive: OK  
Subscr 2 Send: AT+CFUN?  
Subscr 2 Receive: AT+CFUN?  
Subscr 2 Receive: +CFUN: 7  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Enter an AT command (ME will not wake up)

\*\*\*\*\*

Subscr 2 Send: AT+CSQ  
Subscr 2 Receive: AT+CSQ  
Subscr 2 Receive: +CSQ: 17,99  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Switch CYCLIC SLEEP mode off

\*\*\*\*\*

Subscr 2 Send: AT+CFUN?  
Subscr 2 Receive: AT+CFUN?  
Subscr 2 Receive: +CFUN: 7  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 2 Send: AT+CFUN=1  
Subscr 2 Receive: AT+CFUN=1  
Subscr 2 Receive: OK  
Subscr 2 Send: AT+CFUN?  
Subscr 2 Receive: AT+CFUN?  
Subscr 2 Receive: +CFUN: 1  
Subscr 2 Receive:  
Subscr 2 Receive: OK

**Example 2:**

\*\*\*\*\*

Comment: NON-CYCLIC SLEEP mode

\*\*\*\*\*

\*\*\*\*\*

Comment: Request current status of functionality level.

\*\*\*\*\*

Subscr 2 Send: AT+CFUN?

Subscr 2 Receive: AT+CFUN?

Subscr 2 Receive: +CFUN: 1

Subscr 2 Receive:

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Set ME to NON-CYCLIC SLEEP mode.

\*\*\*\*\*

Subscr 2 Send: AT+CFUN=0

Subscr 2 Receive: AT+CFUN=0

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Wake up subscriber 2 by incoming call (URC).

\*\*\*\*\*

Subscr 1 Send: ATD00441522400023

Subscr 1 Receive: ATD00441522400023

Subscr 2 Receive:

Subscr 2 Receive: RING

Subscr 2 Receive:

Subscr 2 Receive: RING

Subscr 2 Send: ATA

Subscr 2 Receive: ATA

Subscr 2 Receive:

Subscr 2 Receive: CONNECT 9600/RLP

Subscr 1 Receive:

Subscr 1 Receive: CONNECT 9600/RLP

Subscr 2 Send: +++

Subscr 2 Receive:

Subscr 2 Receive: OK

Subscr 1 Receive: +++

Subscr 2 Send: ATH

Subscr 2 Receive: ATH

Subscr 2 Receive: OK

Subscr 1 Receive:

Subscr 1 Receive: NO CARRIER

\*\*\*\*\*

Comment: After wake-up of ME, query status of functionality level.

\*\*\*\*\*

Subscr 2 Send: AT+CFUN?

Subscr 2 Receive: AT+CFUN?

Subscr 2 Receive: +CFUN: 1

Subscr 2 Receive:

Subscr 2 Receive: OK

**Example 3:**

\*\*\*\*\*

Configuration CYCLIC SLEEP mode 9 (not supported by all products)

\*\*\*\*\*

\*\*\*\*\*

Comment: Query various ME parameters.

\*\*\*\*\*

```
Subscr 1    Send: AT^SCFG?
Subscr 1    Receive: AT^SCFG?
Subscr 1    Receive: ^SCFG: "Audio/AMR","00101"
Subscr 1    Receive: ^SCFG: "GPRS/ATS0/withAttach","on"
Subscr 1    Receive: ^SCFG: "GPRS/RingOnIncomingData","off"
Subscr 1    Receive: ^SCFG: "PowerSaver/Mode9/Timeout","20"
Subscr 1    Receive: ^SCFG: "Radio/Band/HandOver","0"
Subscr 1    Receive: ^SCFG: "URC/CallStatus/ClEV","restricted"
Subscr 1    Receive: ^SCFG: "URC/CallStatus/SLCC","verbose"
Subscr 1    Receive: ^SCFG: "URC/Datamode/Ringline","off"
Subscr 1    Receive: ^SCFG: "URC/Ringline","local"
Subscr 1    Receive: ^SCFG: "URC/Ringline/ActiveTime","2"
Subscr 1    Receive:
Subscr 1    Receive: OK
```

\*\*\*\*\*

Comment: Set timeout value for power saving mode 9

\*\*\*\*\*

```
Subscr 1    Send: AT^SCFG="PowerSaver/Mode9/Timeout","5"
Subscr 1    Receive: AT^SCFG="PowerSaver/Mode9/Timeout","5"
Subscr 1    Receive: ^SCFG: "PowerSaver/Mode9/Timeout","5"
Subscr 1    Receive:
Subscr 1    Receive: OK
```

2.5 Entering PIN

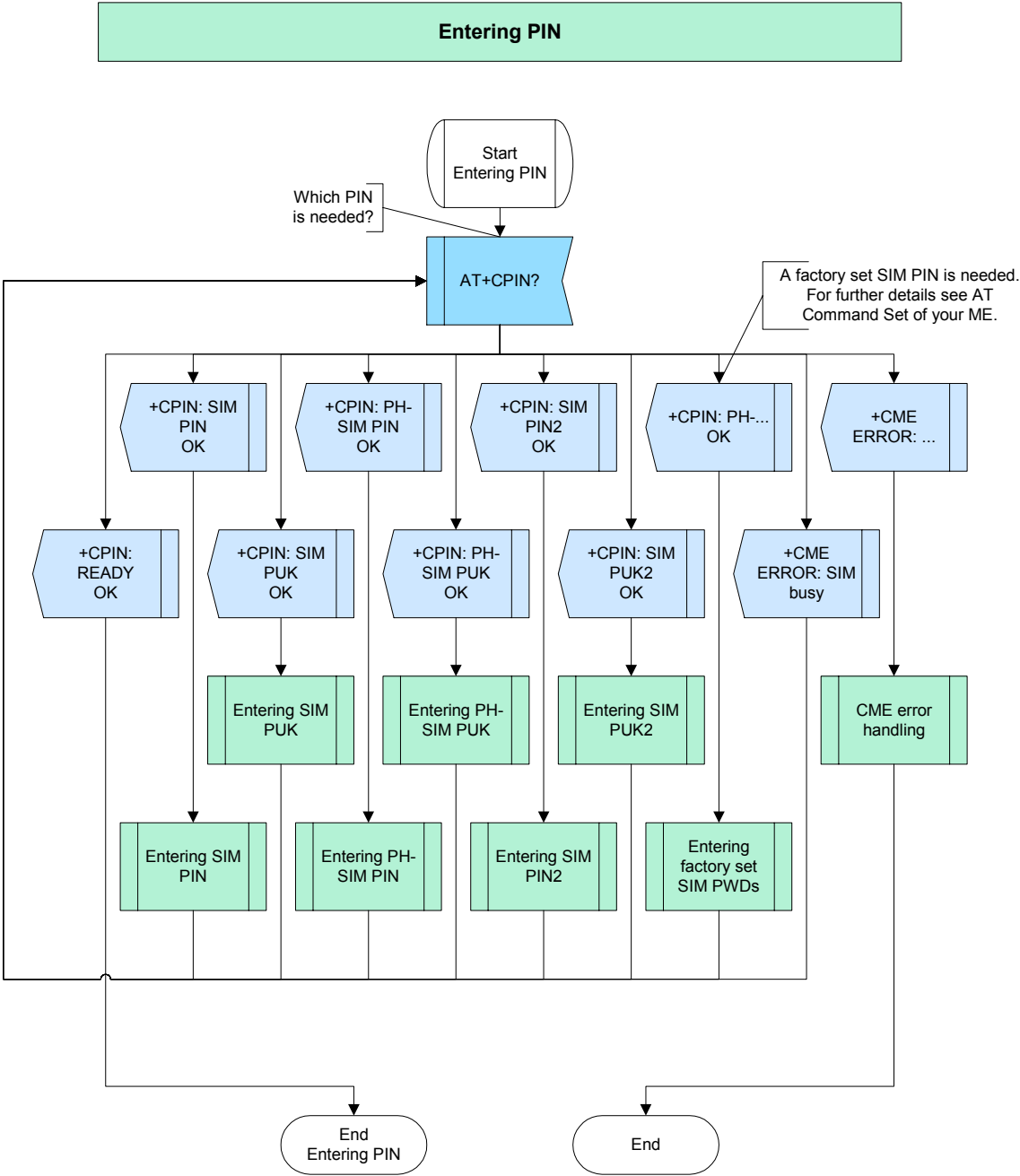


Figure 18: Entering PIN

---

## **2.5.1 Entering SIM PIN**

### **2.5.1.1 Description**

This chapter describes how to enter the SIM PIN. You will also see what happens when a wrong SIM PIN is entered three times.

### **2.5.1.2 Used AT commands**

AT^SPIC	-	Display PIN counter
AT+CPIN	-	Enter PIN

For further details about the commands see [2].



### 2.5.1.3 Flow chart

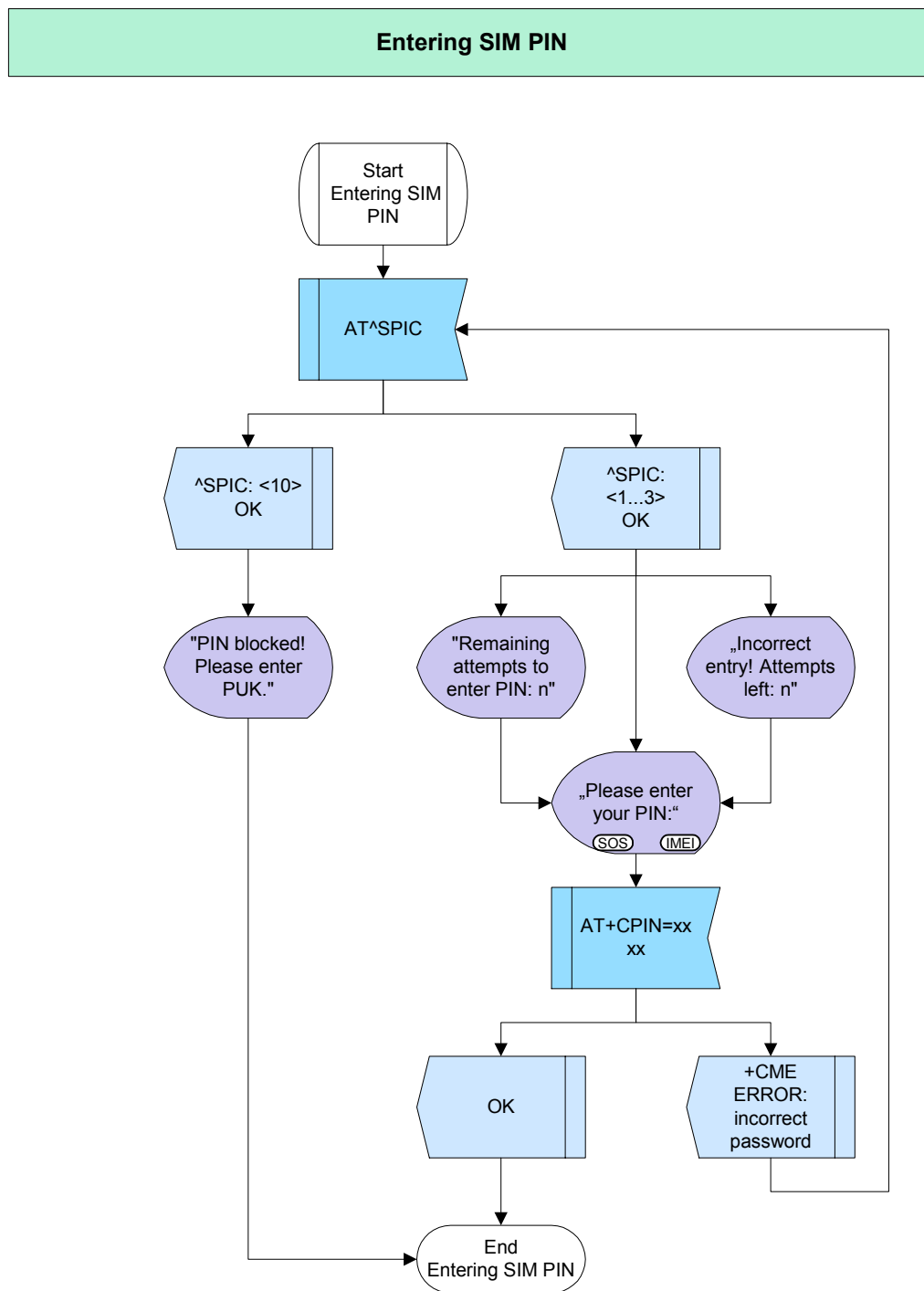


Figure 19: Entering SIM PIN

### 2.5.1.4 Hints

Not applicable.

### 2.5.1.5 Example

\*\*\*\*\*

Comment: Entering SIM PIN

\*\*\*\*\*

\*\*\*\*\*

Comment: Request PIN counter.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 3

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enter wrong PIN first time.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=1234

Subscr 1 Receive: AT+CPIN=1234

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 2

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enter wrong PIN second time.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=1234

Subscr 1 Receive: AT+CPIN=1234

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enter wrong PIN third time.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=1234

Subscr 1 Receive: AT+CPIN=1234

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

---

Comment: Request PIN counter.  
\*\*\*\*\*

Subscr 1    Send: AT^SPIC  
Subscr 1    Receive: AT^SPIC  
Subscr 1    Receive: ^SPIC: 10  
Subscr 1    Receive:  
Subscr 1    Receive: OK

\*\*\*\*\*  
Comment: Request required PIN.  
\*\*\*\*\*

Subscr 1    Send: AT+CPIN?  
Subscr 1    Receive: AT+CPIN?  
Subscr 1    Receive: +CPIN: SIM PUK  
Subscr 1    Receive:  
Subscr 1    Receive: OK

---

## **2.5.2 Entering SIM PUK**

### **2.5.2.1 Description**

This chapter describes how to enter the SIM PUK. The SIM PUK is needed after entering a wrong SIM PIN three times. You have two ways to enter the PUK. The flow chart gives an example of both ways and shows what happens when entering a wrong PUK. After entering a wrong PUK ten times, your SIM will be blocked and you have to ask your provider for a new one.

### **2.5.2.2 Used AT commands**

AT+CPIN	-	Enter PIN
ATD	-	Dial command used with GSM code
AT^SPIC	-	Display PIN counter

For further details about the commands see [2].

2.5.2.3 Flow chart

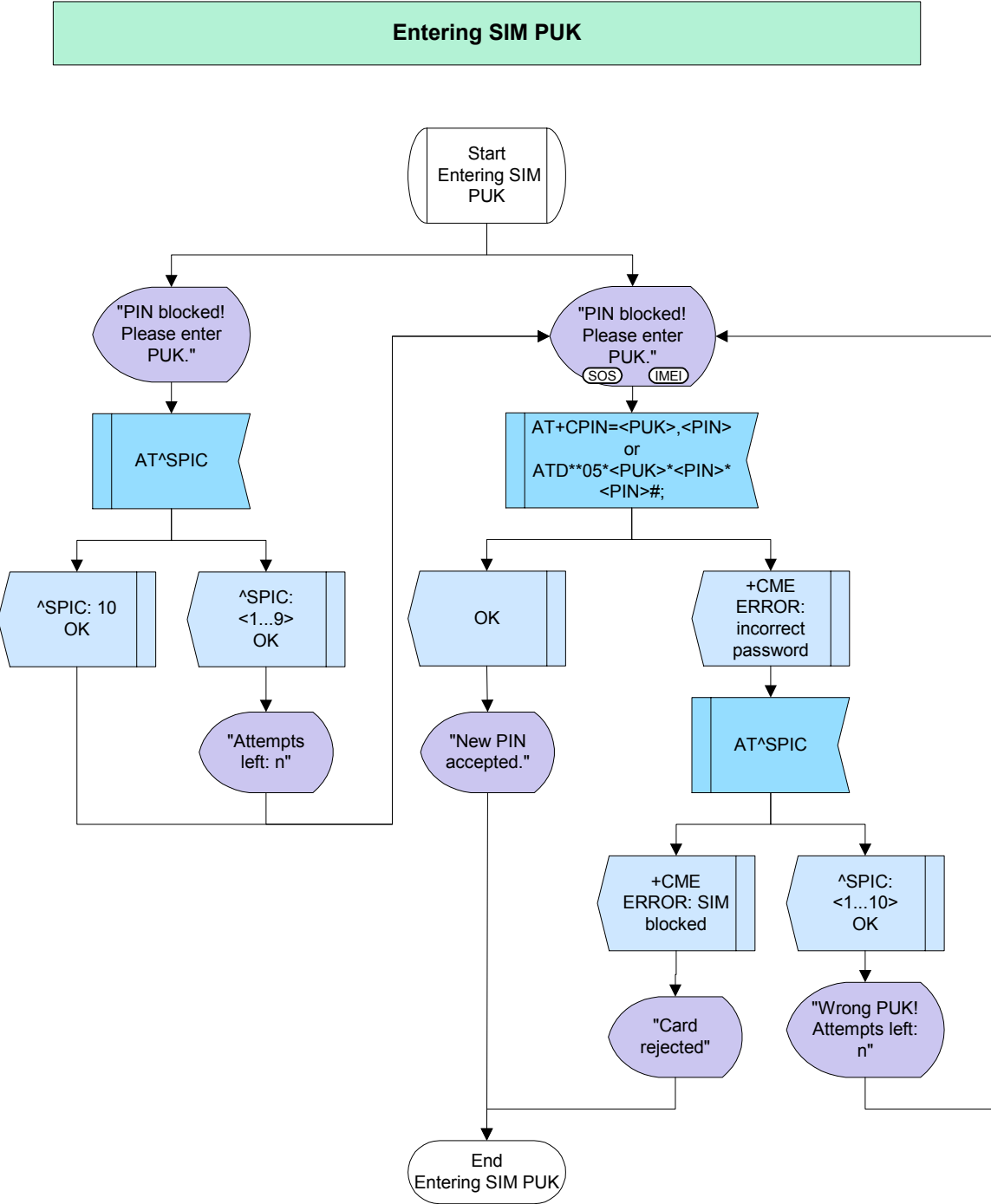


Figure 20: Entering SIM PUK

2.5.2.4 Hints

Not applicable.

### 2.5.2.5 Example

\*\*\*\*\*

Comment: Entering SIM PUK

\*\*\*\*\*

\*\*\*\*\*

Comment: Entering 3 times the wrong PIN

Comment: First failure to enter PIN.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=1111

Subscr 1 Receive: AT+CPIN=1111

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Second failure to enter PIN.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=1111

Subscr 1 Receive: AT+CPIN=1111

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Third failure to enter PIN.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=1111

Subscr 1 Receive: AT+CPIN=1111

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 10

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong PUK by using AT+CPIN command

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=12345679,0000

Subscr 1 Receive: AT+CPIN=12345679,0000

Subscr 1 Receive:

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 9

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

---

Comment: Entering wrong PUK by using AT+CPIN command  
\*\*\*\*\*

Subscr 1 Send: AT+CPIN=12345679,0000  
Subscr 1 Receive: AT+CPIN=12345679,0000  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*  
Comment: Request PIN counter  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 8  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Entering wrong PUK by using ATD command  
\*\*\*\*\*

Subscr 1 Send: ATD \*\*05\*12345679\*0000\*0000#;  
Subscr 1 Receive: ATD \*\*05\*12345679\*0000\*0000#;  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*  
Comment: Request PIN counter  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 7  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Entering correct PUK  
\*\*\*\*\*

Subscr 1 Send: AT+CPIN=12345678,0000  
Subscr 1 Receive: AT+CPIN=12345678,0000  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: +CREG: 2  
Subscr 1 Send: AT+CPIN?

\*\*\*\*\*  
Comment: Entering wrong PUK by using AT+CPIN command  
\*\*\*\*\*

Subscr 1 Send: AT+CPIN=12345679,0000  
Subscr 1 Receive: AT+CPIN=12345679,0000  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password

---

## **2.5.3     Entering PH SIM PIN**

### **2.5.3.1     Description**

This chapter describes how to enter the PH-SIM PIN. The PH-SIM PIN is needed, if you have locked your ME to a special SIM card (referred to as "PS" lock). You will also see what happens when a wrong PH SIM PIN is entered three times.

### **2.5.3.2     Used AT commands**

AT+CPIN	-	Enter PIN
AT^SPIC	-	Display PIN counter

For further details about the commands see [2].



### 2.5.3.3 Flow chart

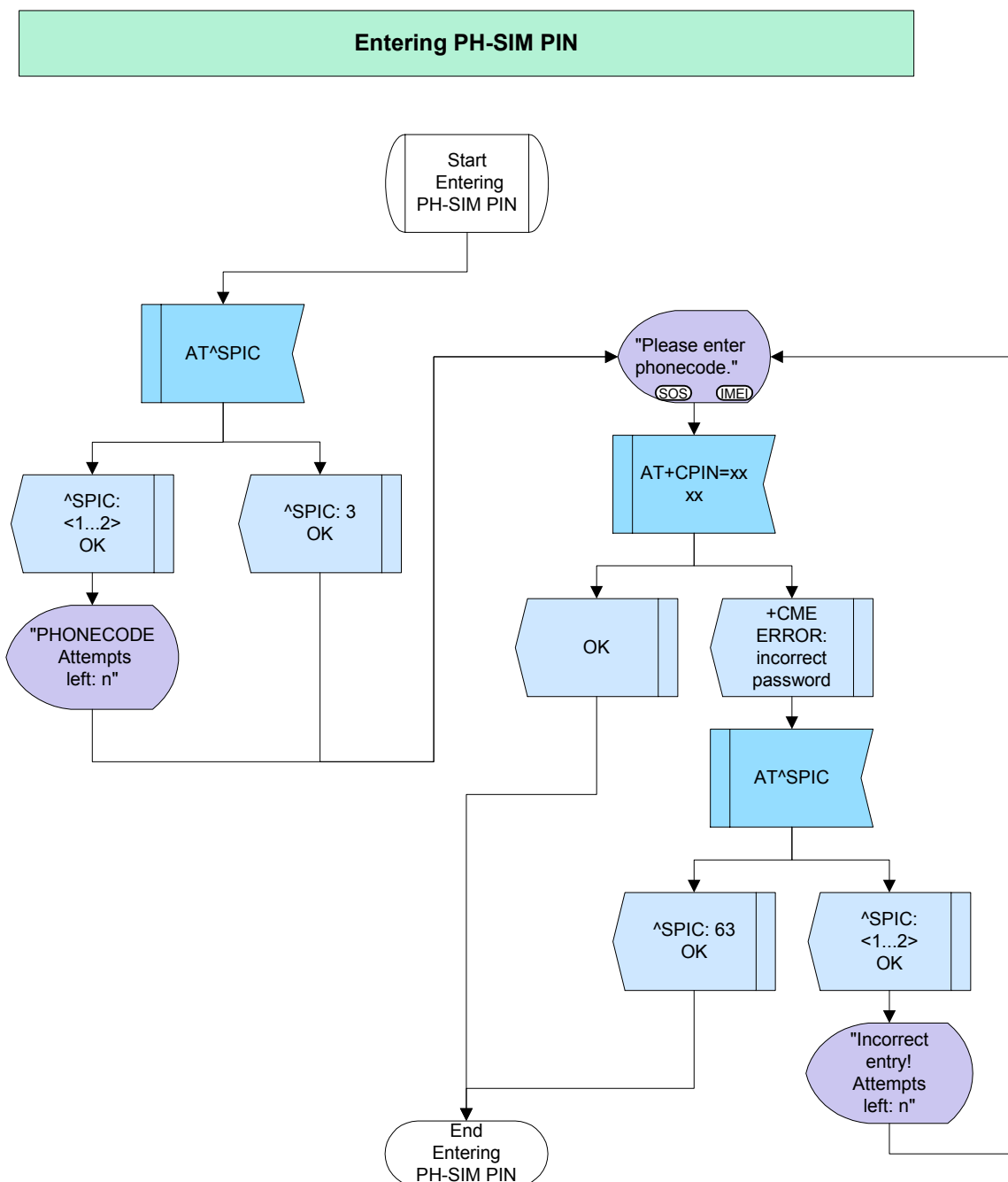


Figure 21: Entering PH-SIM PIN

### 2.5.3.4 Hints

Not applicable.

### 2.5.3.5 Example

\*\*\*\*\*

Comment: Entering PH-SIM PIN

\*\*\*\*\*

\*\*\*\*\*

Comment: Request required PIN.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN?

Subscr 1 Receive: AT+CPIN?

Subscr 1 Receive: +CPIN: PH-SIM PIN

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 3

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong PH-SIM PIN first time.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=5555

Subscr 1 Receive: AT+CPIN=5555

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 2

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong PH-SIM PIN second time.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=5555

Subscr 1 Receive: AT+CPIN=5555

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 1

---

Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering correct PH-SIM PIN.  
\*\*\*\*\*

Subscr 1 Send: AT+CPIN=1234  
Subscr 1 Receive: AT+CPIN=1234  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request required PIN.  
\*\*\*\*\*

Subscr 1 Send: AT+CPIN?  
Subscr 1 Receive: AT+CPIN?  
Subscr 1 Receive: +CPIN: READY  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## **2.5.4 Entering PH SIM PUK**

### **2.5.4.1 Description**

This chapter describes how to enter the PH-SIM PUK. The PH-SIM PUK (also referred to as Master Phone Code) is needed after entering a wrong PH-SIM PIN three times.

You have two ways to enter the Master Phone Code. The flow chart gives an example of both ways and shows what happens when entering a wrong Master Phone Code. After entering a wrong Master Phone Code, you have to wait several minutes before trying the next Master Phone Code. The time to wait is defined by an algorithm explained in [2].

### **2.5.4.2 Used AT commands**

AT+CPIN	-	Enter PIN
ATD*#0003*Master Phone Code#;	-	Entering Master Phone Code
AT^SPIC	-	Display PIN counter

For further details about the commands see [2].

### 2.5.4.3 Flow chart

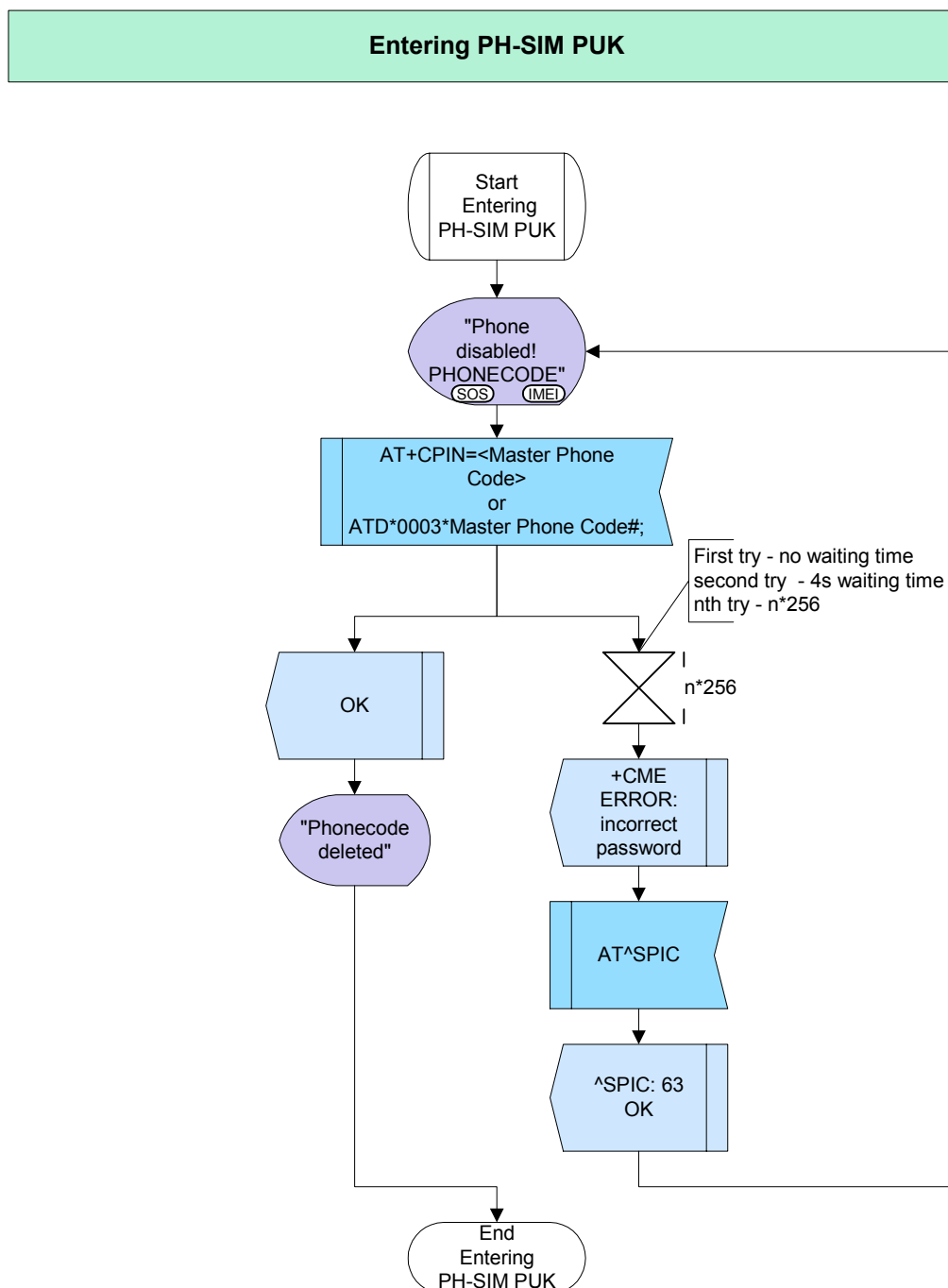


Figure 22: Entering PH-SIM PUK

### 2.5.4.4 Hints

Not applicable.

### 2.5.4.5 Example

\*\*\*\*\*

Comment: Entering PH-SIM PUK

\*\*\*\*\*

\*\*\*\*\*

Comment: Entering wrong PH-SIM PIN 3 times.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=0815  
Subscr 1 Receive: AT+CPIN=0815  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password  
Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 2  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Send: AT+CPIN=0815  
Subscr 1 Receive: AT+CPIN=0815  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password  
Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 1  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Send: AT+CPIN=0815  
Subscr 1 Receive: AT+CPIN=0815  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password  
Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 63  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request required PIN.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN?  
Subscr 1 Receive: AT+CPIN?  
Subscr 1 Receive: +CPIN: PH-SIM PUK  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 63  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

---

Comment: Entering wrong PH-SIM PUK.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=12345678  
Subscr 1 Receive: AT+CPIN=12345678  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Entering wrong PH-SIM PUK.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=12345678  
Subscr 1 Receive: AT+CPIN=12345678  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Entering wrong PH-SIM PUK.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=12345678  
Subscr 1 Receive: AT+CPIN=12345678  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Entering correct PH-SIM PUK.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=18424923  
Subscr 1 Receive: AT+CPIN=18424923  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## **2.5.5 Entering SIM PIN2**

### **2.5.5.1 Description**

This chapter describes how to enter the SIM PIN2. The SIM PIN2 is needed to use the following functions:

- AT+CACM – Accumulated call meter (reset ACM value)
- AT+CAMM – Accumulated call meter maximum (set ACMmax value)
- AT+CLCK or AT^SLCK – Facility lock to "FD" (activate Fixed dialing phonebook)
- AT+CPUC – Price per unit and currency table (change currency or units)
- Editing the "FD" phonebook with AT+CPBW

For details about using PIN2 see [2]. After entering a wrong SIM PIN2 three times you have to enter PUK2 to unblock PIN2.

### **2.5.5.2 Used AT commands**

AT+CPIN2	-	Enter PIN2
AT^SPIC	-	Display PIN counter

For further details about the commands see [2].



### 2.5.5.3 Flow chart

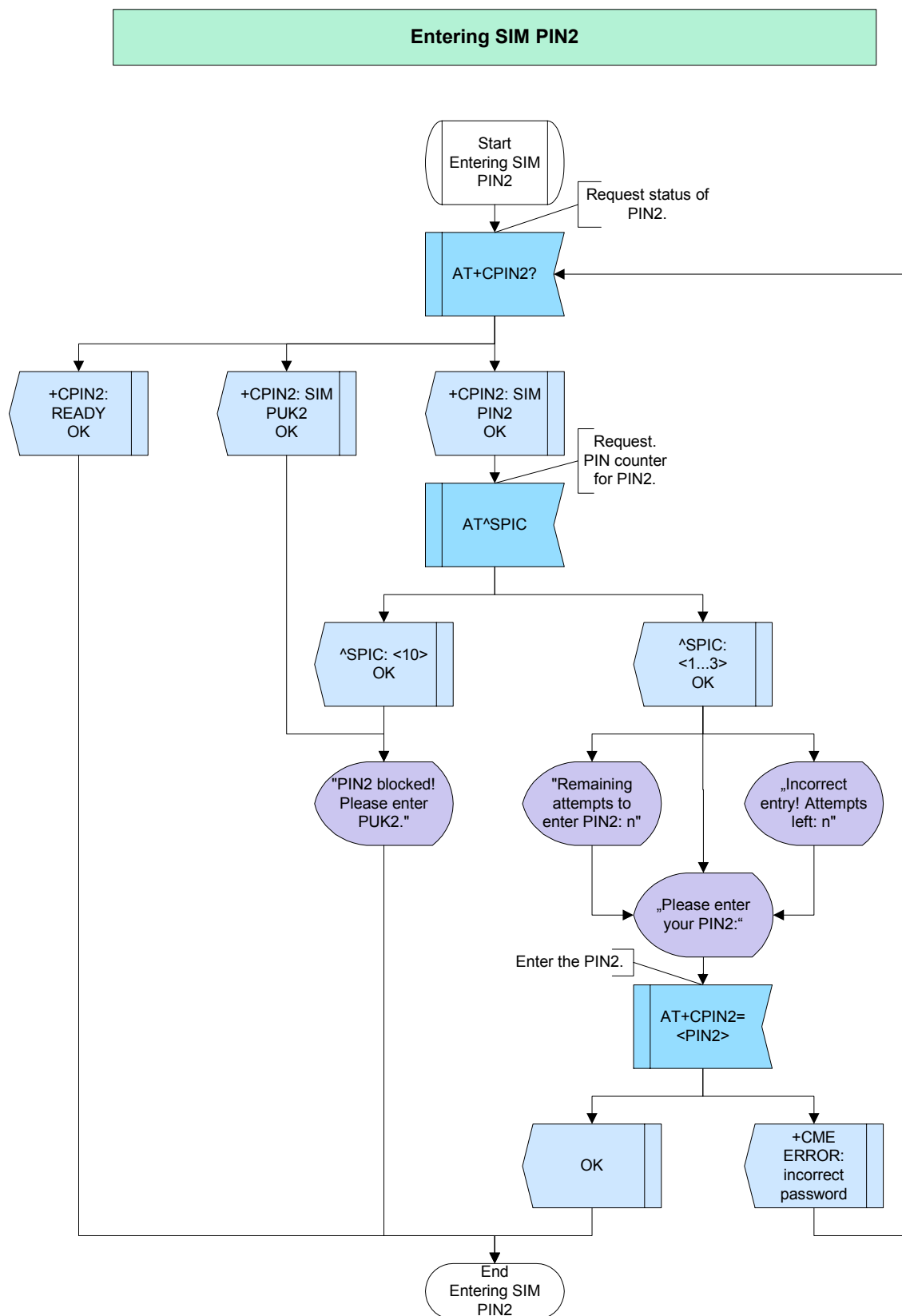


Figure 23: Entering SIM PIN2

#### 2.5.5.4 Hints

- To edit the Fixed dialing phonebook, PIN2 validation must be performed before.

#### 2.5.5.5 Example

\*\*\*\*\*

Comment: Entering SIM PIN2

Comment: Request state of SIM PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2?

Subscr 1 Receive: AT+CPIN2?

Subscr 1 Receive: +CPIN2: SIM PIN2

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 3

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering a wrong PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=5678

Subscr 1 Receive: AT+CPIN2=5678

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request state of SIM PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2?

Subscr 1 Receive: AT+CPIN2?

Subscr 1 Receive: +CPIN2: SIM PIN2

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 2

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Entering a wrong PIN2  
\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=5678  
Subscr 1 Receive: AT+CPIN2=5678  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*  
Comment: Request state of SIM PIN2  
\*\*\*\*\*

Subscr 1 Send: AT+CPIN2?  
Subscr 1 Receive: AT+CPIN2?  
Subscr 1 Receive: +CPIN2: SIM PIN2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Request PIN counter  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Entering a wrong PIN2  
\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=5678  
Subscr 1 Receive: AT+CPIN2=5678  
Subscr 1 Receive: +CME ERROR: incorrect password  
Subscr 1 Send: AT+CPIN2?  
Subscr 1 Receive: AT+CPIN2?  
Subscr 1 Receive: +CPIN2: SIM PUK2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

---

## **2.5.6 Entering SIM PUK2**

### **2.5.6.1 Description**

This chapter describes how to enter the SIM PUK2. The SIM PUK2 is needed after entering a wrong SIM PIN2 three times to unblock the features that need PIN2 authentication. You have two ways to enter the PUK2. The flow chart gives an example of both ways and shows what happens when entering a wrong PUK2. After entering a wrong PUK2 ten times, all PIN2 dependent features will be blocked. Contact your provider to obtain a new SIM card.

### **2.5.6.2 Used AT commands**

AT+CPIN2	-	Enter PIN2
AT^SPIC	-	Display PIN counter

For further details about the commands see [2].

### 2.5.6.3 Flow chart

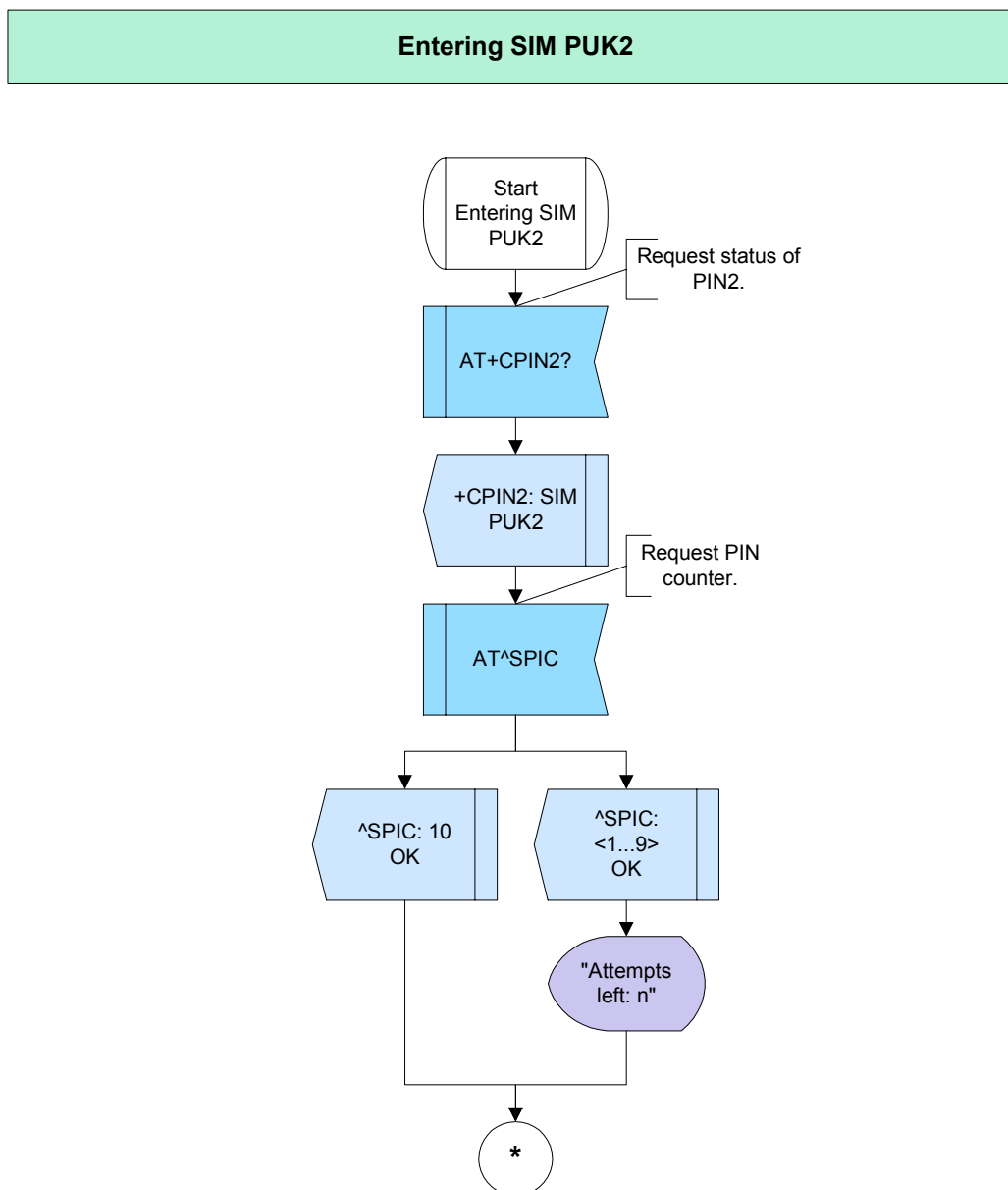


Figure 24: Entering SIM PUK2 - part 1

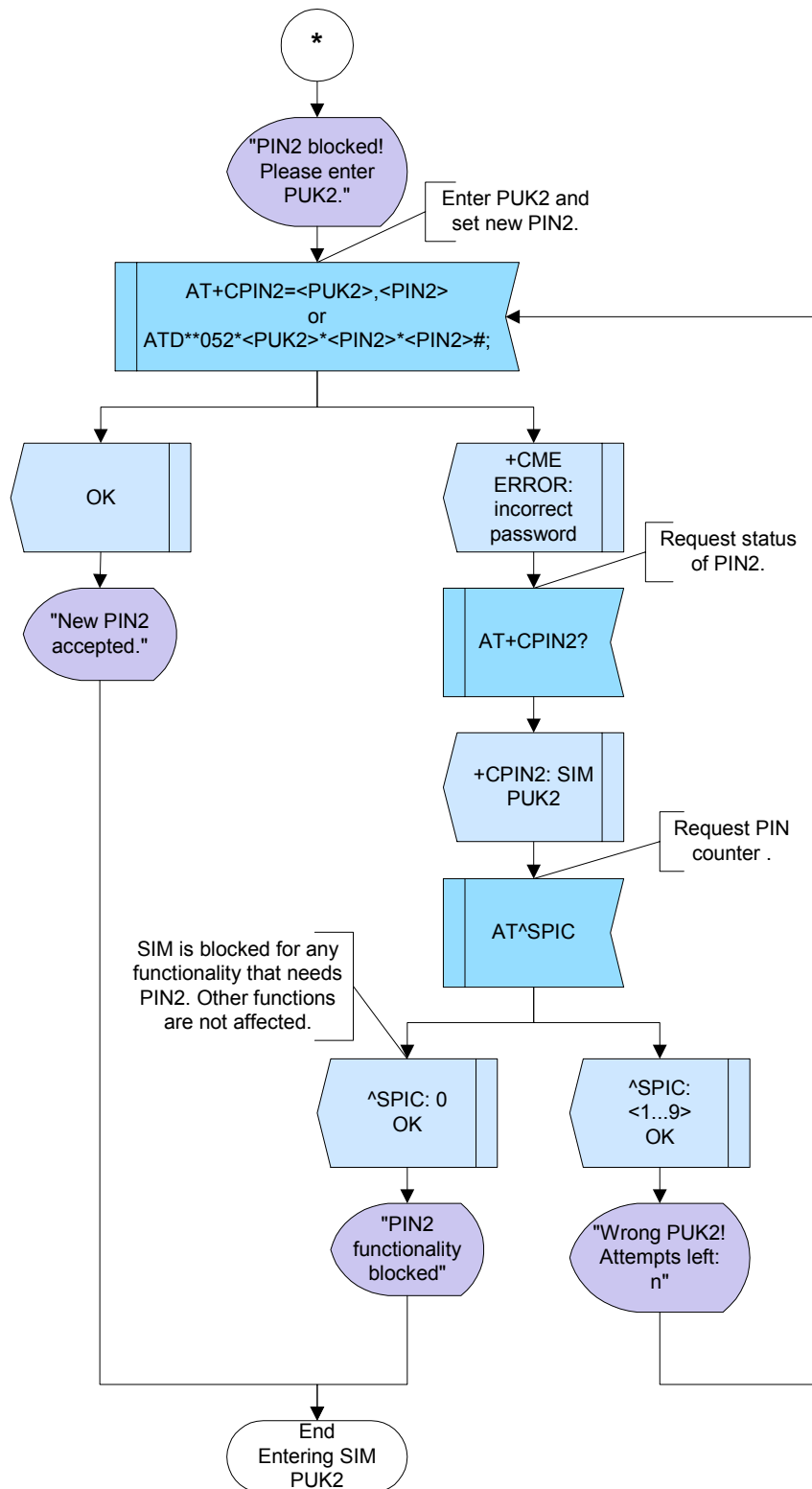


Figure 25: Entering SIM PUK2 - part 2

#### 2.5.6.4 Hints

Not applicable.

### 2.5.6.5 Example

\*\*\*\*\*

Comment: Entering SIM PUK2

\*\*\*\*\*

\*\*\*\*\*

Comment: Request state of SIM PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2?

Subscr 1 Receive: AT+CPIN2?

Subscr 1 Receive: +CPIN2: SIM PUK2

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 10

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong PUK2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=1234567,1234

Subscr 1 Receive: AT+CPIN2=1234567,1234

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request state of SIM PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2?

Subscr 1 Receive: AT+CPIN2?

Subscr 1 Receive: +CPIN2: SIM PUK2

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 10

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong PUK2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=1234567,1234  
Subscr 1 Receive: AT+CPIN2=1234567,1234  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request state of SIM PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2?  
Subscr 1 Receive: AT+CPIN2?  
Subscr 1 Receive: +CPIN2: SIM PUK2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 10  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong PUK2

\*\*\*\*\*

Subscr 1 Send: ATD\*\*052\*12345678\*1234\*1234#;  
Subscr 1 Receive: ATD\*\*052\*12345678\*1234\*1234#;  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request state of SIM PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2?  
Subscr 1 Receive: AT+CPIN2?  
Subscr 1 Receive: +CPIN2: SIM PUK2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 9  
Subscr 1 Receive:  
Subscr 1 Receive: OK



\*\*\*\*\*

Comment: Entering wrong PUK2

\*\*\*\*\*

Subscr 1 Send: ATD\*\*052\*12345678\*1234\*1234#;  
Subscr 1 Receive: ATD\*\*052\*12345678\*1234\*1234#;  
Subscr 1 Receive:  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request state of SIM PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2?  
Subscr 1 Receive: AT+CPIN2?  
Subscr 1 Receive: +CPIN2: SIM PUK2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 8  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering correct PIN

\*\*\*\*\*

Subscr 1 Send: ATD\*\*052\*87654321\*1234\*1234#;  
Subscr 1 Receive: ATD\*\*052\*87654321\*1234\*1234#;  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request state of SIM PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2?  
Subscr 1 Receive: AT+CPIN2?  
Subscr 1 Receive: +CPIN2: SIM PIN2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## 2.5.7 CME ERROR handling

### 2.5.7.1 Description

This chapter describes CME ERRORS that may be encountered while entering a PIN.

### 2.5.7.2 Used AT commands

Not applicable.

### 2.5.7.3 Flow Chart

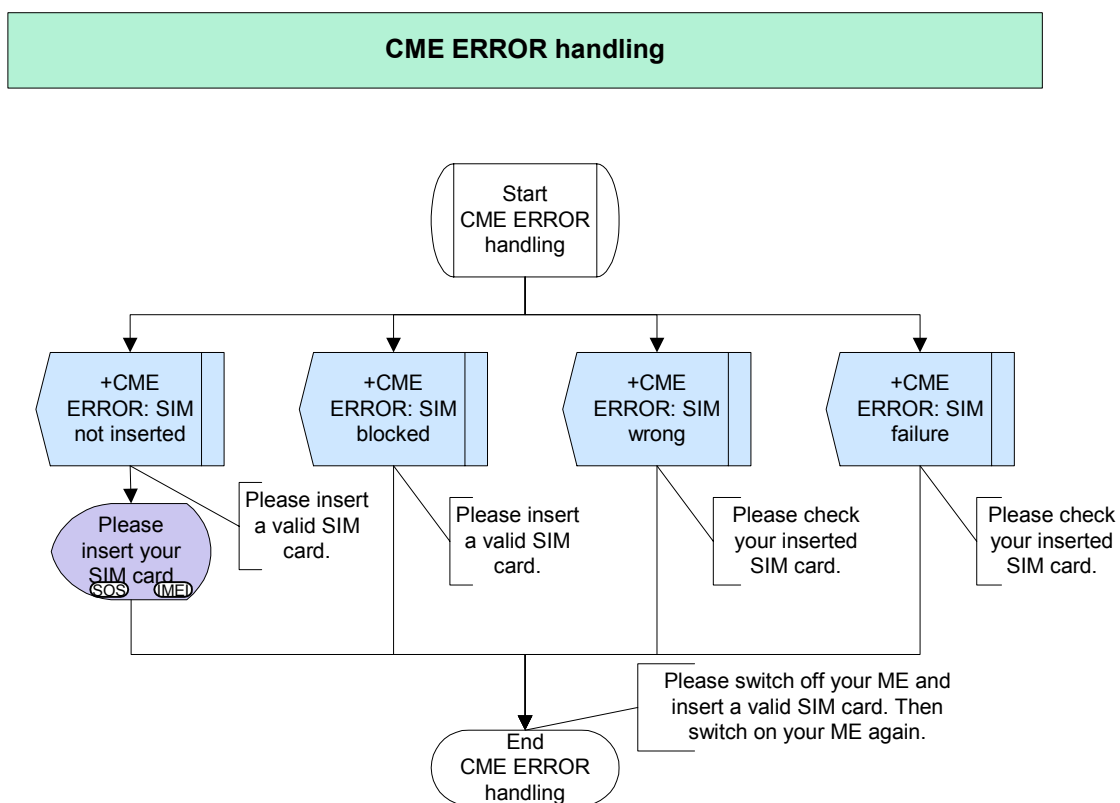


Figure 26: CME ERROR handling

### 2.5.7.4 Hints

Not applicable.

### 2.5.7.5 Example

Not applicable.

## 2.6 Monitoring

There are two approaches to set up an application for permanent monitoring:

- One approach is polling, where the application keeps sending the same AT command at regular intervals. Throughout this document this method is referred to as cyclic monitoring. Typical examples are provided in chapter 2.6.2.  
Polling is easy to implement, but may have disadvantages: The application consumes power when polling (the faster the polling rate the higher is the overall power consumption of the application). Checks are done when nothing happens. The information is not up to date, particularly, if refreshed at the beginning of a long polling cycle.
- The other way is an event-driven or alert-driven notification based on Unsolicited Result Codes (URCs) and referred to as event monitoring. In this case, the ME will send a message to the application whenever a status change occurs. The advantage over polling is significantly lower power consumption. Therefore, if possible, priority should be given to event monitoring. Typical examples are provided in chapter 2.6.3.

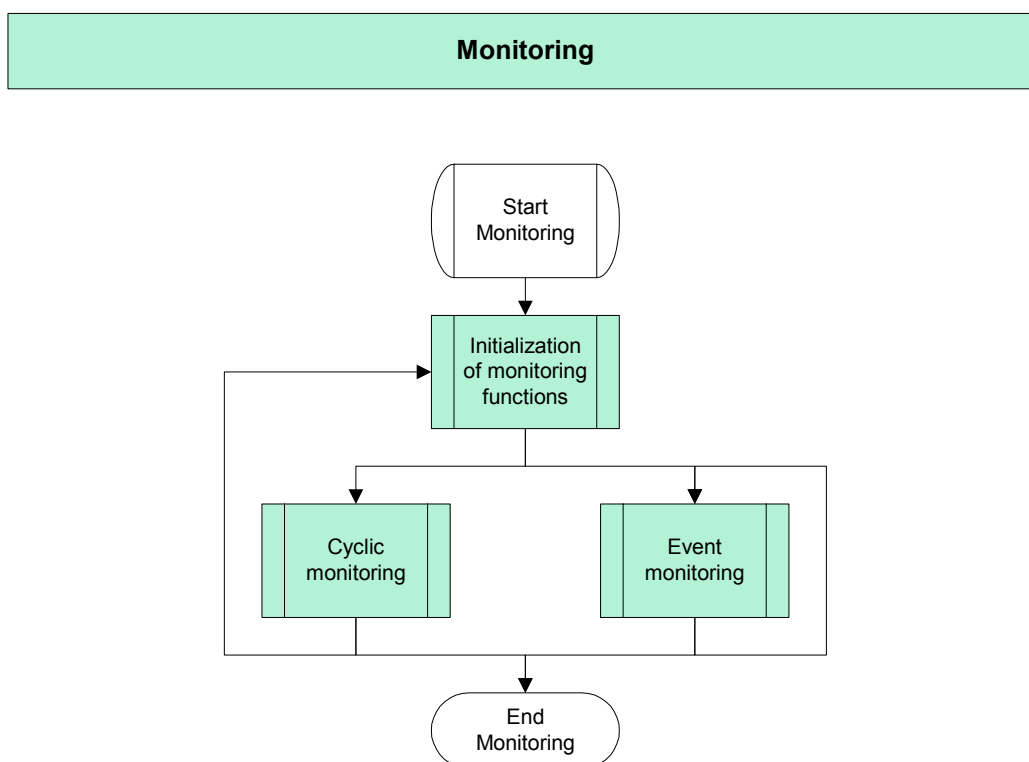


Figure 27: Monitoring

## **2.6.1 Initialization of monitor functions**

### **2.6.1.1 Description**

This chapter describes initial settings you can make to monitor a variety of functions related to the ME and to the network. Not all of them will be needed for every application, but you may consider to include those which are appropriate.

For example, the ME can be configured to generate URCs, whenever the status of the network registration changes, the SIM card is inserted or removed, or the signal quality varies.

### **2.6.1.2 Used AT commands**

AT+CREG	-	Network registration
AT^SCKS	-	Set SIM connection presentation mode
AT+CIND	-	Indicator control
AT+CMER	-	Mobile equipment event reporting
AT^SCTM	-	Set critical operating temperature presentation mode
AT^SBC	-	Battery charging / discharging and charge control

For further details about the commands see [2].

### 2.6.1.3 Flow chart

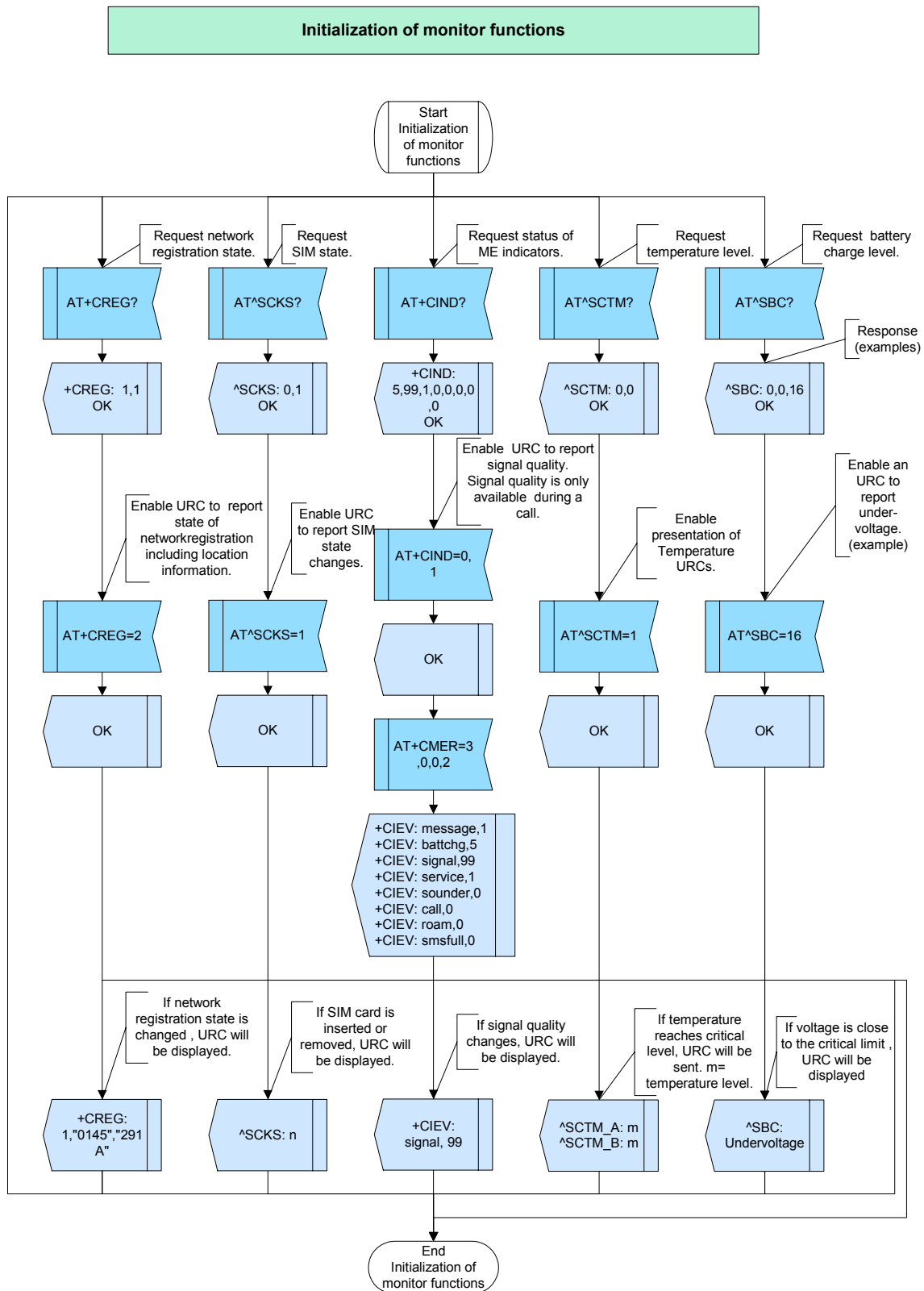


Figure 28: Initialization of monitoring functions

### 2.6.1.4 Hints

Not applicable.

### 2.6.1.5 Example

\*\*\*\*\*

Comment: Initialization of monitor functions

\*\*\*\*\*

\*\*\*\*\*

Comment: Request network registration state.

\*\*\*\*\*

Subscr 1 Send: AT+CREG=?

Subscr 1 Receive: AT+CREG=?

Subscr 1 Receive: +CREG: (0-2)

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable network registration URC.

\*\*\*\*\*

Subscr 1 Send: AT+CREG=2

Subscr 1 Receive: AT+CREG=2

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request SIM card and chip card holder status.

\*\*\*\*\*

Subscr 1 Send: AT^SCKS?

Subscr 1 Receive: AT^SCKS?

Subscr 1 Receive: ^SCKS: 0,1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable URC to report changes of SIM card and chip card holder status.

\*\*\*\*\*

Subscr 1 Send: AT^SCKS=1

Subscr 1 Receive: AT^SCKS=1

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request status of ME indicators.

\*\*\*\*\*

Subscr 1 Send: AT+CIND?

Subscr 1 Receive: AT+CIND?

Subscr 1 Receive: +CIND: 5,99,1,0,1,0,0,0

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable URC to report signal quality.

\*\*\*\*\*

Subscr 1 Send: AT+CIND=0,1

Subscr 1 Receive: AT+CIND=0,1

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable URC for event reporting.

\*\*\*\*\*

Subscr 1 Send: AT+CMER=3,0,0,2  
Subscr 1 Receive: AT+CMER=3,0,0,2  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: +CIEV: signal,99  
Subscr 1 Receive:  
Subscr 1 Receive: +CIEV: service,1  
Subscr 1 Receive:  
Subscr 1 Receive: +CIEV: sounder,0  
Subscr 1 Receive:  
Subscr 1 Receive: +CIEV: message,1  
Subscr 1 Receive:  
Subscr 1 Receive: +CIEV: call,0  
Subscr 1 Receive:  
Subscr 1 Receive: +CIEV: roam,0  
Subscr 1 Receive:  
Subscr 1 Receive: +CIEV: smsfull,0  
Subscr 1 Receive:

\*\*\*\*\*

Comment: Request temperature level.

\*\*\*\*\*

Subscr 1 Send: AT^SCTM?  
Subscr 1 Receive: AT^SCTM?  
Subscr 1 Receive: ^SCTM: 0,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable URC to report critical temperature.

\*\*\*\*\*

Subscr 1 Send: AT^SCTM=1  
Subscr 1 Receive: AT^SCTM=1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request battery charge level and current consumption.<sup>1)</sup>

\*\*\*\*\*

Subscr 1 Send: AT^SBC?  
Subscr 1 Receive: AT^SBC?  
Subscr 1 Receive: ^SBC: 0,0,15  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable URC to report undervoltage.<sup>2)</sup>

\*\*\*\*\*

Subscr 1 Send: AT^SBC=1  
Subscr 1 Receive: AT^SBC=1  
Subscr 1 Receive: OK

- 1) The parameters indicated by the read command AT^SBC? depend on the product type. For details please refer to [1] and [2].
- 2) The methods to enable / disable the presentation mode of undervoltage or overvoltage conditions vary with the product type. To make sure please refer to [1] and [2].

## 2.6.2 Cyclic monitoring

### 2.6.2.1 Description

This chapter describes cyclic monitoring implemented in the application (polling). To do so, set up your application to send the read form of an AT command at a given polling rate.

Remember that in terms of power consumption event-driven notification may be more efficient than the cyclic approach. For example, to check the network registration activate the URCs "+CREG: <stat>" or "+CREG: <stat>[, <lac>,<ci>]" rather than sending the AT+CREG? read command in a polling scheme. Also, the signal quality can be polled with AT+CSQ?, but it can be better monitored by activating the event indicator <rssi> provided by AT+CIND. Compare chapter 2.6.3.

The battery charge and/or the current consumption can be polled using the AT^SBC? read command as shown in chapter 2.6.2.4. The URC function provided by AT^SBC applies only to undervoltage conditions and, depending on the module type, overvoltage conditions. See examples in chapter 2.6.1.5.

### 2.6.2.2 Used AT commands

AT+CREG	-	Network registration
AT+CSQ	-	Signal quality
AT+COPS	-	Operator selection
AT^SBC	-	Battery charging / discharging and charge control

For further details about the commands see [2].

### 2.6.2.3 Flow chart

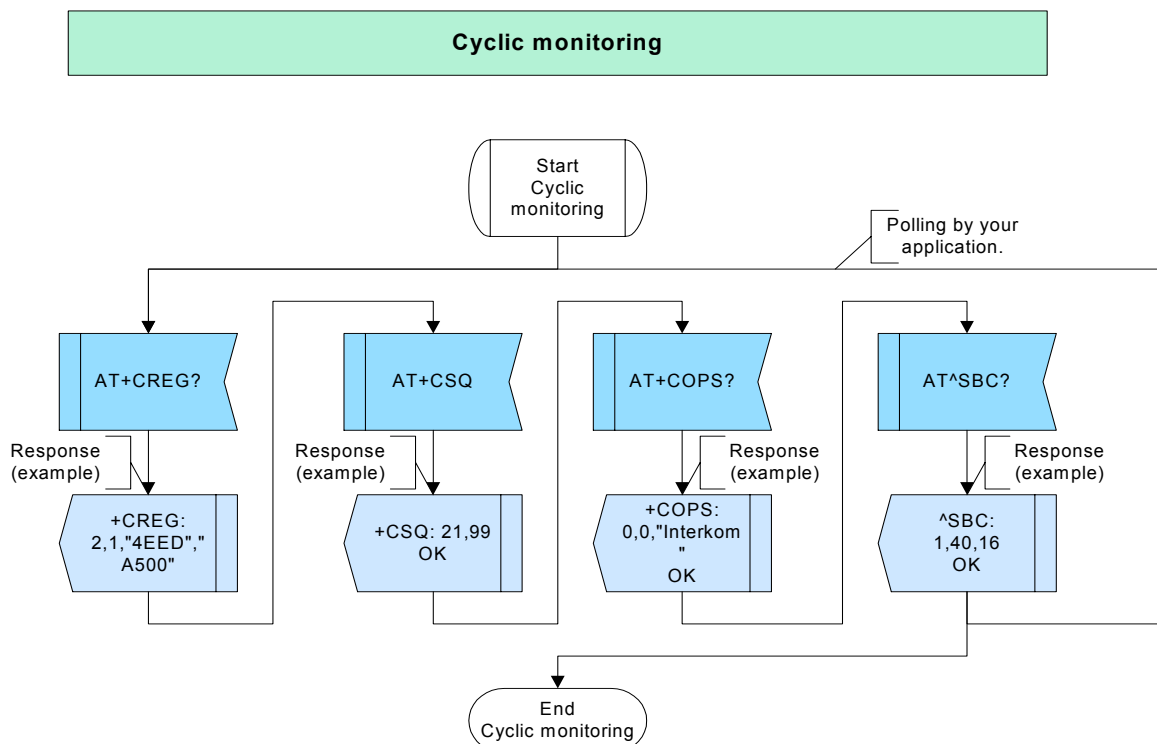


Figure 29: Cyclic monitoring



#### 2.6.2.4 Hints

Not applicable.

#### 2.6.2.5 Example

\*\*\*\*\*

Comment: Cyclic monitoring

\*\*\*\*\*

\*\*\*\*\*

Comment: Request network registration.

\*\*\*\*\*

Subscr 1 Send: AT+CREG?

Subscr 1 Receive: AT+CREG?

Subscr 1 Receive: +CREG: 2,1,"4EED","A500"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request signal quality.

\*\*\*\*\*

Subscr 1 Send: AT+CSQ

Subscr 1 Receive: AT+CSQ

Subscr 1 Receive: +CSQ: 24,99

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request current operator.

\*\*\*\*\*

Subscr 1 Send: AT+COPS?

Subscr 1 Receive: AT+COPS?

Subscr 1 Receive: +COPS: 0,2,"26207"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request Battery charge and current consumption.<sup>1)</sup>

\*\*\*\*\*

Subscr 1 Send: AT^SBC?

Subscr 1 Receive: AT^SBC?

Subscr 1 Receive: ^SBC: 0,0,15

Subscr 1 Receive:

Subscr 1 Receive: OK

<sup>1)</sup> The parameters indicated by the read command AT^SBC? depend on the product type. For details please refer to [1] and [2].

## 2.6.3 Event monitoring

### 2.6.3.1 Description

This chapter describes solutions of event-driven or alert-driven notifications, generated in the form of URCs. Your application should be designed to react adequately when a URC is received. For example, it may be necessary to switch off parts of the application to save power or reduce load on the ME.

### 2.6.3.2 Used AT commands

Not applicable.

### 2.6.3.3 Flow chart

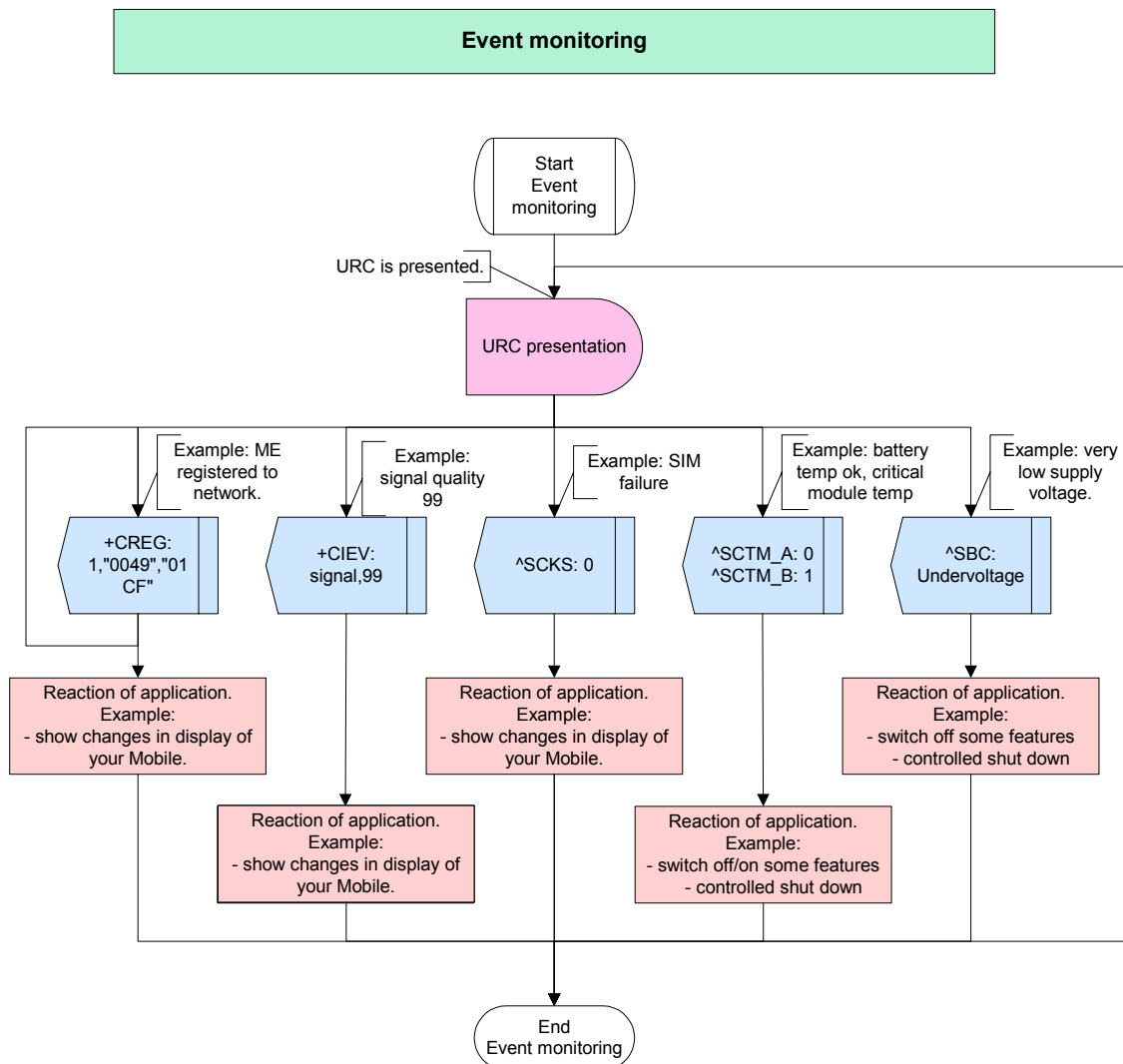


Figure 30: Event monitoring

### 2.6.3.4 Hints

Not applicable.

---

### **2.6.3.5 Example**

Not applicable.

## 2.7 Supplementary services

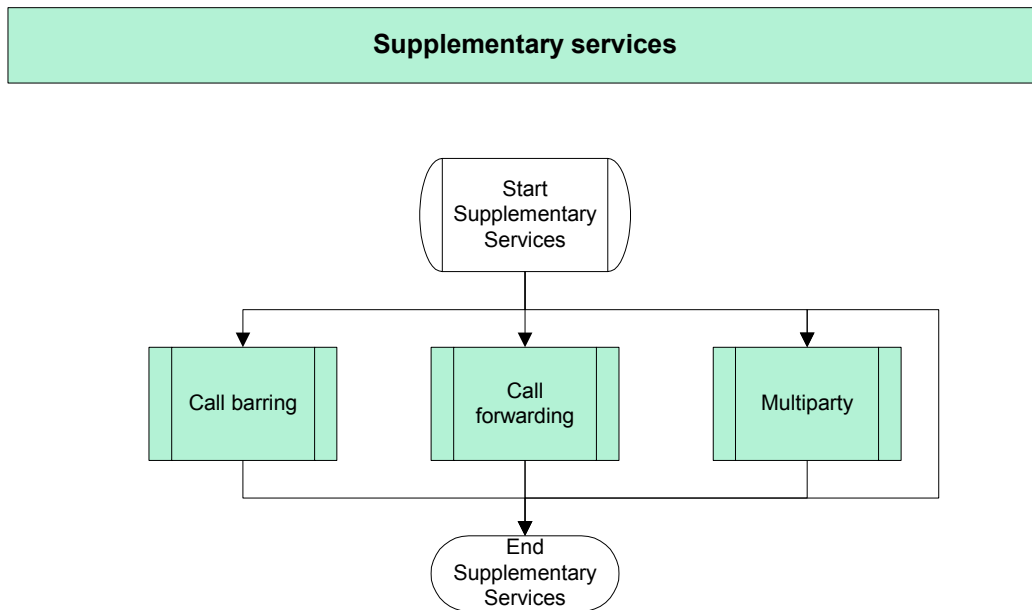


Figure 31: Supplementary services

### 2.7.1 Call barring – all outgoing calls

#### 2.7.1.1 Description

This chapter describes the usage of the supplementary service *Call barring* for all outgoing calls. The availability of this service depends on the network provider. If available, it is protected by a password supplied by the network provider (net password).

**Note:** A similar scenario applies to all other Call barring options, e.g. AI (All incoming calls etc.). Therefore, no other flow charts or examples are listed.

#### 2.7.1.2 Used AT commands

AT+CLCK	-	Facility lock
ATD*#33 #	-	Interrogate status of Call barring for all outgoing calls
ATD*33*PW*BS#	-	Activate Call barring for all outgoing calls
ATD#33*PW*BS#	-	Deactivate Call barring for all outgoing calls

For further details about the commands see [2].

### 2.7.1.3 Flow Chart

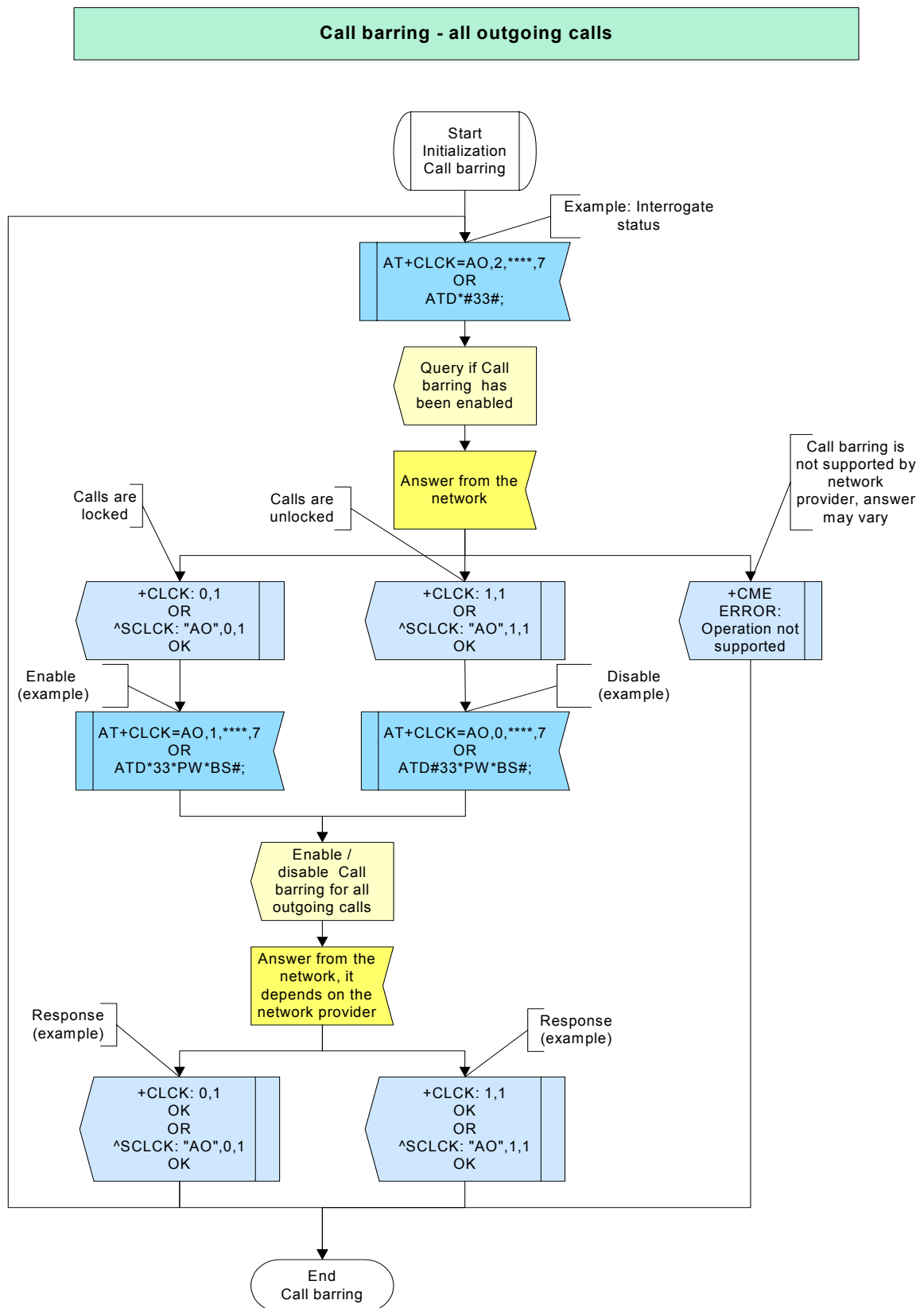


Figure 32: Call barring – all outgoing calls

#### 2.7.1.4 Hints

- The net password is provisioned by the service provider or network operator.
- The number of parameters displayed in ^SCLCK output strings differs from the equivalent +CLCK output strings: The ^SCLCK string includes additionally the parameter <fac>.

GCF-CC note: \*# sequences the user enters on the keypad shall be transmitted over the AT interface without any conversion. Also, GCF test cases require that \*# sequences can be entered during a call.

#### 2.7.1.5 Example

\*\*\*\*\*

Comment: Call barring

\*\*\*\*\*

\*\*\*\*\*

Comment: Check Call barring status for all outgoing calls

\*\*\*\*\*

Subscr 1 Send: AT+CLCK=AO,2,1234,7  
Subscr 1 Receive: AT+CLCK=AO,2,1234,7  
Subscr 1 Receive:  
Subscr 1 Receive: +CLCK: 0,1  
Subscr 1 Receive: +CLCK: 0,2  
Subscr 1 Receive: +CLCK: 0,4  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Activate Call barring for all outgoing (voice, data, fax) calls (class 7)

\*\*\*\*\*

Subscr 1 Send: AT+CLCK=AO,1,1234,7  
Subscr 1 Receive: AT+CLCK=AO,1,1234,7  
Subscr 1 Receive:  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Interrogate status of Call barring for all outgoing calls with \*# code

\*\*\*\*\*

Subscr 1 Send: ATD\*#33#;  
Subscr 1 Receive: ATD\*#33#;  
Subscr 1 Receive:  
Subscr 1 Receive: ^SCLCK: "AO",1,1  
Subscr 1 Receive: ^SCLCK: "AO",1,8  
Subscr 1 Receive: ^SCLCK: "AO",1,4  
Subscr 1 Receive: ^SCLCK: "AO",1,2  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Disable Call Barring for all outgoing (voice, data, fax) calls

\*\*\*\*\*

Subscr 1 Send: AT+CLCK=AO,0,1234,7  
Subscr 1 Receive: AT+CLCK=AO,0,1234,7  
Subscr 1 Receive:  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Activate Call barring for all outgoing (voice, sms, fax) calls with \*# code

\*\*\*\*\*

Subscr 1 Send: ATD\*33\*1234\*10#;  
Subscr 1 Receive: ATD\*33\*1234\*10#;  
Subscr 1 Receive:  
Subscr 1 Receive: ^SCLCK: "AO",1,1  
Subscr 1 Receive: ^SCLCK: "AO",1,8  
Subscr 1 Receive: ^SCLCK: "AO",1,4  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Interrogate status of Call barring for all outgoing calls with \*# code

\*\*\*\*\*

Subscr 1 Send: ATD\*#33#;  
Subscr 1 Receive: ATD\*#33#;  
Subscr 1 Receive:  
Subscr 1 Receive: ^SCLCK: "AO",1,1  
Subscr 1 Receive: ^SCLCK: "AO",1,8  
Subscr 1 Receive: ^SCLCK: "AO",1,4  
Subscr 1 Receive: ^SCLCK: "AO",0,2  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Disable Call Barring for all outgoing (voice, sms, fax) calls with \*# code (class 10)

\*\*\*\*\*

Subscr 1 Send: ATD#33\*1234\*10#;  
Subscr 1 Receive: ATD#33\*1234\*10#;  
Subscr 1 Receive:  
Subscr 1 Receive: ^SCLCK: "AO",0,1  
Subscr 1 Receive: ^SCLCK: "AO",0,8  
Subscr 1 Receive: ^SCLCK: "AO",0,4  
Subscr 1 Receive: ^SCLCK: "AO",0,2  
Subscr 1 Receive: OK

## **2.7.2 Call forwarding unconditional for voice calls**

### **2.7.2.1 Description**

This chapter will discuss the usage of the supplementary service *Call Forwarding*. It describes all the steps required to activate Call forwarding unconditional (CFU) for voice. After the activation of CFU for the specified class (here: voice calls), all calls of that class are forwarded to the specified phone number. Depending on the service provider or tariff package, CF services may need to be subscribed to. If the client attempts to activate a non-provisioned or a non-subscribed option, the response varies with the network provider, but regardless of the response, the setting does not take effect.

**Note:** All other CF scenarios are similar to this one. Therefore, CF for other classes is not considered.

### **2.7.2.2 Used AT commands**

AT+CCFC	-	Call forwarding number and conditions control
ATD*#21#;	-	Interrogate status of Call forwarding unconditional
ATD*21*DN*BS#;	-	Activate Call forwarding unconditional
ATD#21#;	-	Deactivate Call forwarding unconditional
ATD**21*DN*BS#;	-	Register and activate Call forwarding unconditional
ATD##21#;	-	Erase and deactivate Call forwarding unconditional

For further details about the commands see [2].



### 2.7.2.3 Flow chart

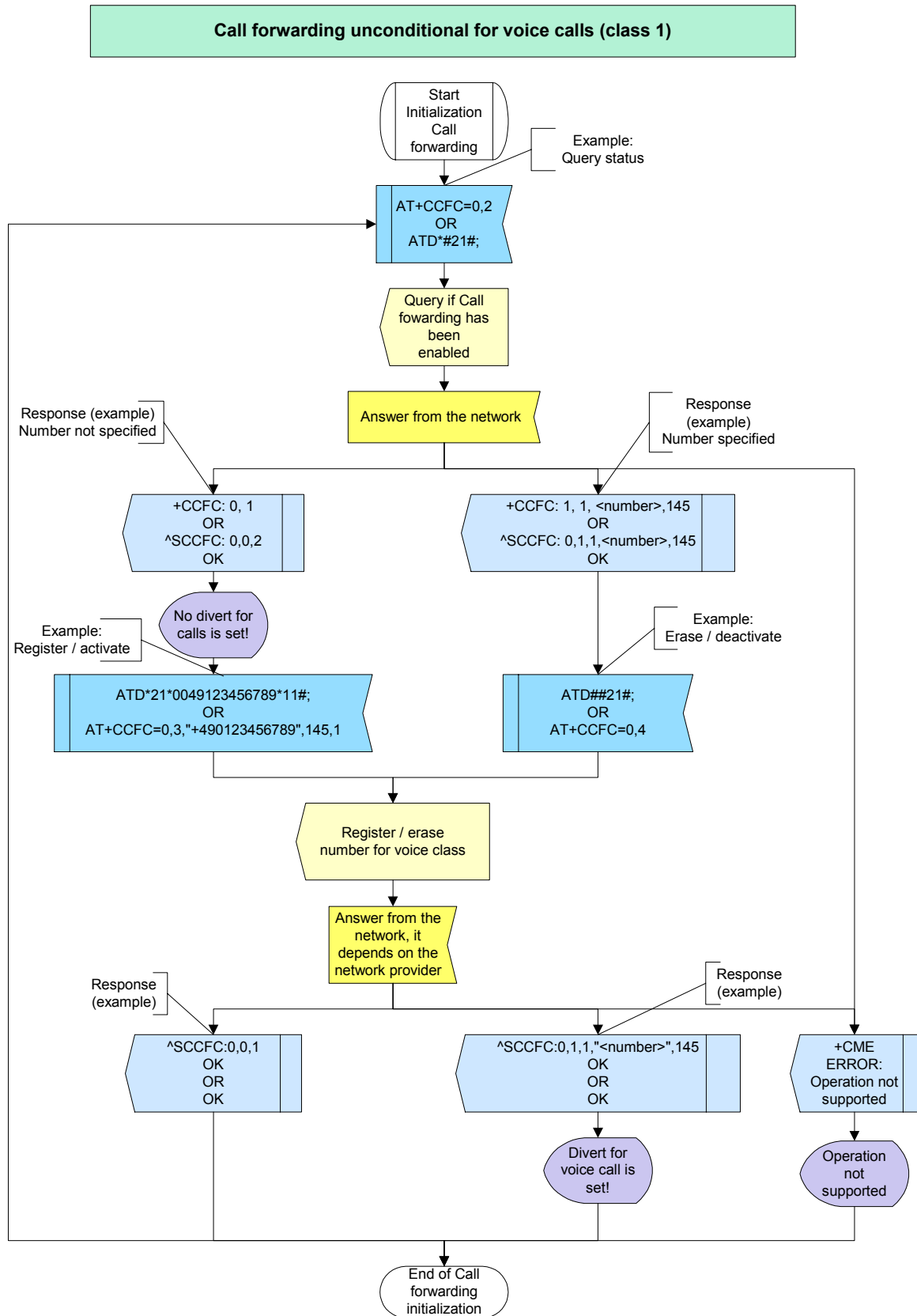


Figure 33: Call forwarding unconditional for voice call (class 1)

#### 2.7.2.4 Hints

- Querying the status of <reas> 4 (all Call forwarding) and 5 (all Conditional Call forwarding) with AT+CCFC will result in an error ("CME error: Operation not supported"). As an alternative, you may use the ATD command followed by \*# codes to check the status of these two reasons.
- Some networks may choose to have certain Call forwarding conditions permanently enabled (e.g. forwarding to a mailbox if the mobile is not reachable). In this case, deactivation of Call forwarding for these conditions will not be successful, even if the CCFC request is answered with response "OK".
- The number of parameters displayed in the ^SCCFC output strings differs from the equivalent +CCFC output strings: In contrast to the +CCFC string, ^SCCFC also includes the parameter <reason>.

GCF-CC note: \*# sequences the user enters on the keypad shall be transmitted over the AT interface without any conversion. Also, GCF test cases require that \*# sequences can be entered during a call.

#### 2.7.2.5 Example

\*\*\*\*\*

Comment: Call forwarding

\*\*\*\*\*

\*\*\*\*\*

Comment: Request the state of Call forwarding unconditional.

\*\*\*\*\*

```
Subscr 1   Send: AT+CCFC=0,2
Subscr 1   Send:
Subscr 1   Receive: AT+CCFC=0,2
Subscr 1   Receive:
Subscr 1   Receive: +CCFC: 0,1
Subscr 1   Receive: +CCFC: 0,2
Subscr 1   Receive: +CCFC: 0,4
Subscr 1   Receive:
Subscr 1   Receive: OK
```

\*\*\*\*\*

Comment: Register a number for class 1.

\*\*\*\*\*

```
Subscr 1   Send: AT+CCFC=0,3,"+490123456789",145,1
Subscr 1   Send:
Subscr 1   Receive: AT+CCFC=0,3,"+490123456789",145,1
Subscr 1   Receive:
Subscr 1   Receive:
Subscr 1   Receive: OK
```

\*\*\*\*\*

Comment: Interrogate the state of Call forwarding unconditional with \*# code.

\*\*\*\*\*

```
Subscr 1   Send: ATD*#21#;
Subscr 1   Send:
Subscr 1   Receive: ATD*#21#;
Subscr 1   Receive:
Subscr 1   Receive: ^SCCFC: 0,1,1,"+490123456789",145
Subscr 1   Receive: ^SCCFC: 0,0,8
Subscr 1   Receive: ^SCCFC: 0,0,4
Subscr 1   Receive: ^SCCFC: 0,0,2
Subscr 1   Receive: OK
```

\*\*\*\*\*

Comment: Erase and deactivate Call forwarding unconditional.

\*\*\*\*\*

Subscr 1 Send: AT+CCFC=0,4  
Subscr 1 Send:  
Subscr 1 Receive: AT+CCFC=0,4  
Subscr 1 Receive:  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Activate a number for class 1 with \*# code.

\*\*\*\*\*

Subscr 1 Send: ATD\*21\*0049123456789\*11#;  
Subscr 1 Send:  
Subscr 1 Receive: ATD\*21\*0049123456789\*11#;  
Subscr 1 Receive:  
Subscr 1 Receive: ^SCCFC: 0,1,1,"+49123456789",145  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Interrogate the state of Call forwarding unconditional with \*# code.

\*\*\*\*\*

Subscr 1 Send: ATD\*#21#;  
Subscr 1 Send:  
Subscr 1 Receive: ATD\*#21#;  
Subscr 1 Receive:  
Subscr 1 Receive: ^SCCFC: 0,1,1,"+49123456789",145  
Subscr 1 Receive: ^SCCFC: 0,0,8  
Subscr 1 Receive: ^SCCFC: 0,0,4  
Subscr 1 Receive: ^SCCFC: 0,0,2  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Erase and deactivate Call forwarding unconditional with \*# code.

\*\*\*\*\*

Subscr 1 Send: ATD##21#;  
Subscr 1 Send:  
Subscr 1 Receive: ATD##21#;  
Subscr 1 Receive:  
Subscr 1 Receive: ^SCCFC: 0,0,1  
Subscr 1 Receive: ^SCCFC: 0,0,8  
Subscr 1 Receive: ^SCCFC: 0,0,4  
Subscr 1 Receive: ^SCCFC: 0,0,2  
Subscr 1 Receive: OK

## 2.7.3 Multiparty

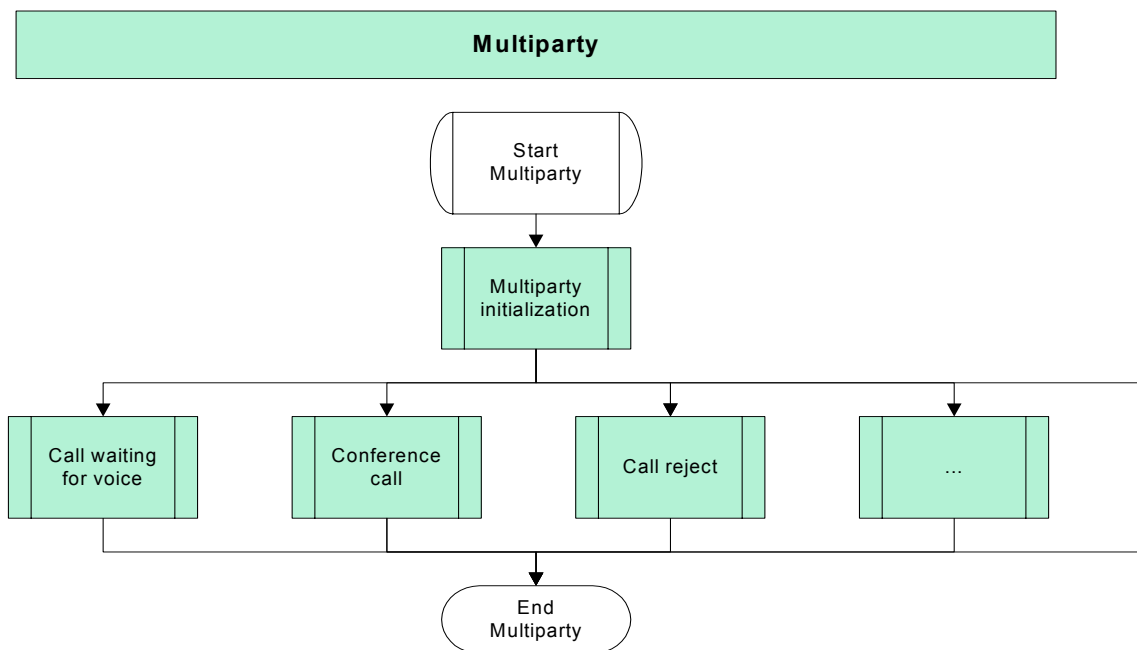


Figure 34: Multiparty

### 2.7.3.1 Multiparty initialization

#### 2.7.3.1.1 Description

This chapter describes all the steps required to initialize the supplementary service *Multiparty* call waiting, call hold.

This can be done in two steps:

- First, activate the presentation of the URC that indicates a waiting caller to the called party. This URC takes the form "+CCWA: <number>,<type>,<class>,<CLI validity>" or "^SCWA". For further detail please refer to [2]. Please note that "^SCWA" is not considered in the following examples. The activation of the URC only has effect on the module and does not involve any network related activities. Therefore the response from the module will be returned immediately. The setting will not be stored when powering off the module.
- Activate Call waiting (Flow chart and example only show the scenario for voice). This action has effect on the network because the settings will be stored in the network. Therefore the module response will take a longer time and the setting will still be present after power off and restart of the module.

It is recommended to save this initialization and only deactivate it when you are sure that the indication of waiting calls is not needed any longer.

#### 2.7.3.1.2 Used AT commands

AT+CCWA	-	Call waiting
ATD*#43#;	-	Querying status of call waiting
ATD*43*BS#;	-	Activate call waiting
ATD#43#	-	Deactivate call waiting

For further details about the commands see [2].

### 2.7.3.1.3 Flow chart

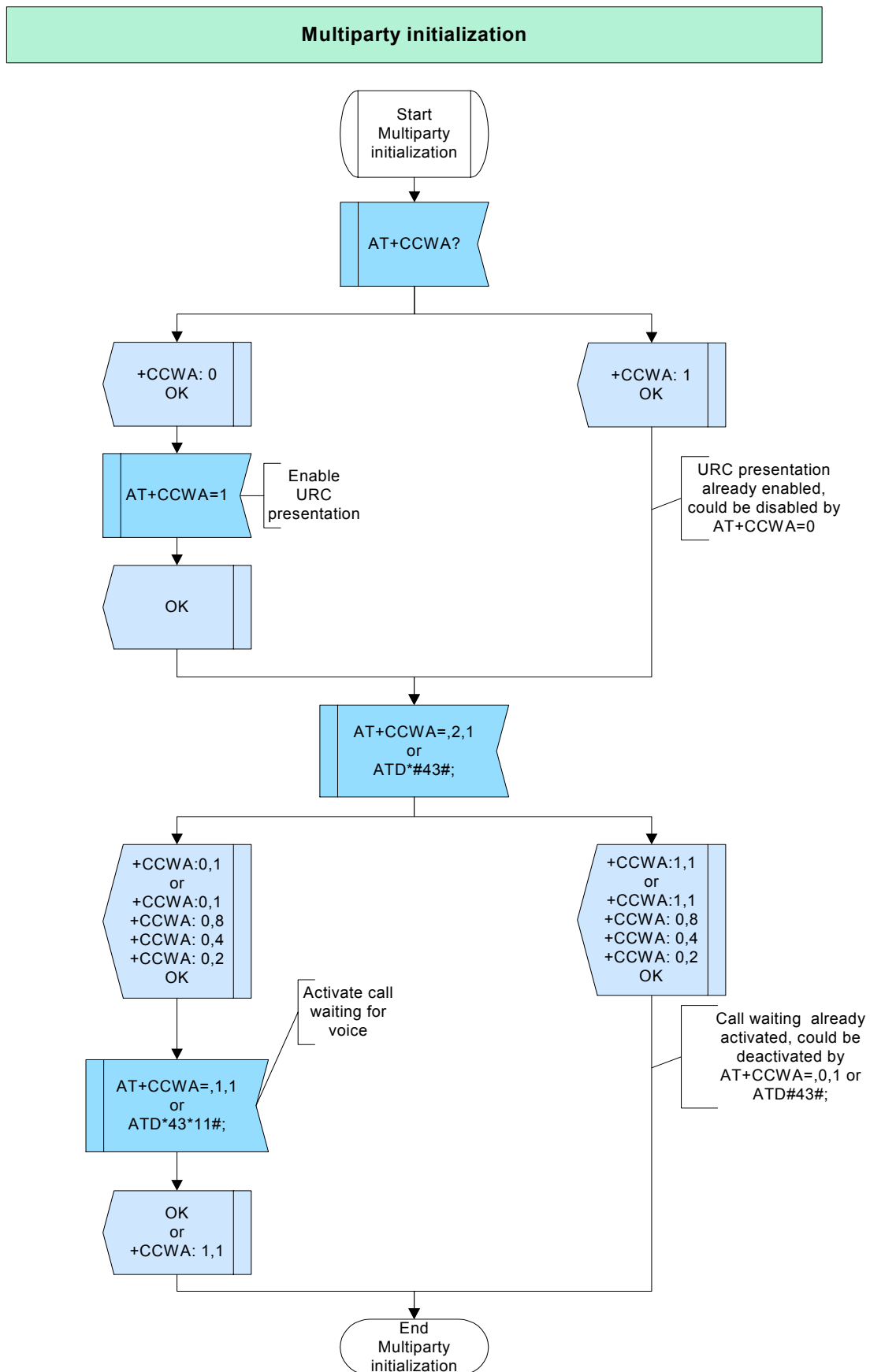


Figure 35: Multiparty initialization

#### 2.7.3.1.4 Hints

- The URC presentation mode will not be retained when the module is powered down. After restart, the default setting AT+CCWA=0 will be restored. The activation of Call waiting itself will be stored on network side and therefore, is not affected when you shut down the module.

GCF-CC note: \*# sequences the user enters on the keypad shall be transmitted over the AT interface without any conversion. Also, GCF test cases require that \*# sequences can be entered during a call.

#### 2.7.3.1.5 Example

##### Example 1:

\*\*\*\*\*

Comment: Initalization multiparty

\*\*\*\*\*

\*\*\*\*\*

Comment: Status query for display of URC. Note that URC presentation will be disabled after reboot of the module.

\*\*\*\*\*

Subscr 2 Send: AT+CCWA?  
Subscr 2 Receive: AT+CCWA?  
Subscr 2 Receive: +CCWA: 0  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Display of URC disabled, next step: enable display for URC.

\*\*\*\*\*

Subscr 2 Send: AT+CCWA=1  
Subscr 2 Receive: AT+CCWA=1  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Status query for CCWA, Subscriber2.

\*\*\*\*\*

Subscr 2 Send: AT+CCWA=,2,1  
Subscr 2 Receive: AT+CCWA=,2,1  
Subscr 2 Receive:  
Subscr 2 Receive: +CCWA: 0,1  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: CCWA during voice calls disabled, next step: enable CCWA for voice only.

\*\*\*\*\*

Subscr 2 Send: AT+CCWA=,1,1  
Subscr 2 Receive: AT+CCWA=,1,1  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Status query for enabled value.

\*\*\*\*\*

Subscr 2 Send: AT+CCWA=1,2,1  
Subscr 2 Receive: AT+CCWA=1,2,1  
Subscr 2 Receive:  
Subscr 2 Receive: +CCWA: 1,1  
Subscr 2 Receive:  
Subscr 2 Receive: OK

### Example 2:

\*\*\*\*\*

Comment: Initialization multiparty

\*\*\*\*\*

\*\*\*\*\*

Comment: Alternative option using \*# sequence.

Comment: Status query for display of URC. Note that URC presentation will be disabled after reboot of the module.

\*\*\*\*\*

Subscr 2 Send: AT+CCWA?  
Subscr 2 Receive: AT+CCWA?  
Subscr 2 Receive: +CCWA: 0  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Display of URC disabled, next step: enable display of URC.

\*\*\*\*\*

Subscr 2 Send: AT+CCWA=1  
Subscr 2 Receive: AT+CCWA=1  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Status query for CCWA, Subscriber2.

\*\*\*\*\*

Subscr 2 Send: ATD\*#43#;  
Subscr 2 Receive: ATD\*#43#;  
Subscr 2 Receive:  
Subscr 2 Receive: +CCWA: 0,1  
Subscr 2 Receive: +CCWA: 0,8  
Subscr 2 Receive: +CCWA: 0,4  
Subscr 2 Receive: +CCWA: 0,2  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: CCWA during voice calls disabled, next step: enable CCWA for voice only.

\*\*\*\*\*

Subscr 2 Send: ATD\*43\*11#;  
Subscr 2 Receive: ATD\*43\*11#;  
Subscr 2 Receive:  
Subscr 2 Receive: +CCWA: 1,1  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Status query for enabled value.

\*\*\*\*\*

Subscr 2    Send: ATD\*#43#;  
Subscr 2    Receive: ATD\*#43#;  
Subscr 2    Receive: +CCWA: 1,1  
Subscr 2    Receive: +CCWA: 0,8  
Subscr 2    Receive: +CCWA: 0,4  
Subscr 2    Receive: +CCWA: 0,2  
Subscr 2    Receive: OK



## **2.7.3.2    Multiparty – call waiting during voice calls**

### **2.7.3.2.1    Description**

This chapter describes all the steps needed to use the Multiparty supplementary services call waiting and call hold for voice calls.

At least three subscribers are involved. Two subscribers are connected and a third subscriber is calling subscriber 2. This waiting call is accepted while subscriber 1 is on hold. Then, the active call is terminated and the held call will be activated automatically. Generally, a call "on hold" doesn't have a voice connection to the connected party.

### **2.7.3.2.2    Used AT commands**

ATA	-	Answer a call
ATD	-	Mobile originated call to dial a number
ATH	-	Disconnect existing connection
AT+CHLD	-	Call hold and multiparty
AT+CLCC	-	Returns a list of current calls

For further details about the commands see [2].

### 2.7.3.2.3 Flowchart

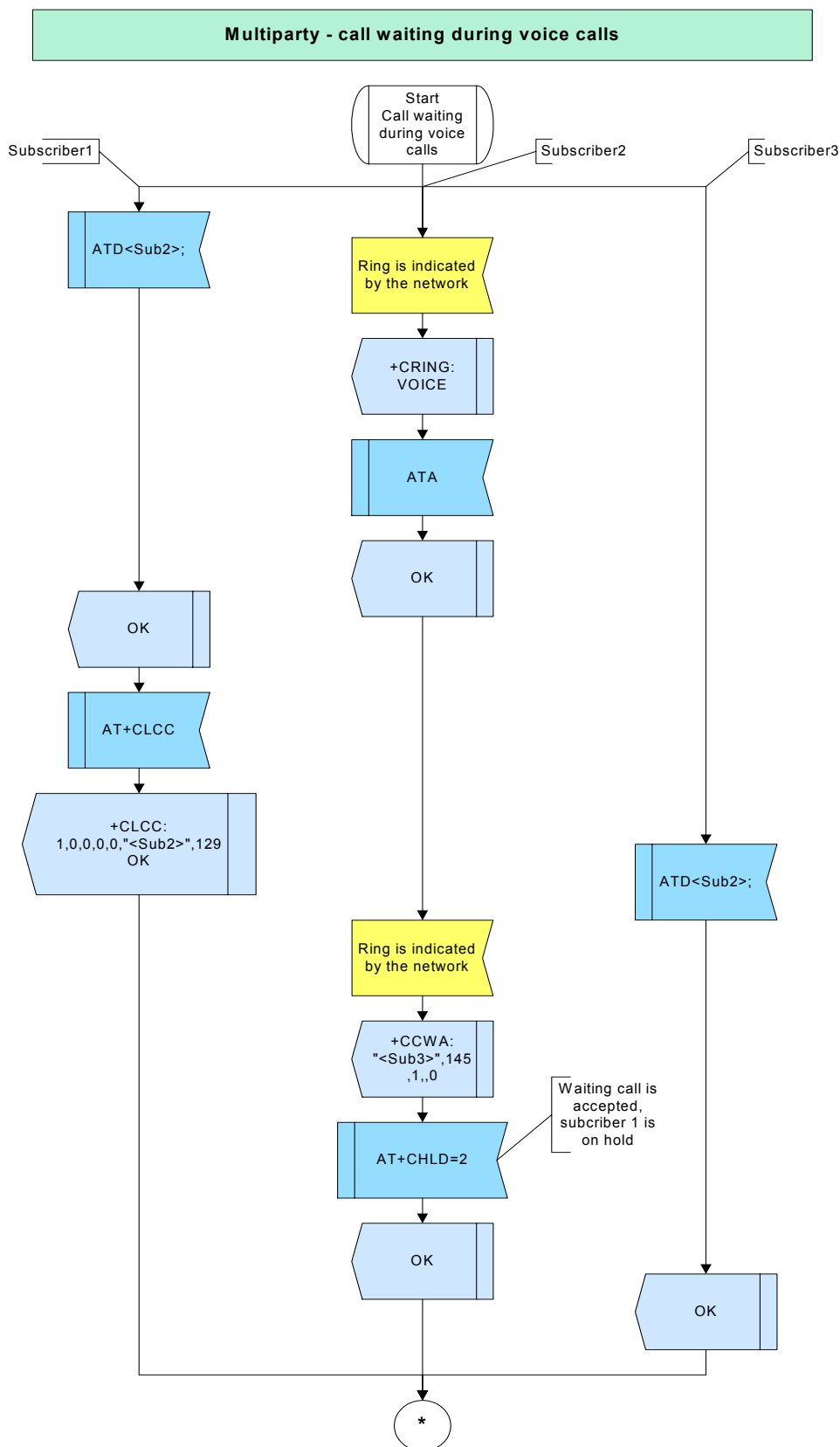


Figure 36: Multiparty - call waiting during voice calls - part 1

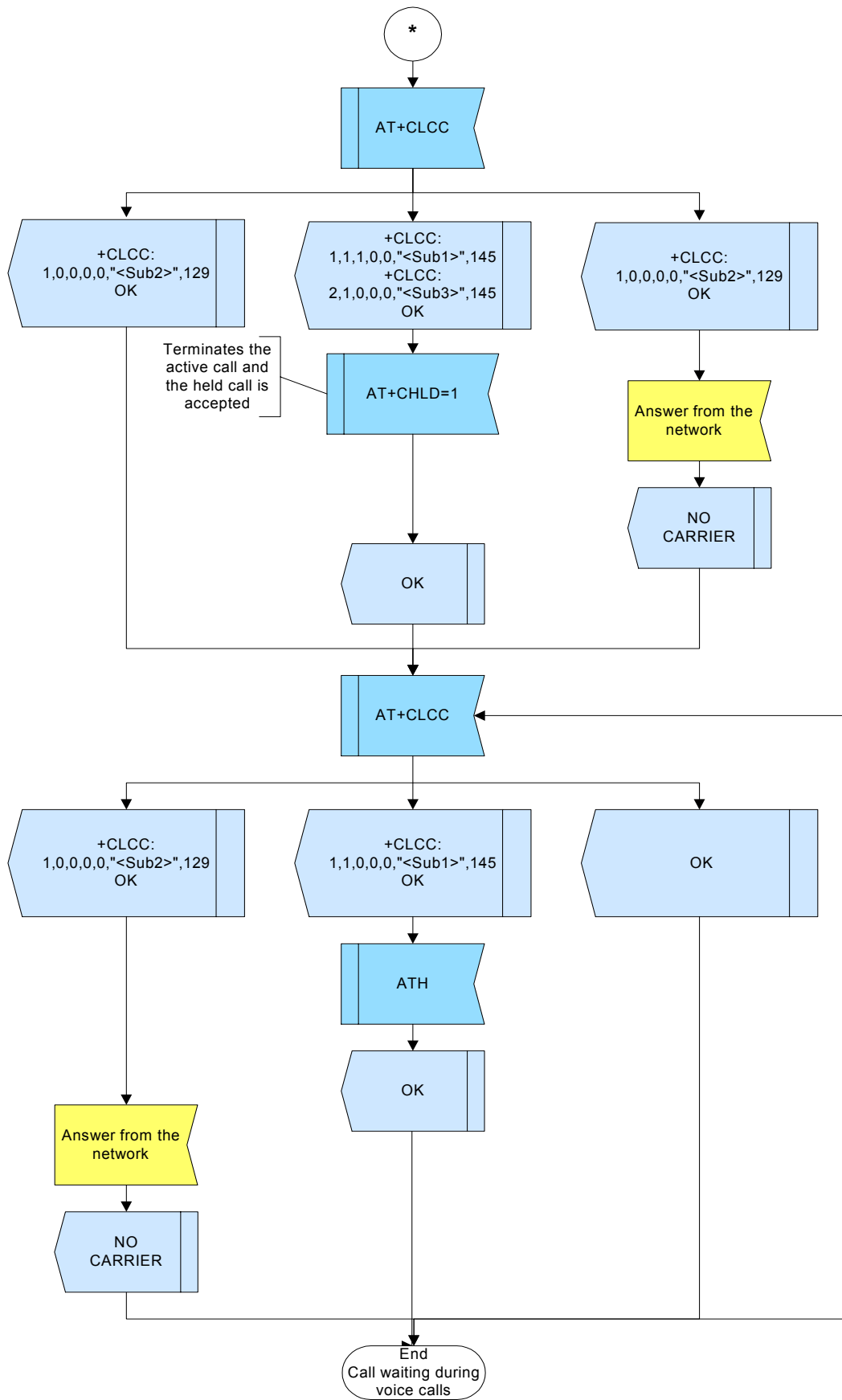


Figure 37: Multiparty - call waiting during voice calls- part 2

#### 2.7.3.2.4 Hints

- Only a voice call can be put on hold in order to accept a waiting voice, data or fax call. In case of a data call you can only terminate this data call and accept the waiting call.
- A data or fax call cannot be put on hold.

GCF-CC note: \*# sequences the user enters on the keypad shall be transmitted over the AT interface without any conversion. Also, GCF test cases require that \*# sequences can be entered during a call.

#### 2.7.3.2.5 Example

\*\*\*\*\*

Comment: Multiparty Call waiting during voice calls

\*\*\*\*\*

\*\*\*\*\*

Comment: Establish voice call Sub1-->Sub2

\*\*\*\*\*

Subscr 1    Send: atd<Sub2>;

\*\*\*\*\*

Comment: Sub2: waiting for CRING

\*\*\*\*\*

Subscr 1    Receive: atd<Sub2>;

Subscr 2    Receive:

Subscr 2    Receive: +CRING: VOICE

\*\*\*\*\*

Comment: Sub2: accept waiting call of Sub1

\*\*\*\*\*

Subscr 2    Send: ATA

Subscr 2    Receive: ATA

Subscr 2    Receive: OK

Subscr 1    Receive:

Subscr 1    Receive: OK

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1    Send: at+clcc

Subscr 1    Receive: at+clcc

Subscr 1    Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129

Subscr 1    Receive:

Subscr 1    Receive: OK

\*\*\*\*\*

Comment: 2nd call Sub3-->Sub2

\*\*\*\*\*

Subscr 3    Send: atd<Sub2>;

Subscr 3    Receive: atd<Sub2>;

Subscr 2    Receive:

Subscr 2    Receive: +CCWA: "<Sub3>",145,1,,0

\*\*\*\*\*

Comment: 2nd call accepted by Sub2, Sub1 on hold, Sub2 connected with Sub3

\*\*\*\*\*

Subscr 2 Send: at+chld=2  
Subscr 2 Receive: at+chld=2  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1 Send: at+clcc  
Subscr 1 Receive: at+clcc  
Subscr 1 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 2 Send: at+clcc  
Subscr 2 Receive: at+clcc  
Subscr 2 Receive: +CLCC: 1,1,1,0,0,"<Sub1>",145  
Subscr 2 Receive: +CLCC: 2,1,0,0,0,"<Sub3>",145  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 3 Send: at+clcc  
Subscr 3 Receive: at+clcc  
Subscr 3 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Sub2 disconnects active connection to Sub3, connection to Sub1 re-activated

\*\*\*\*\*

Subscr 2 Send: at+chld=1  
Subscr 3 Receive:  
Subscr 3 Receive: NO CARRIER  
Subscr 2 Receive: at+chld=1  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1 Send: at+clcc  
Subscr 1 Receive: at+clcc  
Subscr 1 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 2 Send: at+clcc  
Subscr 2 Receive: at+clcc  
Subscr 2 Receive: +CLCC: 1,1,0,0,0,"<Sub1>",145  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 3 Send: at+clcc  
Subscr 3 Receive: at+clcc  
Subscr 3 Receive: OK

\*\*\*\*\*

---

Comment: Sub2 disconnects the last active connection to Sub1

\*\*\*\*\*

Subscr 2    Send: ATH  
Subscr 2    Receive: ATH  
Subscr 2    Receive: OK  
Subscr 1    Receive:  
Subscr 1    Receive: NO CARRIER

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1    Send: at+clcc  
Subscr 1    Receive: at+clcc  
Subscr 1    Receive: OK  
Subscr 2    Send: at+clcc  
Subscr 2    Receive: at+clcc  
Subscr 2    Receive: OK  
Subscr 3    Send: at+clcc  
Subscr 3    Receive: at+clcc  
Subscr 3    Receive: OK

### **2.7.3.3    Multiparty – conference call**

#### **2.7.3.3.1    Description**

This chapter describes all the steps needed to use the Multiparty supplementary services call waiting and call hold for a conference call.

At least three subscribers are involved. At first two subscribers (1 and 2) are connected.

There are two ways to establish a conference call:

- Subscriber 2 puts subscriber 1 on hold while he is establishing an additional call. Afterwards the held call will be connected to the active call in order to establish a conference call.
- If during an active call an additional call comes in, the active call has to be put on hold, the waiting call is accepted and afterwards the held call has to be added to the active call.

#### **2.7.3.3.2    Used AT commands**

ATA	-	Answer a call
ATD	-	Mobile originated call to dial a number
AT+CHLD	-	Call hold and multiparty
AT+CLCC	-	Returns a list of current calls

For further details about the commands see [2].

### 2.7.3.3.3 Flow chart

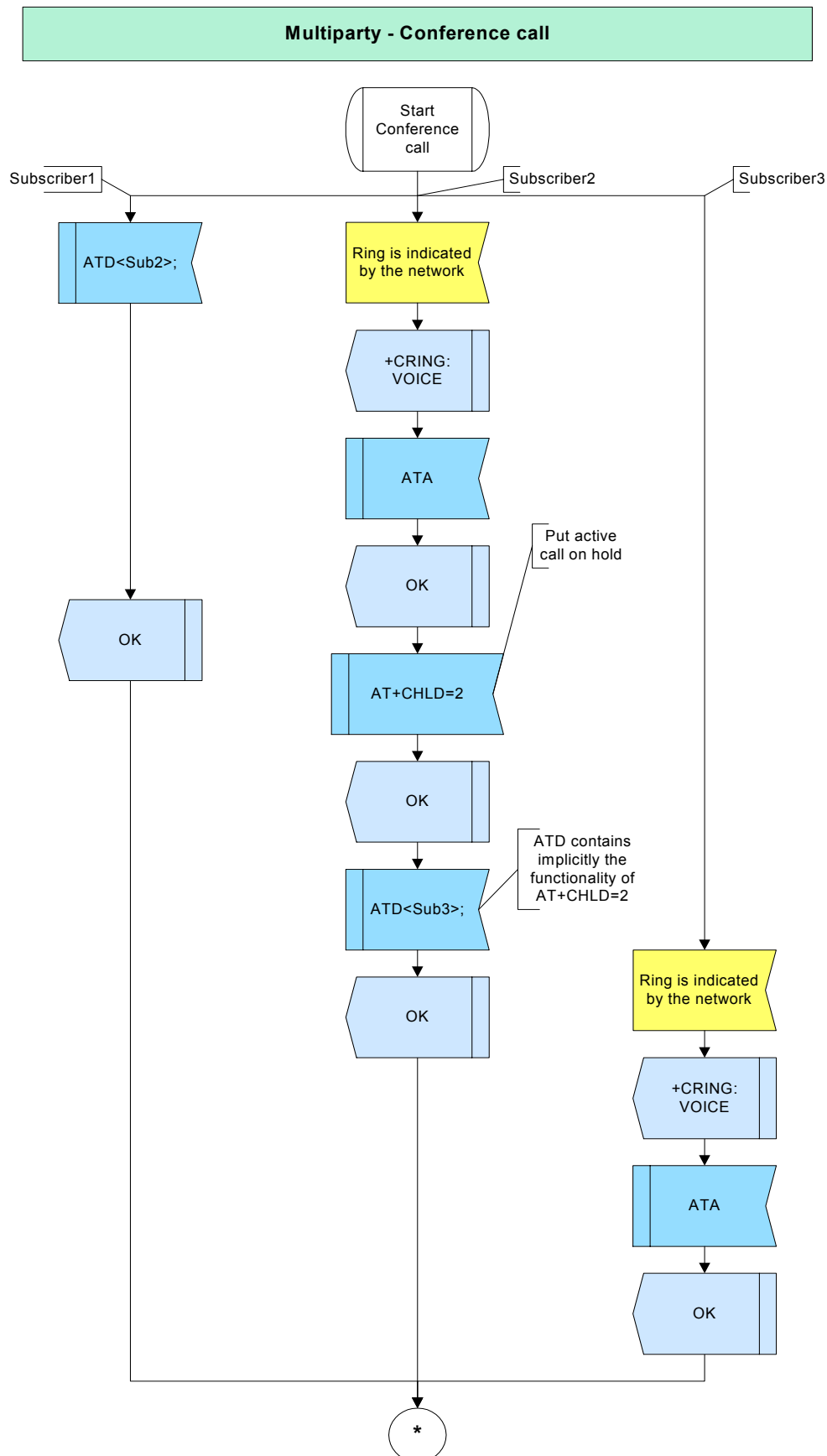


Figure 38: Multiparty - conference call - part 1



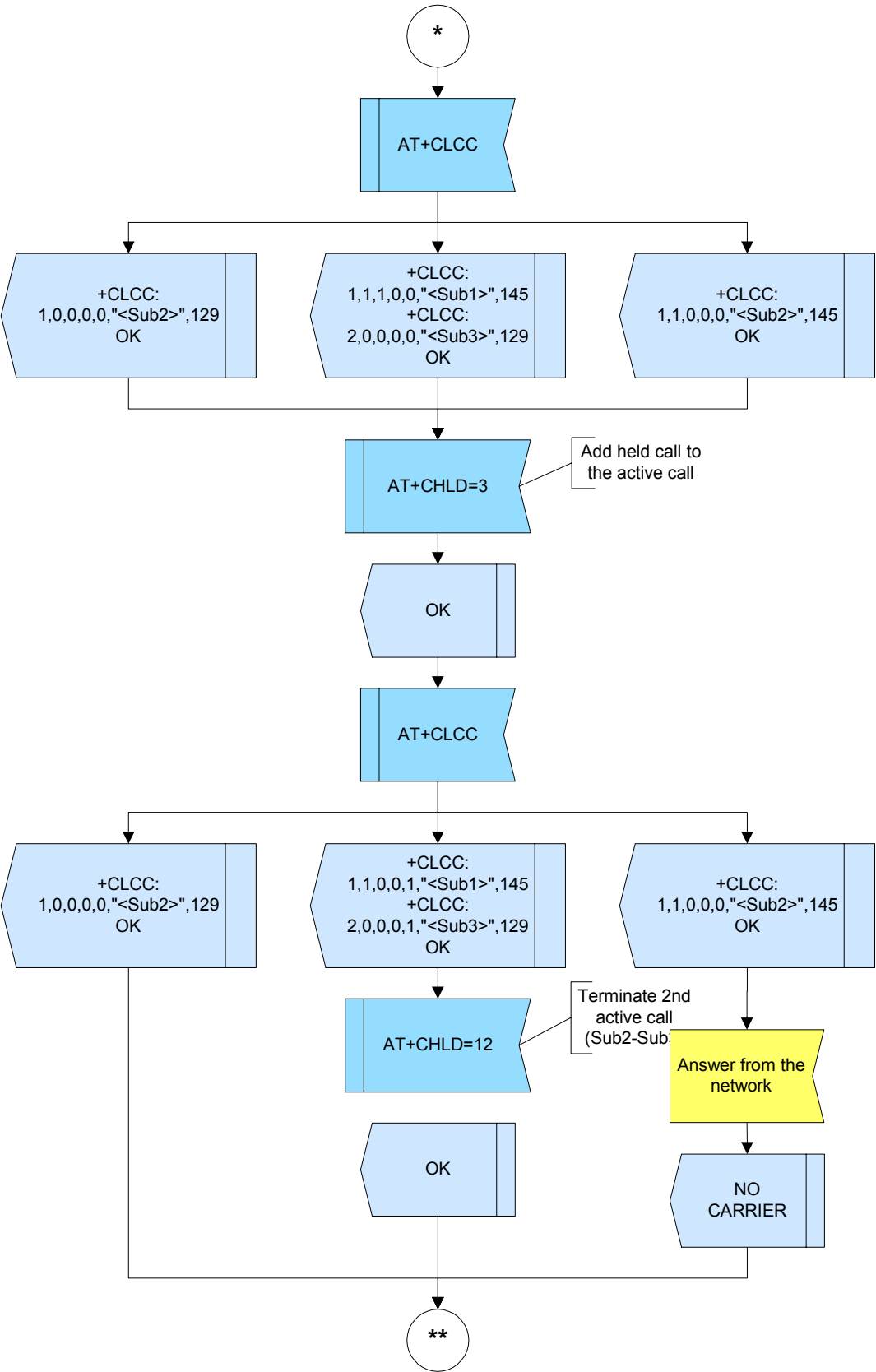


Figure 39: Multiparty - conference call - part 2

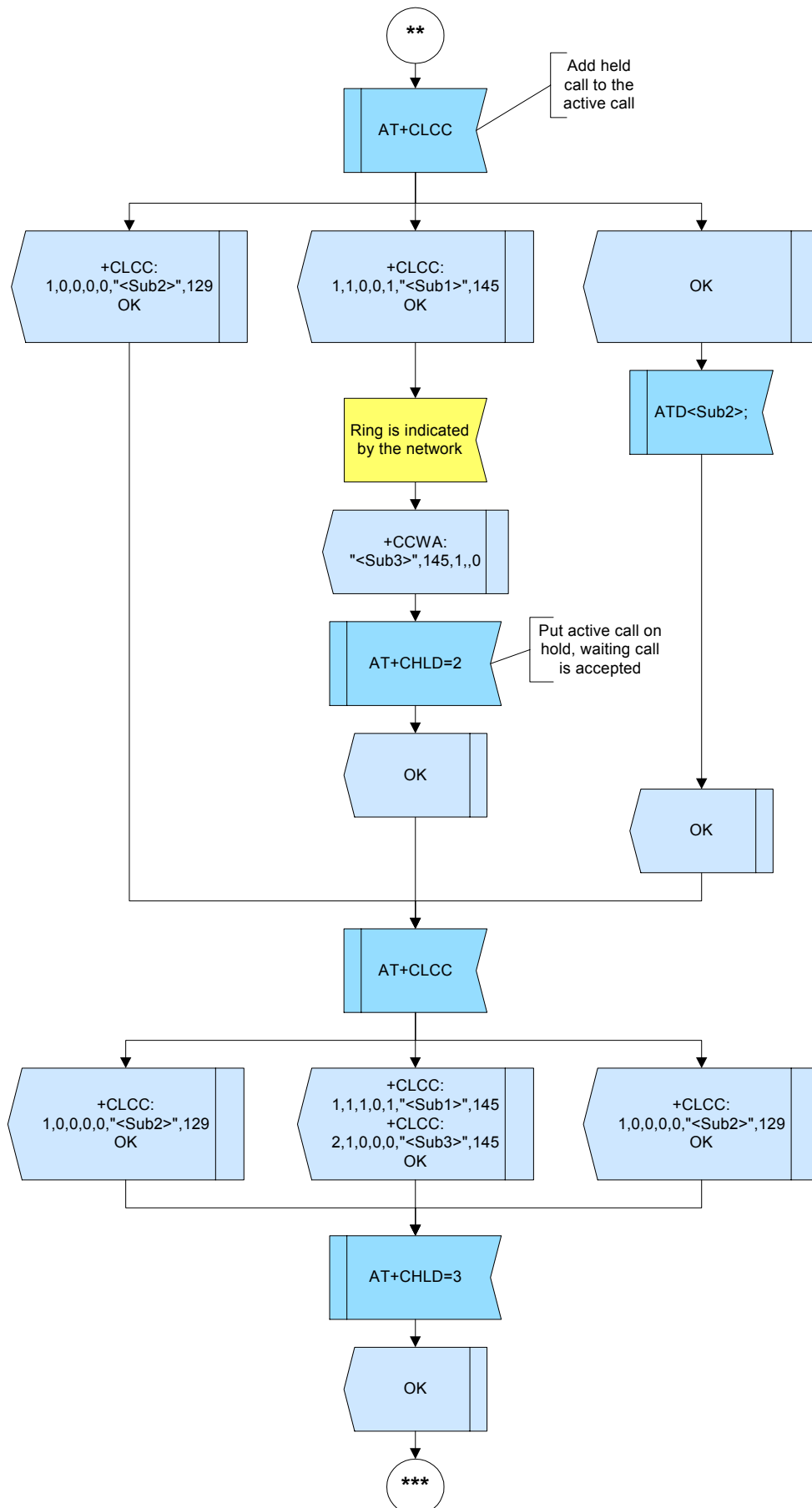


Figure 40: Multiparty - conference call - part 3

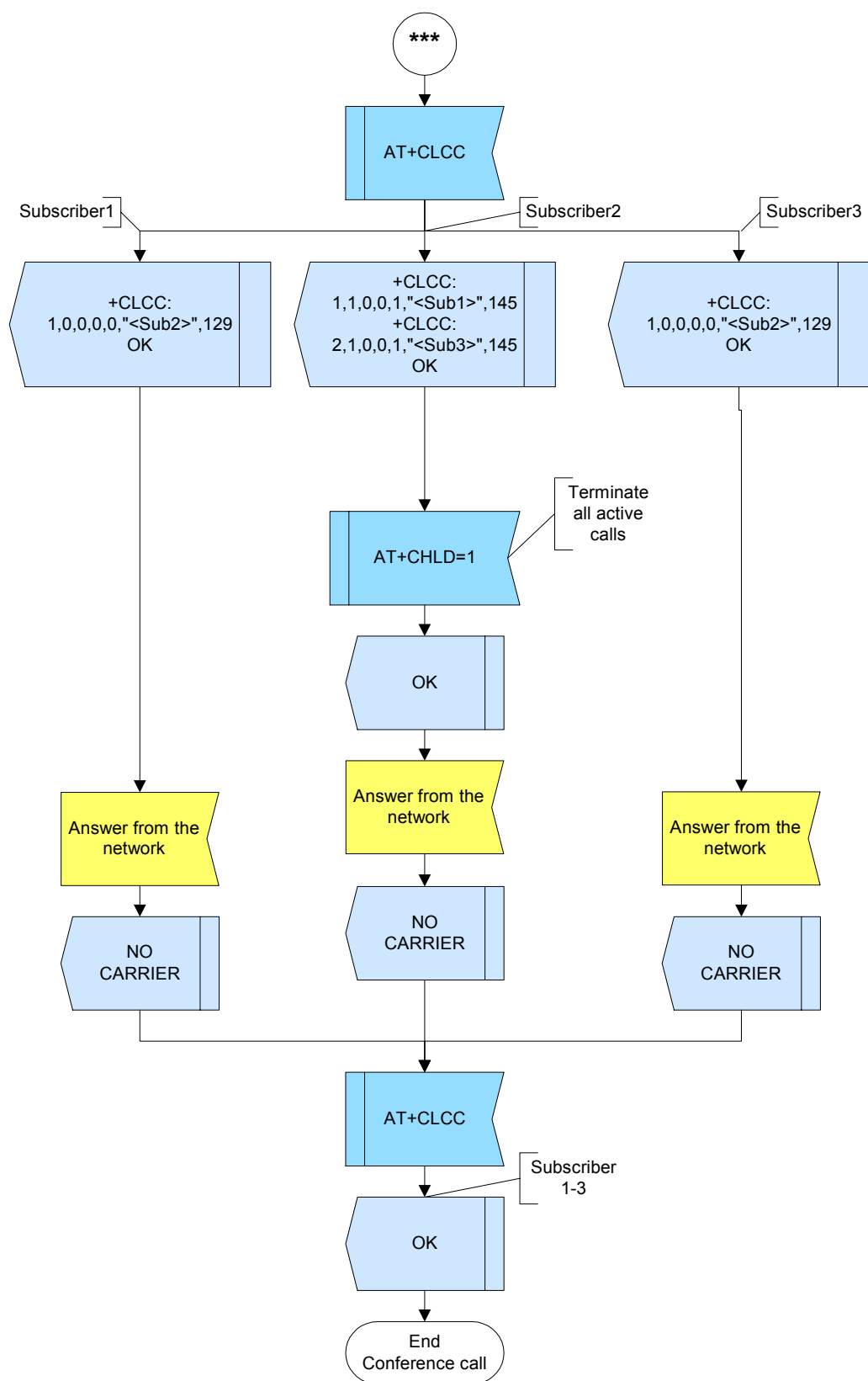


Figure 41- Multiparty - conference call - part 4

#### 2.7.3.3.4 Hints

- When a subscriber disconnects from a 3-party conference call, the related entry is cleared from the list of current calls provided with AT+CLCC. Yet, the multiparty parameter <mpty> of the other two subscribers will not be updated in the list. This means, although the status of the call has changed to a simple 2-party call, the value of <mpty> remains 1 (multiparty) instead of being reset to 0 (no multiparty).
- If you try to add a party to a conference call, and the call is answered by the mailbox, you are advised to disconnect the call with AT+CHLD=1X. Otherwise, in extreme cases, the conference call might be recorded until the mailbox automatically disconnects the call.

GCF-CC note: \*# sequences the user enters on the keypad shall be transmitted over the AT interface without any conversion. Also, GCF test cases require that \*# sequences can be entered during a call.

#### 2.7.3.3.5 Example

```
*****
Comment: Multiparty conference call
*****
*****
Comment: Establish voice call Sub1-->Sub2
*****

Subscr 1   Send: ATD<Sub2>;

*****

Comment: Sub2: waiting for CRING
*****

Subscr 1   Receive: ATD<Sub2>;
Subscr 2   Receive:
Subscr 2   Receive: +CRING: VOICE

*****

Comment: Sub2: accept waiting call of Sub1
*****

Subscr 2   Send: ATA
Subscr 2   Receive: ATA
Subscr 2   Receive: OK
Subscr 1   Receive:
Subscr 1   Receive: OK

*****

Comment: Put active call on hold
*****

Subscr 2   Send: AT+CHLD=2
Subscr 2   Receive: AT+CHLD=2
Subscr 2   Receive: OK

*****

Comment: Establish voice call Sub2-->Sub3
*****

Subscr 2   Send: ATD<Sub3>;
```

\*\*\*\*\*

Comment: Sub3: waiting for CRING

\*\*\*\*\*

Subscr 2 Receive: ATD<Sub3>;  
Subscr 2 Receive: OK  
Subscr 3 Receive:  
Subscr 3 Receive: +CRING: VOICE

\*\*\*\*\*

Comment: Sub3: accept waiting call of Sub2

\*\*\*\*\*

Subscr 3 Send: ATA  
Subscr 3 Receive: ATA  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1 Send: AT+CLCC  
Subscr 1 Receive: AT+CLCC  
Subscr 1 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 2 Send: AT+CLCC  
Subscr 2 Receive: AT+CLCC  
Subscr 2 Receive: +CLCC: 1,1,1,0,0,"<Sub1>",145  
Subscr 2 Receive: +CLCC: 2,0,0,0,0,"<Sub3>",129  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 3 Send: AT+CLCC  
Subscr 3 Receive: AT+CLCC  
Subscr 3 Receive: +CLCC: 1,1,0,0,0,"<Sub2>",145  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Add the held call to the active call

\*\*\*\*\*

Subscr 2 Send: AT+CHLD=3  
Subscr 2 Receive: AT+CHLD=3  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1 Send: AT+CLCC  
Subscr 1 Receive: AT+CLCC  
Subscr 1 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 2 Send: AT+CLCC  
Subscr 2 Receive: AT+CLCC  
Subscr 2 Receive: +CLCC: 1,1,0,0,1,"<Sub1>",145

Subscr 2 Receive: +CLCC: 2,0,0,0,1,"<Sub3>",129  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 3 Send: AT+CLCC  
Subscr 3 Receive: AT+CLCC  
Subscr 3 Receive: +CLCC: 1,1,0,0,0,"<Sub2>",145  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Terminate the active call no. 2 (Sub2 - Sub3)

\*\*\*\*\*

Subscr 2 Send: AT+CHLD=12  
Subscr 2 Receive: AT+CHLD=12  
Subscr 2 Receive: OK  
Subscr 3 Receive:  
Subscr 3 Receive: NO CARRIER

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1 Send: AT+CLCC  
Subscr 1 Receive: AT+CLCC  
Subscr 1 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 2 Send: AT+CLCC  
Subscr 2 Receive: AT+CLCC  
Subscr 2 Receive: +CLCC: 1,1,0,0,1,"<Sub1>",145  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 3 Send: AT+CLCC  
Subscr 3 Receive: AT+CLCC  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Incoming voice call Sub3-->Sub2

\*\*\*\*\*

Subscr 3 Send: ATD<Sub2>;  
Subscr 3 Receive: ATD<Sub2>;  
Subscr 2 Receive:  
Subscr 2 Receive: +CCWA: "<Sub3>",145,1,,0

\*\*\*\*\*

Comment: 2nd call accepted by Sub2, Sub1 on hold, Sub2 connected with Sub3

\*\*\*\*\*

Subscr 2 Send: AT+CHLD=2  
Subscr 2 Receive: AT+CHLD=2  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1 Send: AT+CLCC  
Subscr 1 Receive: AT+CLCC  
Subscr 1 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 2 Send: AT+CLCC  
Subscr 2 Receive: AT+CLCC  
Subscr 2 Receive: +CLCC: 1,1,1,0,1,"<Sub1>",145  
Subscr 2 Receive: +CLCC: 2,1,0,0,0,"<Sub3>",145  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 3 Send: AT+CLCC  
Subscr 3 Receive: AT+CLCC  
Subscr 3 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Add the held call to the active call

\*\*\*\*\*

Subscr 2 Send: AT+CHLD=3  
Subscr 2 Receive: AT+CHLD=3  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1 Send: AT+CLCC  
Subscr 1 Receive: AT+CLCC  
Subscr 1 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 2 Send: AT+CLCC  
Subscr 2 Receive: AT+CLCC  
Subscr 2 Receive: +CLCC: 1,1,0,0,1,"<Sub1>",145  
Subscr 2 Receive: +CLCC: 2,1,0,0,1,"<Sub3>",145  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 3 Send: AT+CLCC  
Subscr 3 Receive: AT+CLCC  
Subscr 3 Receive: +CLCC: 1,0,0,0,0,"<Sub2>",129  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Terminate all active calls

\*\*\*\*\*

Subscr 2 Send: AT+CHLD=1  
Subscr 2 Receive: AT+CHLD=1  
Subscr 2 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: NO CARRIER  
Subscr 1 Receive:  
Subscr 1 Receive: NO CARRIER  
Subscr 3 Receive:

---

Subscr 3 Receive: NO CARRIER

\*\*\*\*\*

Comment: Request list of current calls

\*\*\*\*\*

Subscr 1 Send: AT+CLCC

Subscr 1 Receive: AT+CLCC

Subscr 1 Receive: OK

Subscr 2 Send: AT+CLCC

Subscr 2 Receive: AT+CLCC

Subscr 2 Receive: OK

Subscr 3 Send: AT+CLCC

Subscr 3 Receive: AT+CLCC

Subscr 3 Receive: OK



## **2.7.3.4    Multiparty - call reject**

### **2.7.3.4.1    Description**

This chapter describes all the steps needed to reject a waiting call within the Multiparty supplementary service call waiting and call hold. At least three subscribers are involved.

At first two subscribers are connected. Then, a third subscriber is calling subscriber 2. There are two ways to reject a waiting call, Subscriber 2 can reject the waiting call with

- AT+CHLD=0 (Figure 42) or
- AT+CHLD=1x (Figure 43).

However, if subscriber 2 uses ATH the active call between subscriber 1 and 2 will be disconnected, and the waiting caller (subscriber 3) can be accepted with ATA or rejected with ATH (see normal call handling, example in Figure 50).

### **2.7.3.4.2    Used AT commands**

ATA	-	Answer a call
ATD	-	Mobile originated call to dial a number
AT+CHLD	-	Call hold and multiparty
AT+CLCC	-	Returns a list of current calls

For further details about the commands see [2].

### 2.7.3.4.3 Flowchart

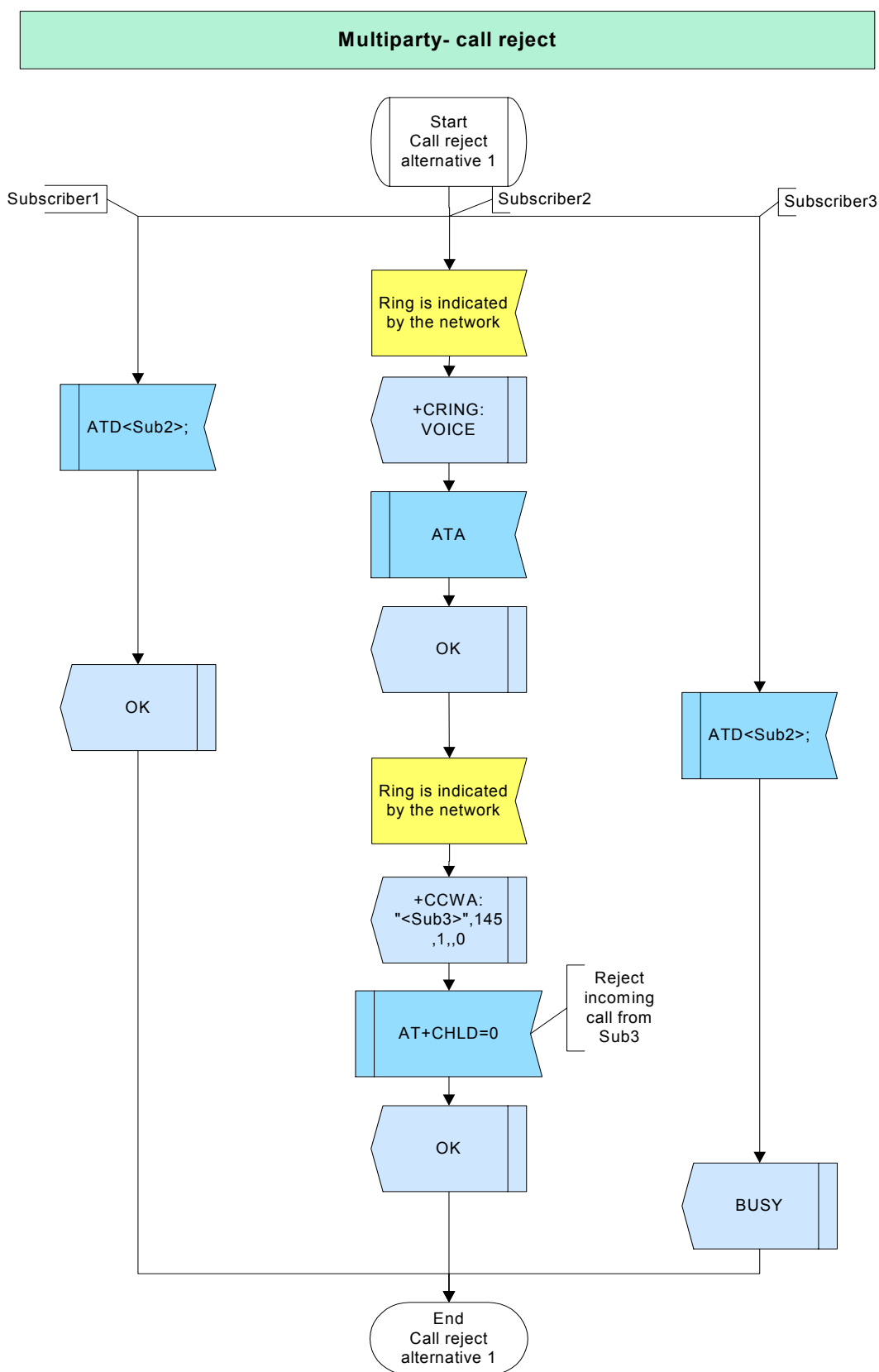


Figure 42: Multiparty - call reject - alternative 1

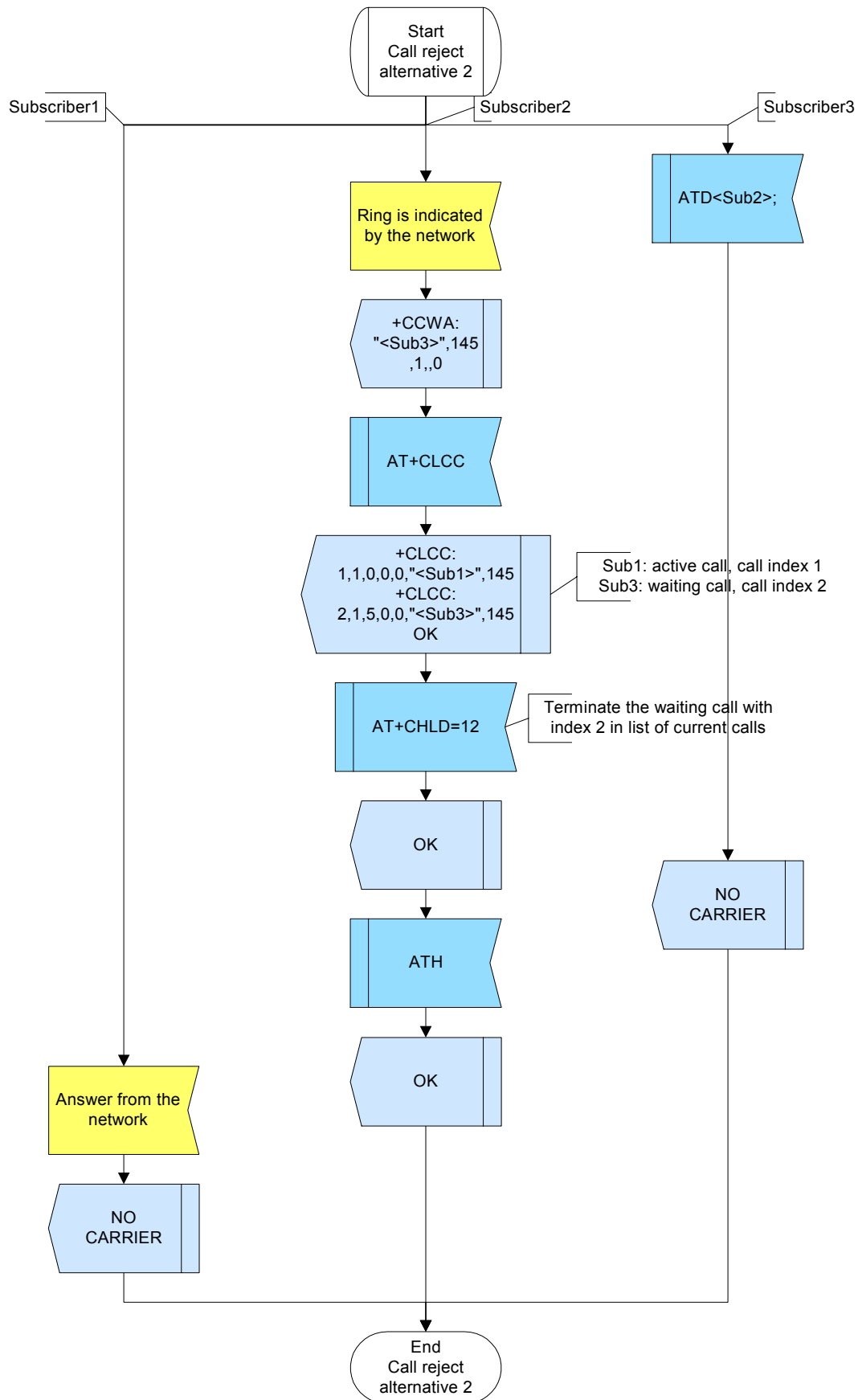


Figure 43: Multiparty - call reject - alternative 2

#### **2.7.3.4.4 Hints**

GCF-CC note: \*# sequences the user enters on the keypad shall be transmitted over the AT interface without any conversion. Also, GCF test cases require that \*# sequences can be entered during a call.

#### **2.7.3.4.5 Example**

##### **Example 1:**

\*\*\*\*\*

Comment: Multiparty - call reject- ATH

\*\*\*\*\*

\*\*\*\*\*

Comment: Establish voice call Sub1-->Sub2

\*\*\*\*\*

Subscr 1 Send: ATD<Sub2>;

\*\*\*\*\*

Comment: Sub2: waiting for CRING

\*\*\*\*\*

Subscr 1 Receive: ATD<Sub2>;

Subscr 2 Receive:

Subscr 2 Receive: +CRING: VOICE

\*\*\*\*\*

Comment: Sub2: accept waiting call of Sub1

\*\*\*\*\*

Subscr 2 Send: ATA

Subscr 2 Receive: ATA

Subscr 2 Receive: OK

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Establish voice call Sub3-->Sub2

\*\*\*\*\*

Subscr 3 Send: ATD<Sub2>;

Subscr 3 Receive: ATD<Sub2>;

Subscr 2 Receive:

Subscr 2 Receive: +CCWA: "<Sub3>",145,1,,0

\*\*\*\*\*

Comment: Terminate the active call

\*\*\*\*\*

Subscr 2 Send: ATH

Subscr 2 Receive: ATH

Subscr 2 Receive: OK

Subscr 2 Receive:

Subscr 2 Receive: +CRING: VOICE

Subscr 1 Receive:

Subscr 1 Receive: NO CARRIER

\*\*\*\*\*

Comment: Waiting call may be the last active call

Comment: Reject the active call

\*\*\*\*\*

Subscr 2 Send: ATH

Subscr 2 Receive: ATH

Subscr 2 Receive: OK

Subscr 3 Receive:

Subscr 3 Receive: NO CARRIER

### Example 2:

\*\*\*\*\*

Comment: Multiparty - call reject- AT+CHLD=0

\*\*\*\*\*

Comment: Establish voice call Sub1-->Sub2

\*\*\*\*\*

Subscr 1 Send: ATD<Sub2>;

\*\*\*\*\*

Comment: Sub2: waiting for CRING

\*\*\*\*\*

Subscr 1 Receive: ATD<Sub2>;

Subscr 2 Receive:

Subscr 2 Receive: +CRING: VOICE

\*\*\*\*\*

Comment: Sub2: accept waiting call of Sub1

\*\*\*\*\*

Subscr 2 Send: ATA

Subscr 2 Receive: ATA

Subscr 2 Receive: OK

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Establish voice call Sub3-->Sub2

\*\*\*\*\*

Subscr 3 Send: ATD<Sub2>;

Subscr 3 Receive: ATD<Sub2>;

Subscr 2 Receive:

Subscr 2 Receive: +CCWA: "<Sub3>",145,1,,0

\*\*\*\*\*

Comment: Set UDUB=user determined user busy, i.e. reject a waiting call

\*\*\*\*\*

Subscr 2 Send: AT+CHLD=0

Subscr 2 Receive: AT+CHLD=0

Subscr 2 Receive: OK

Subscr 3 Receive:

Subscr 3 Receive: BUSY

**Example 3:**

\*\*\*\*\*

Comment: Multiparty - call reject- AT+CHLD=12

\*\*\*\*\*

\*\*\*\*\*

Comment: Establish voice call Sub3-->Sub2

\*\*\*\*\*

Subscr 3 Send: ATD<Sub2>;  
Subscr 3 Receive: ATD<Sub2>;  
Subscr 2 Receive:  
Subscr 2 Receive: +CCWA: "<Sub3>",145,1,,0  
Subscr 2 Send: AT+CLCC  
Subscr 2 Receive: AT+CLCC  
Subscr 2 Receive: +CLCC: 1,1,0,0,0,"<Sub1>",145  
Subscr 2 Receive: +CLCC: 2,1,5,0,0,"<Sub3>",145  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Terminate the call with index 2 (=waiting call)

\*\*\*\*\*

Subscr 2 Send: AT+CHLD=12  
Subscr 2 Receive: AT+CHLD=12  
Subscr 2 Receive: OK  
Subscr 3 Receive:  
Subscr 3 Receive: NO CARRIER

\*\*\*\*\*

Comment: Disconnect the active call

\*\*\*\*\*

Subscr 2 Send: ATH  
Subscr 2 Receive: ATH  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: NO CARRIER

## **2.7.4 Calling line identification presentation (CLIP)**

### **2.7.4.1 Description**

The supplementary service CLIP permits the called subscriber to display the calling line identity (CLI) of the calling party when a call is received.

You can enable and disable the presentation of the CLI by using the command AT+CLIP. If CLIP is enabled, every RING will be followed by an unsolicited result code.

### **2.7.4.2 Used AT commands**

AT+CLIP	-	Calling line identification presentation (CLIP)
ATD*#31#	-	Query status of Calling line identification restriction (CLIR)
ATD*31#	-	Deactivate CLIR= enable presentation
ATD#31#	-	Activate CLIR= disable presentation
ATD	-	Mobile originated call to dial number
ATA	-	Answer call
ATH	-	Disconnect existing connection

For further details about the commands see [2].

### 2.7.4.3 Flow Chart

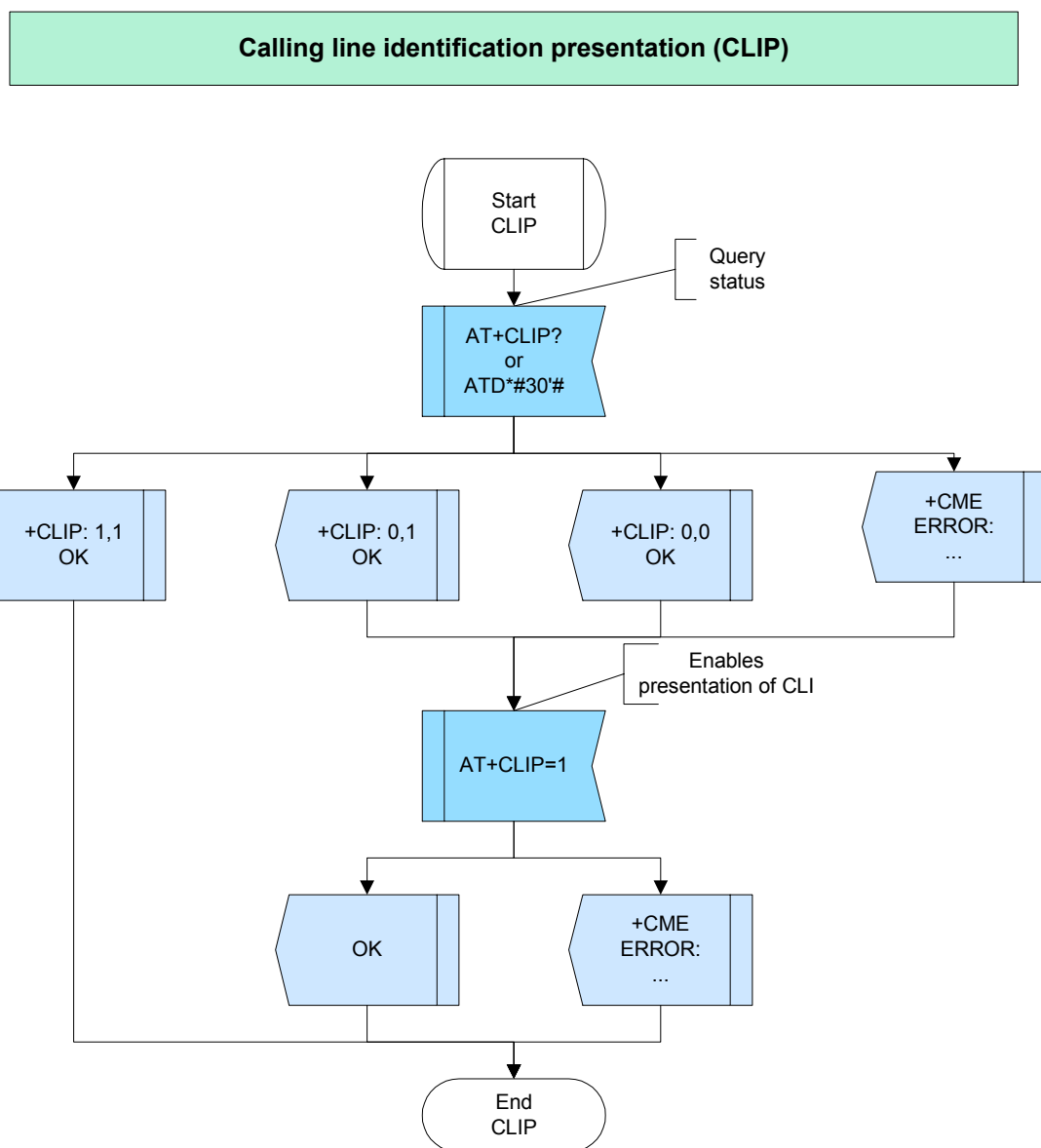


Figure 44: CLIP

### 2.7.4.4 Hints

GCF-CC note: \*# sequences the user enters on the keypad shall be transmitted over the AT interface without any conversion. Also, GCF test cases require that \*# sequences can be entered during a call.



## 2.7.4.5 Example

### Example 1:

\*\*\*\*\*

Comment: Enable calling line identification presentation (CLIP)

\*\*\*\*\*

\*\*\*\*\*

Comment: Query CLIP status of the called subscriber

\*\*\*\*\*

Subscr 1 Send: AT+CLIP?

Subscr 1 Receive: AT+CLIP?

Subscr 1 Receive:

Subscr 1 Receive: +CLIP: 1,1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set parameter to get the calling line identity

\*\*\*\*\*

Subscr 1 Send: AT+CLIP=1

Subscr 1 Receive: AT+CLIP=1

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Query the CLIR status of the calling subscriber

\*\*\*\*\*

Subscr 2 Send: ATD\*#31#;

Subscr 2 Receive: ATD\*#31#;

Subscr 2 Receive:

Subscr 2 Receive: +CLIR: 0,4

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Enable presentation of own phone number to called party and display CLI

\*\*\*\*\*

Subscr 2 Send: ATD\*31#00441522400033;

Subscr 2 Receive: ATD\*31#00441522400033;

Subscr 1 Receive:

Subscr 1 Receive: RING

Subscr 1 Receive:

Subscr 1 Receive: +CLIP: "+441522400080",145,,,0

\*\*\*\*\*

Comment: Answer a call

\*\*\*\*\*

Subscr 1 Send: ATA

Subscr 1 Receive: ATA

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Disconnect existing connection

\*\*\*\*\*

Subscr 1 Send: ATH  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 1 Receive: ATH  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: NO CARRIER

**Example 2:**

\*\*\*\*\*

Comment: Disable calling line identification presentation (CLIP)

\*\*\*\*\*

\*\*\*\*\*

Comment: Query the CLIP status of the called subscriber

\*\*\*\*\*

Subscr 1 Send: AT+CLIP?  
Subscr 1 Receive: AT+CLIP?  
Subscr 1 Receive:  
Subscr 1 Receive: +CLIP: 1,1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set parameter to suppress the calling line identity

\*\*\*\*\*

Subscr 1 Send: AT+CLIP=0  
Subscr 1 Receive: AT+CLIP=0  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable presentation of own phone number to called party

\*\*\*\*\*

Subscr 2 Send: ATD\*31#00441522400033;  
Subscr 2 Receive: ATD\*31#00441522400033;  
Subscr 1 Receive:  
Subscr 1 Receive: RING

\*\*\*\*\*

Comment: Answer a call

\*\*\*\*\*

Subscr 1 Send: ATA  
Subscr 1 Receive: ATA  
Subscr 1 Receive: OK

---

\*\*\*\*\*

Comment: Disconnect existing connection

\*\*\*\*\*

Subscr 1    Send: ATH  
Subscr 2    Receive:  
Subscr 2    Receive: OK  
Subscr 1    Receive: ATH  
Subscr 1    Receive: OK  
Subscr 2    Receive:  
Subscr 2    Receive: NO CARRIER

## **2.7.5 Calling line identification restriction (CLIR)**

### **2.7.5.1 Description**

The supplementary service CLIR permits the calling subscriber to suppress the presentation of his or her own phone number to a called party, when the call is set up.

The command AT+CLIR is not supported in every module. Please refer to [2] for specifications.

The calling subscriber can handle CLIR call by call, using the ATD command and the \*# sequence. The \*# sequence enables or disables the presentation of the calling party's phone number for the next call.

Note that the CLIR function is also network dependent. When the query for the network status returns "+CLIR:0,4", the network supports CLIR. In any case the called subscriber must enable CLIP in order to display the calling party's number.

### **2.7.5.2 Used AT commands**

AT+CLIR	-	Calling line identification restriction (CLIR)
AT+CLIP	-	Calling line identification presentation (CLIP)
ATD*#31#	-	Query status of Calling line identification restriction (CLIR)
ATD*31#	-	Deactivate CLIR= enable presentation
ATD#31#	-	Activate CLIR= disable presentation
ATD	-	Mobile originated call to dial number
ATA	-	Answer call
ATH	-	Disconnect existing connection

For further details about the commands see [2].

2.7.5.3 Flow Chart

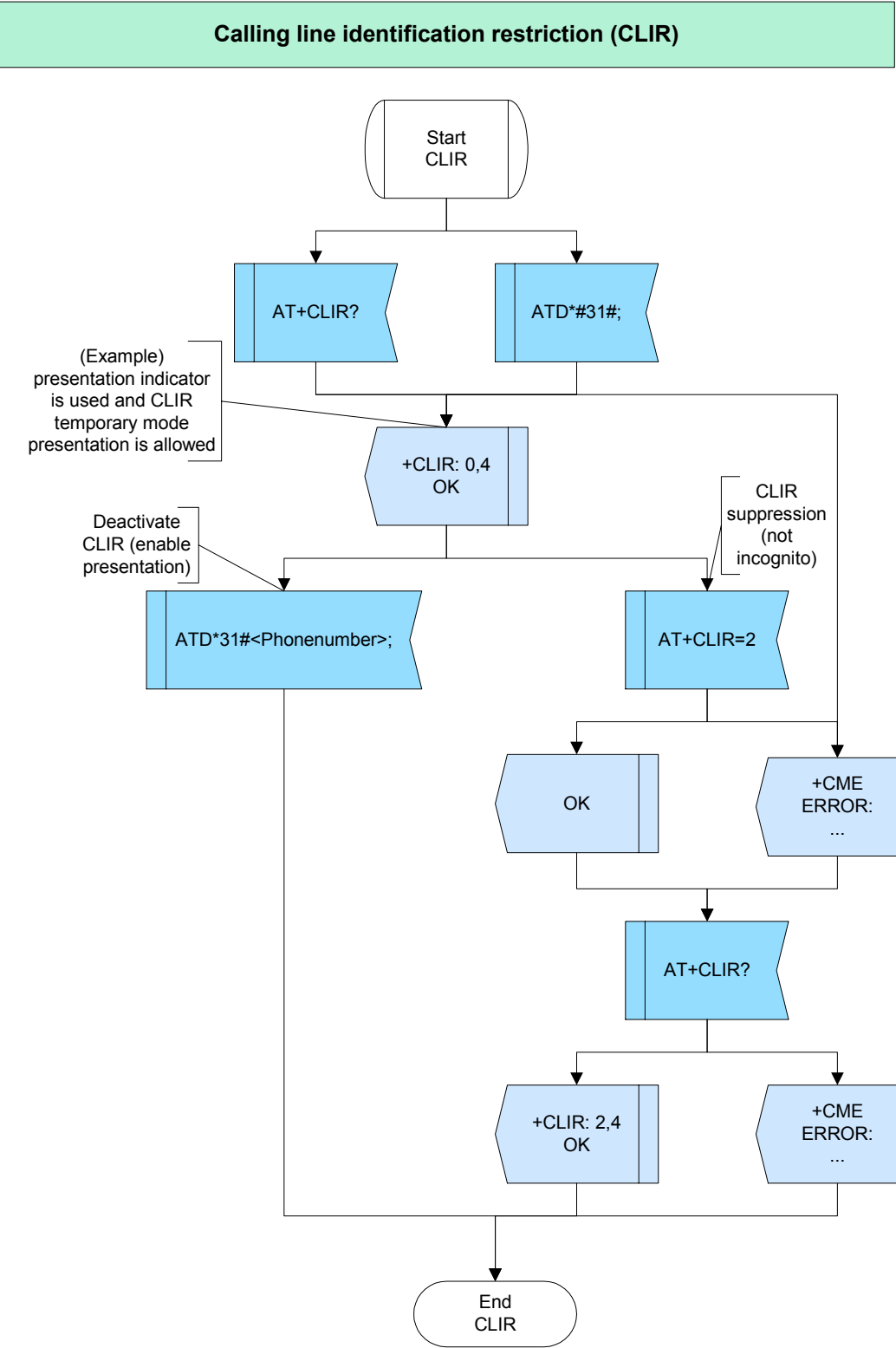


Figure 45: CLIR

#### 2.7.5.4 Hints

- If you want to change the network status of the supplementary service CLIR you must contact your network provider.

GCF-CC note: \*# sequences the user enters on the keypad shall be transmitted over the AT interface without any conversion. Also, GCF test cases require that \*# sequences can be entered during a call.

#### 2.7.5.5 Example

##### Example 1:

\*\*\*\*\*

Comment: CLIR

\*\*\*\*\*

\*\*\*\*\*

Comment: Enable the presentation of the CLI (CLIP - called subscriber)

\*\*\*\*\*

Subscr 2 Send: AT+CLIP=1

Subscr 2 Receive: AT+CLIP=1

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Query the CLIR status (calling subscriber)

\*\*\*\*\*

Subscr 1 Send: AT+CLIR?

Subscr 1 Receive: AT+CLIR?

Subscr 1 Receive:

Subscr 1 Receive: +CLIR: 0,4

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set the CLIR status invocation (incognito)

\*\*\*\*\*

Subscr 1 Send: AT+CLIR=1

Subscr 1 Receive: AT+CLIR=1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Call a phone number

\*\*\*\*\*

Subscr 1 Send: ATD00441522400023;

Subscr 1 Receive: ATD00441522400023;

Subscr 2 Receive:

Subscr 2 Receive: RING

Subscr 2 Receive:

Subscr 2 Receive: +CLIP: "",128,,,1

\*\*\*\*\*

Comment: Answer a call

\*\*\*\*\*

Subscr 2 Send: ATA  
Subscr 2 Receive: ATA  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Disconnect existing connection  
\*\*\*\*\*

Subscr 2 Send: ATH  
Subscr 2 Receive: ATH  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: NO CARRIER

\*\*\*\*\*

Comment: Set the CLIR status invocation (not incognito)  
\*\*\*\*\*

Subscr 1 Send: AT+CLIR=2  
Subscr 1 Receive: AT+CLIR=2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Call a phone number  
\*\*\*\*\*

Subscr 1 Send: ATD00441522400023;  
Subscr 1 Receive: ATD00441522400023;  
Subscr 2 Receive:  
Subscr 2 Receive: RING  
Subscr 2 Receive:  
Subscr 2 Receive: +CLIP: "+441522400033",145,,,0

\*\*\*\*\*

Comment: Answer a call  
\*\*\*\*\*

Subscr 2 Send: ATA  
Subscr 2 Receive: ATA  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Disconnect exsisting connection  
\*\*\*\*\*

Subscr 2 Send: ATH  
Subscr 2 Receive: ATH  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: NO CARRIER

**Example 2:**

\*\*\*\*\*

Comment: Setting CLIR with \*# code when dialing

\*\*\*\*\*

\*\*\*\*\*

Comment: Query the CLIP status of the called subscriber

\*\*\*\*\*

Subscr 1 Send: AT+CLIP?

Subscr 1 Receive: AT+CLIP?

Subscr 1 Receive:

Subscr 1 Receive: +CLIP: 1,1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Query the CLIR status of the calling subscriber

\*\*\*\*\*

Subscr 2 Send: ATD\*#31#;

Subscr 2 Receive: ATD\*#31#;

Subscr 2 Receive:

Subscr 2 Receive: +CLIR: 0,4

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Call a phone number

\*\*\*\*\*

Subscr 2 Send: ATD\*31#00441522400033;

Subscr 2 Receive: ATD\*31#00441522400033;

Subscr 1 Receive:

Subscr 1 Receive: RING

Subscr 1 Receive:

Subscr 1 Receive: +CLIP: "+441522400080",145,,,0

\*\*\*\*\*

Comment: Answer a call

\*\*\*\*\*

Subscr 1 Send: ATA

Subscr 1 Receive: ATA

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Disconnect existing connection

\*\*\*\*\*

Subscr 1 Send: ATH

Subscr 2 Receive:

Subscr 2 Receive: OK

Subscr 1 Receive: ATH

Subscr 1 Receive: OK

Subscr 2 Receive:

Subscr 2 Receive: NO CARRIER

**Example 3:**

\*\*\*\*\*

Comment: Suppressing CLIR with \*# code when dialing



\*\*\*\*\*

\*\*\*\*\*

Comment: Query the CLIP status of the called subscriber

\*\*\*\*\*

Subscr 1 Send: AT+CLIP?  
Subscr 1 Receive: AT+CLIP?  
Subscr 1 Receive:  
Subscr 1 Receive: +CLIP: 1,1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Query the CLIR status of the calling subscriber

\*\*\*\*\*

Subscr 2 Send: ATD\*#31#;  
Subscr 2 Receive: ATD\*#31#;  
Subscr 2 Receive:  
Subscr 2 Receive: +CLIR: 0,4  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Suppress presentation of own phone number to called party

\*\*\*\*\*

Subscr 2 Send: ATD#31#00441522400033;  
Subscr 2 Receive: ATD#31#00441522400033;  
Subscr 1 Receive:  
Subscr 1 Receive: RING  
Subscr 1 Receive:  
Subscr 1 Receive: +CLIP: "",128,,,1

\*\*\*\*\*

Comment: Answer a call

\*\*\*\*\*

Subscr 1 Send: ATA  
Subscr 1 Receive: ATA  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Disconnect existing connection

\*\*\*\*\*

Subscr 1 Send: ATH  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 1 Receive: ATH  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: NO CARRIER

2.8 Voice call handling

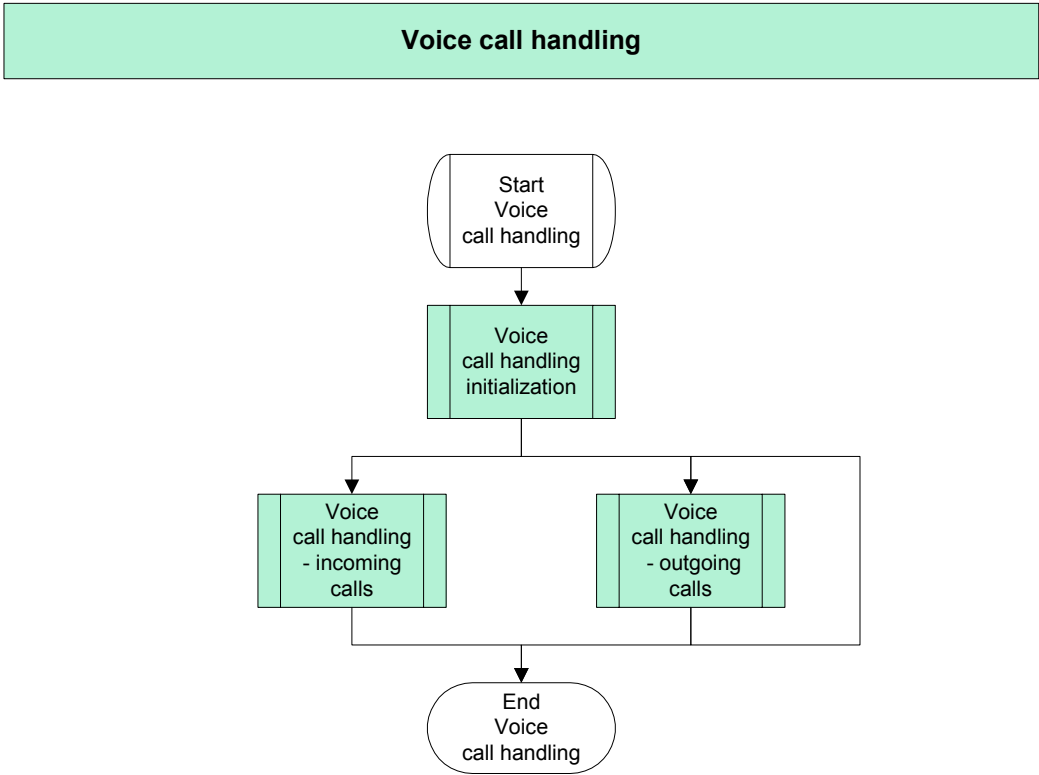


Figure 46: Voice call handling

## **2.8.1 Voice call handling initialization**

### **2.8.1.1 Description**

This chapter describes basic settings recommended to handle mobile originated and mobile terminated voice calls:

- The command AT+CSNS enables the ME to accept incoming calls when no bearer capability information is provided with the call. The setting must be set before the call is received. For voice calls the default setting AT+CSNS=0 can be kept.
- The AT^SM20 command specifies two call setup response modes, i.e. two different modes of responses returned when dialing voice call numbers with ATD:  
AT^SM20=1 (factory default) causes the ME to respond once the call setup is completed either successfully ("OK") or unsuccessfully ("NO CARRIER", "NO DIAL TONE", "BUSY").  
AT^SM20=0 causes the ME to return "OK" immediately after dialing was completed (i.e. before call setup terminates successfully or unsuccessfully).
- The ATX command specifies different result code formats and enables / disables the presentation of dial tones and busy signals during call setup. The setting can be stored to the user profile using AT&W.
- Use AT+CRC to enable or disable the extended format of result codes for incoming call indication. In the case of voice calls AT+CRC=1 can be used to replace the factory default result code "RING" with the extended format "+CRING VOICE".
- Depending on the type of Siemens module, autoanswer mode (ATS0≠000) is also supported for voice calls. If supported, this is explicitly stated in [2], chapter ATS0.

### **2.8.1.2 Used AT commands**

AT+CSNS	-	Single numbering scheme
AT^SM20	-	Set M20 Compatibility
ATX	-	Set CONNECT result code format and call monitoring
AT&W	-	Store current configuration to user defined profile
ATS0	-	Set number of rings before automatically answering the call (not supported by all products)

For further details about the commands see [2].

### 2.8.1.3 Flow chart

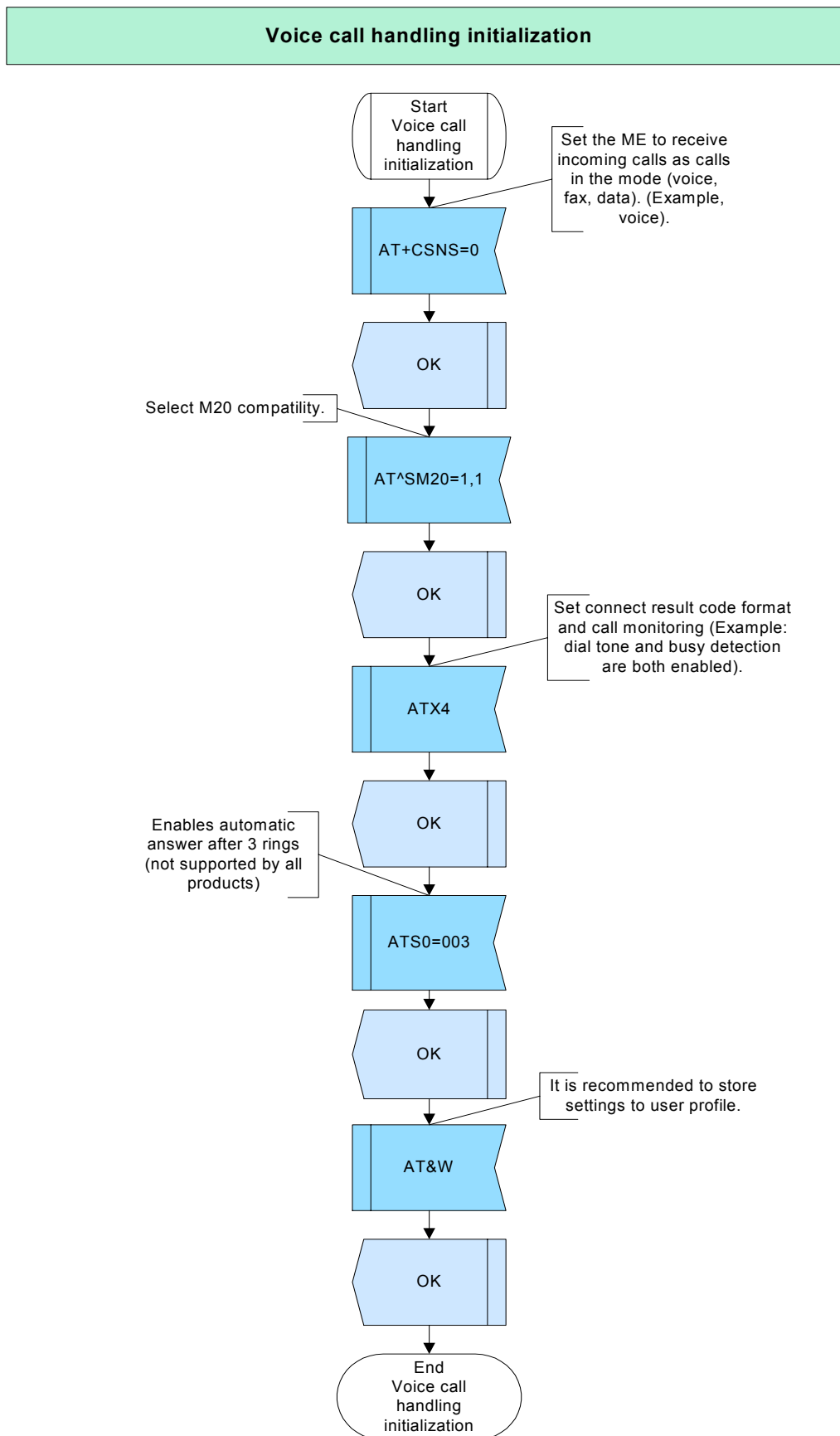


Figure 47: Voice call handling initialization

#### 2.8.1.4 Hints

- Out of the AT commands listed in this chapter only ATX can be stored with AT&W.

#### 2.8.1.5 Example

\*\*\*\*\*

Comment: Voice call handling initialization

\*\*\*\*\*

\*\*\*\*\*

Comment: Set single numbering scheme to receive all calls without bearer elements as voice calls.

\*\*\*\*\*

Subscr 1 Send: AT+CSNS=0

Subscr 1 Receive: AT+CSNS=0

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set compatibility to SM20.

\*\*\*\*\*

Subscr 1 Send: AT^SM20=1,1

Subscr 1 Receive: AT^SM20=1,1

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable dial tone and busy detection.

\*\*\*\*\*

Subscr 1 Send: ATX4

Subscr 1 Receive: ATX4

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable automatic answer after 3 rings (Autoanswer mode for voice calls is not supported by all products)

\*\*\*\*\*

Subscr 1 Send: ATSO=003

Subscr 1 Receive: ATSO=003

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Store settings to user profile.

\*\*\*\*\*

Subscr 1 Send: AT&W

Subscr 1 Receive: AT&W

Subscr 1 Receive: OK

## **2.8.2 Voice call handling – incoming calls**

### **2.8.2.1 Description**

This chapter describes all AT commands you need to handle an incoming voice call.

By default, an incoming call is indicated by the URC RING. With AT+CRC=1, the extended format of ring indication "+CRING: VOICE" can be enabled.

A mobile terminated call can be answered with ATA or rejected with ATH or AT+CHUP. To hang up an existing call you can also use ATH or AT+CHUP. The result code "NO CARRIER" indicates that an existing call was disconnected or hung up by the other party. To check the reason of call release you can use the command AT+CEER.

### **2.8.2.2 Used AT commands**

ATA	-	Answer a call
ATH	-	Disconnect existing connection
AT+CHUP	-	Hang up call
AT+CEER	-	Extended error report

For further details about the commands see [2].

### 2.8.2.3 Flow chart

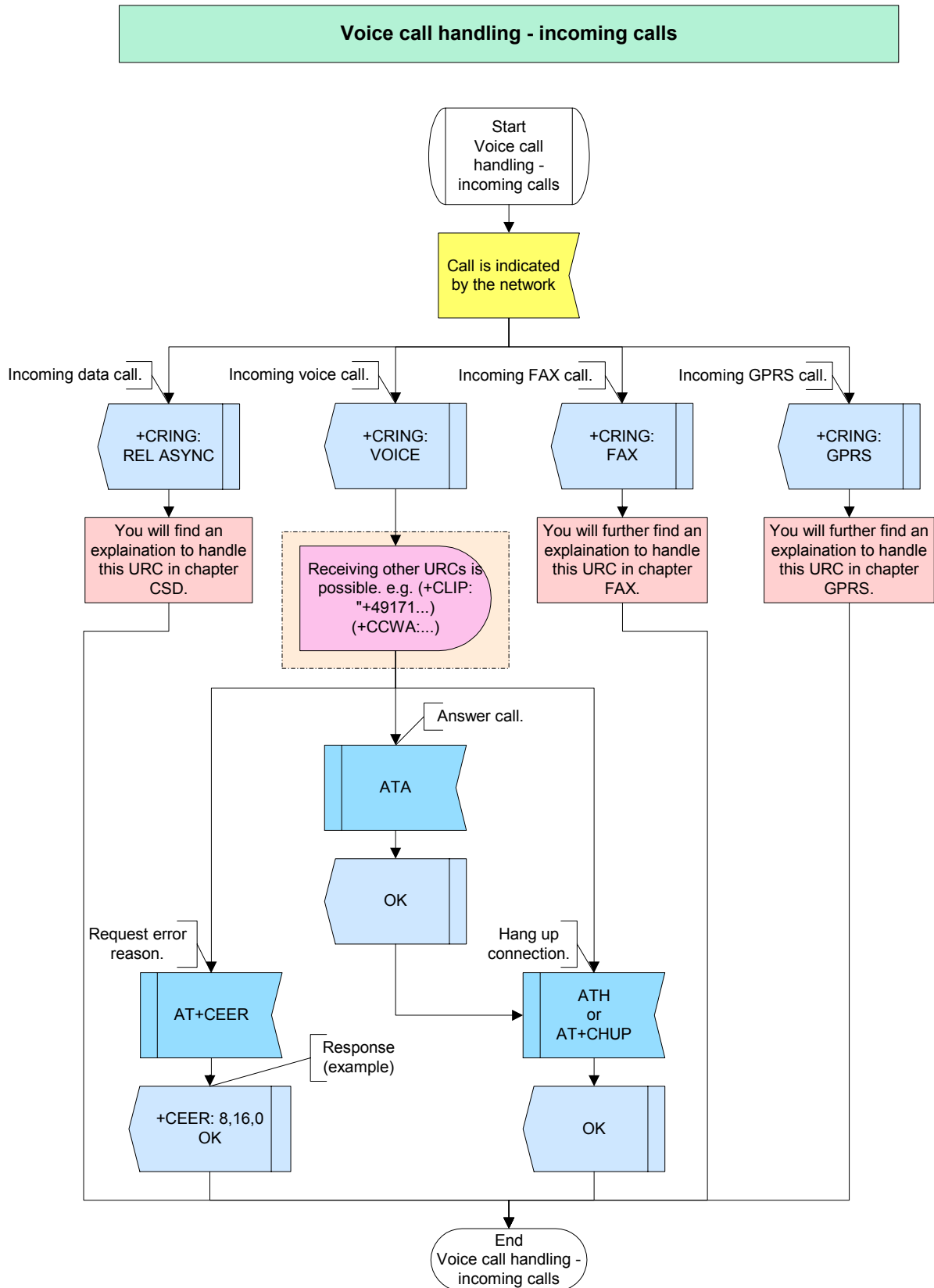


Figure 48: Voice call handling - incoming calls

#### **2.8.2.4 Hints**

Not applicable.

#### **2.8.2.5 Example**

##### **Example 1:**

\*\*\*\*\*

Comment: Voice call handling - incoming call – reject

\*\*\*\*\*

\*\*\*\*\*

Comment: Subscriber 2 makes a voice call to subscriber 1

\*\*\*\*\*

Subscr 2 Send: ATD2400058;  
Subscr 2 Receive: ATD2400058;  
Subscr 1 Receive:  
Subscr 1 Receive: +CRING: VOICE

\*\*\*\*\*

Comment: Subscriber 1 rejects the incoming voice call.

\*\*\*\*\*

Subscr 1 Send: AT+CHUP  
Subscr 1 Receive: AT+CHUP  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: NO CARRIER

##### **Example 2:**

\*\*\*\*\*

Comment: Voice call handling - incoming call - answer call 1

\*\*\*\*\*

\*\*\*\*\*

Comment: Subscriber 2 makes voice call to subscriber 1.

\*\*\*\*\*

Subscr 2 Send: ATD2400058;  
Subscr 2 Receive: ATD2400058;  
Subscr 1 Receive:  
Subscr 1 Receive: +CRING: VOICE

\*\*\*\*\*

Comment: Subscriber 1 answers the incoming voice call.

\*\*\*\*\*

Subscr 1 Send: ATA  
Subscr 1 Receive: ATA  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: OK



\*\*\*\*\*

Comment: Subscriber 2 hangs up the connection.

\*\*\*\*\*

Subscr 2 Send: ATH  
Subscr 2 Receive: ATH  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: NO CARRIER

\*\*\*\*\*

Comment: Subscriber 1 requests the cause of call release, in this case reason for NO CARRIER.

\*\*\*\*\*

Subscr 1 Send: AT+CEER  
Subscr 1 Receive: AT+CEER  
Subscr 1 Receive: +CEER: 8,16,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

### Example 3:

\*\*\*\*\*

Comment: Voice call handling - incoming call - answer call 2

\*\*\*\*\*

\*\*\*\*\*

Comment: Subscriber 2 makes voice call to subscriber 1.

\*\*\*\*\*

Subscr 2 Send: ATD2400058;  
Subscr 2 Receive: ATD2400058;  
Subscr 1 Receive:  
Subscr 1 Receive: +CRING: VOICE

\*\*\*\*\*

Comment: Subscriber 1 answers the incoming voice call.

\*\*\*\*\*

Subscr 1 Send: ATA  
Subscr 1 Receive: ATA  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Subscriber 1 hangs up the connection.

\*\*\*\*\*

Subscr 1 Send: ATH  
Subscr 1 Receive: ATH  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: NO CARRIER

## **2.8.3 Voice call handling – outgoing calls**

### **2.8.3.1 Description**

To make a mobile originated voice call use the commands ATD, ATD>mem, ATD>n, ATD>str, ATDL or ATDI. Remember that for voice calls the semicolon “;” must be appended after the destination number. Otherwise the call would be interpreted as a CSD call.

When dialing with one of the ATD commands the following responses can be returned:

- OK
- NO CARRIER
- BUSY
- NO DIALTONE
- Call barred

To hang up a call the command ATH or AT+CHUP can be used either by the caller or by the called party. The result code “NO CARRIER” indicates that an existing call was disconnected or hung up by the other party.

No matter whether the call attempt was successful or not you can use the command AT+CEER to request the cause of call release.

### **2.8.3.2 Used AT commands**

ATD	-	Mobile originated call to dial a number
AT+CEER	-	Extended error report
ATH	-	Disconnect existing connection
AT+CHUP	-	Hang up call

For further details about the commands see [2].

2.8.3.3 Flow chart

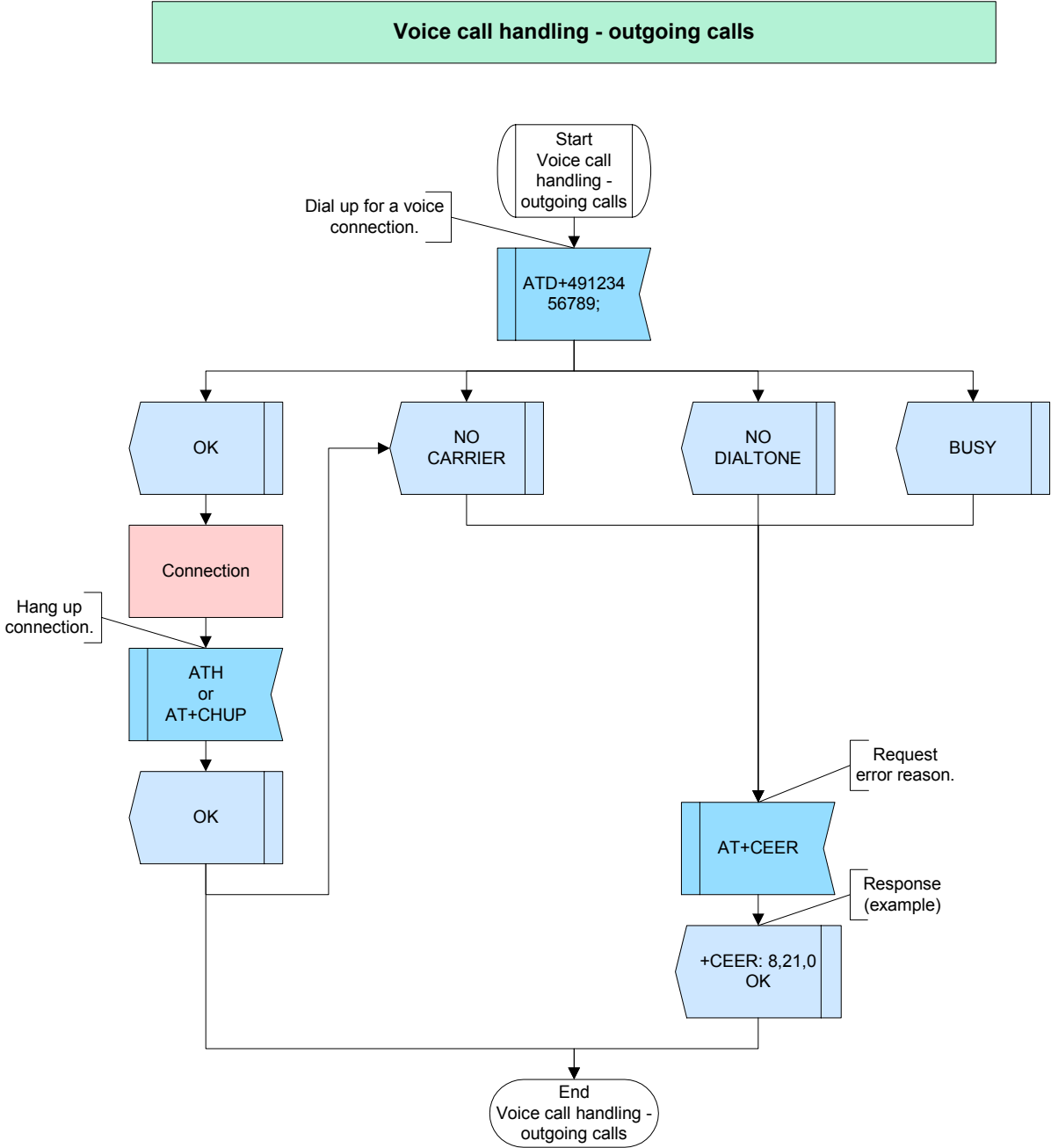


Figure 49: Voice call handling - outgoing calls

#### 2.8.3.4 Hints

- If a maximum number of dial retries to the same destination fails in a row, the dialed number is blacklisted according to "GSM02.07 Annex A". In this case dialing will be denied until the number is cleared from the blacklist. Possible responses are "Call barred" for voice call numbers, and "NO CARRIER" for fax or data numbers. For further details refer to the description of ATD in [2].
- The minimum time between call attempts is described in [11], may differ depending on the used provider.

#### 2.8.3.5 Example

##### Example 1:

\*\*\*\*\*

Comment: Voice call handling - outgoing call 1

\*\*\*\*\*

\*\*\*\*\*

Comment: Subscriber 1 makes voice call to subscriber 2.

\*\*\*\*\*

Subscr 1 Send: ATD2400058;  
Subscr 1 Receive: ATD2400058;  
Subscr 2 Receive:  
Subscr 2 Receive: +CRING: VOICE

\*\*\*\*\*

Comment: Subscriber 2 rejects the incoming voice call.

\*\*\*\*\*

Subscr 2 Send: ATH  
Subscr 2 Receive: ATH  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: NO CARRIER

\*\*\*\*\*

Comment: Subscriber 1 requests the cause of call release, in this case reason for NO CARRIER.

\*\*\*\*\*

Subscr 1 Send: AT+CEER  
Subscr 1 Receive: AT+CEER  
Subscr 1 Receive: +CEER: 8,21,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

##### Example 2:

\*\*\*\*\*

Comment: Voice call handling - outgoing call 2

\*\*\*\*\*

\*\*\*\*\*

Comment: Subscriber 1 makes voice call to subscriber 2.

\*\*\*\*\*

Subscr 1 Send: ATD2400058;  
Subscr 1 Receive: ATD2400058;  
Subscr 2 Receive:

---

Subscr 2    Receive: +CRING: VOICE

\*\*\*\*\*

Comment: Subscriber 2 answers the incoming voice call.

\*\*\*\*\*

Subscr 2    Send: ATA  
Subscr 2    Receive: ATA  
Subscr 2    Receive: OK  
Subscr 1    Receive:  
Subscr 1    Receive: OK

\*\*\*\*\*

Comment: Subscriber 1 hangs up the call.

\*\*\*\*\*

Subscr 1    Send: ATH  
Subscr 1    Receive: ATH  
Subscr 1    Receive: OK  
Subscr 2    Receive:  
Subscr 2    Receive: NO CARRIER

## **2.8.4 Further scenarios of outgoing voice calls**

### **2.8.4.1 Description**

The following scenario of outgoing voice calls considers all AT commands used by the calling party and the called party and, in addition, describes the handling of a waiting call.

When a third subscriber calls one of the other two (while the called subscriber has not enabled Call waiting) the call from the third subscriber is not signaled to the called subscriber.

### **2.8.4.2 Used AT commands**

ATD	-	Mobile originated call to dial a number
ATH	-	Disconnect existing connection
ATA	-	Answer a call

For further details about the commands see [2].

2.8.4.3 Flow chart

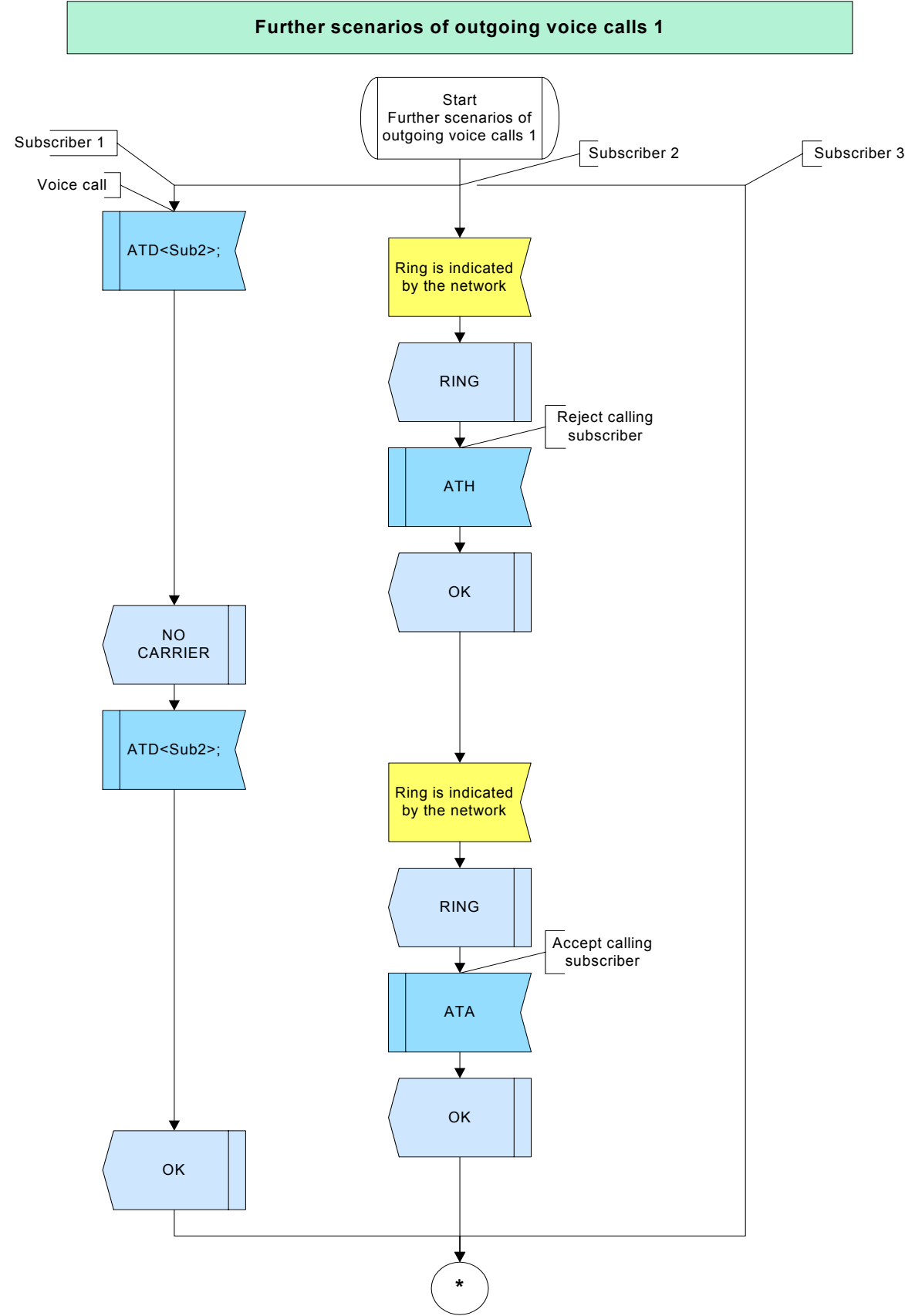


Figure 50: Further scenarios of outgoing calls 1- part 1

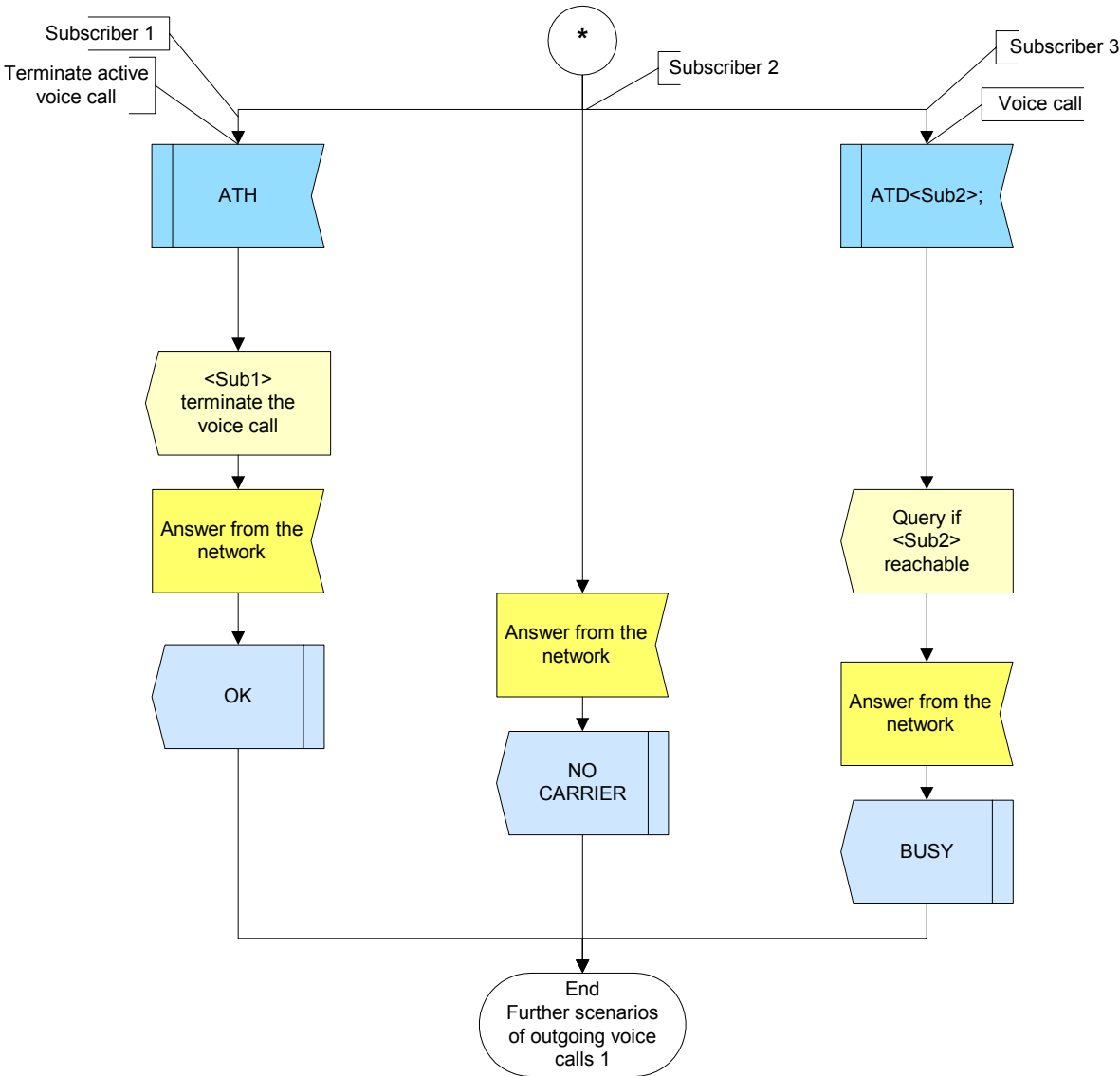


Figure 51: Further scenarios of outgoing voice calls 1- part 2

2.8.4.4 Hints

Not applicable.

2.8.4.5 Example

\*\*\*\*\*

Comment: Call handling

\*\*\*\*\*

\*\*\*\*\*

Comment: Establish voice call Sub1-->Sub2

\*\*\*\*\*

Subscr 1 Send: ATD<Sub2>;

\*\*\*\*\*

Comment: Sub2: Waiting for RING

\*\*\*\*\*



Subscr 1 Receive: ATD<Sub2>;  
Subscr 2 Receive:  
Subscr 2 Receive: RING

\*\*\*\*\*

Comment: Sub2: Reject waiting call of Sub1

\*\*\*\*\*

Subscr 2 Send: ATH  
Subscr 2 Receive: ATH  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: NO CARRIER

\*\*\*\*\*

Comment: Establish voice call Sub1-->Sub2

\*\*\*\*\*

Subscr 1 Send: ATD<Sub2>;

\*\*\*\*\*

Comment: Sub2: Waiting for RING

\*\*\*\*\*

Subscr 1 Receive: ATD<Sub2>;  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: RING

\*\*\*\*\*

Comment: Sub2: Accept waiting call of Sub1

\*\*\*\*\*

Subscr 2 Send: ATA  
Subscr 2 Receive: ATA  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Establish voice call Sub3-->Sub2 without enabled call waiting

\*\*\*\*\*

Subscr 3 Send: ATD<Sub2>;  
Subscr 3 Receive: ATD<Sub2>;  
Subscr 3 Receive:  
Subscr 3 Receive: BUSY

\*\*\*\*\*

Comment: Disconnect the active call

\*\*\*\*\*

Subscr 1 Send: ATH  
Subscr 1 Receive: ATH  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: NO CARRIER

## 2.9 CSD

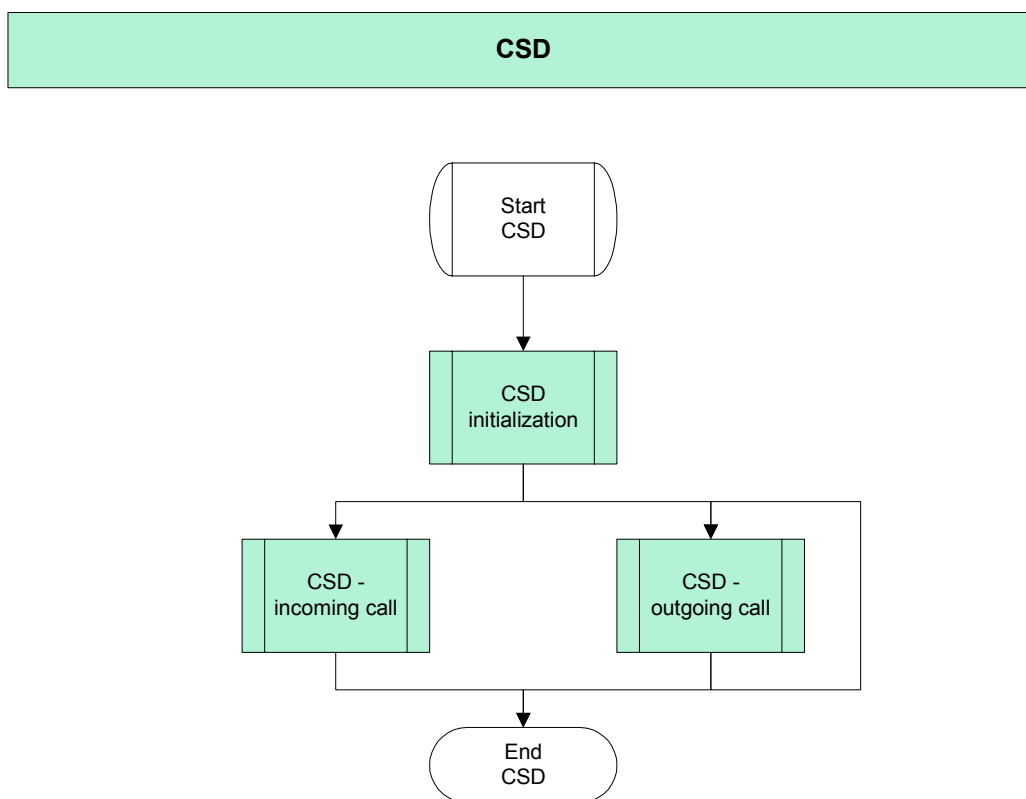


Figure 52: CSD

### 2.9.1 CSD initialization

#### 2.9.1.1 Description

This chapter describes the basic settings recommended for handling CSD calls. Before making a CSD call be sure that flow control is enabled as described in chapter 2.2.2. All other settings listed below are optional:

- AT+CSNS=4 enables calls received without bearer capability element to be accepted as data call. By default, incoming calls without bearer capability element are assumed to be voice, except for fax calls with fclass 1 or 2. These are assumed as fax calls.
- ATX determines whether the ME detects the presence of dial tone and busy signal. If ATX>0 the CONNECT result code will include the transmission speed.
- Using the ATSO command you can specify the number of rings before the ME automatically answers incoming data calls.  
Note that all types of Siemens modules support autoanswer mode at least for data and fax calls. Autoanswer ability for other services is module specific, such as autoanswering voice calls or network initiated requests for GPRS PDP context activation. For details see [2].
- Using the ATS7 command you can specify the number of seconds the ME will wait for the completion of call setup when answering or originating a call.
- Using ATS10 you can set the time the ME remains connected after having indicated the absence of the data carrier.
- ATS18 enables extended call release reports indicated every time a fax or data call is released or fails to be established. This is useful especially for MT single numbering scheme calls or calls received from analog devices.

- With AT+CBST you can select the bearer service and the data rate to be used when data calls are originated. The default mode "non-transparent" cannot be changed. For incoming calls the settings of AT+CBST are not relevant.
- Use AT+CRC to enable or disable the extended format of result codes for incoming call indication. In the case of CSD calls AT+CRC=1 can be used to replace the factory default result code "RING" with the extended format "+CRING REL ASYNC" or "+CRING FAX".
- Use AT+CR to enable or disable an intermediate result code to report information about the connection when a call is being answered. In a data connection this is the result code "+CR: REL ASYNC" which is presented before the CONNECT result code.
- If you need to change radio link protocol parameters use AT+CRLP.
- Except for AT+CSNS and AT+CRLP all above settings can be stored to the user profile with AT&W.
- You can select ATV0 to set the short format (numeric code) or ATV1 to set the long format (verbose code) of result codes. In case of using the command without parameter the value will be set to 0. A list of numeric and verbose result codes can be found in [2], chapter ATV.
- Some products support the command ATV0 to choose whether or not the CONNECT result code shall include the RLP trailer. See example in chapter 2.9.1.5. See ATV command in [2] to make sure if the command is supported.
- If supported by your product use the AT^SCFG command to make settings for the indication of URCs via the RING line when a call is received during data mode. See [2] to make sure if the command is supported.

### 2.9.1.2 Used AT commands

AT\Qn	-	Flow control
AT+CSNS	-	Single Numbering Scheme
ATX	-	Set CONNECT result code format and call monitoring
ATS0	-	Set number of rings before automatically answering the call
ATS7	-	Set number of seconds to wait for connection completion
ATS10	-	Set disconnect delay after indicating the absence of data carrier
ATS18	-	Extended error report
AT+CBST	-	Select bearer service type
AT+CR	-	Service reporting control
AT+CRLP	-	Select radio link protocol param. for orig. non-transparent data call
AT&W	-	Store current configuration to user defined profile
ATV	-	Set result code format mode
ATV	-	Set CONNECT result code format (not supported by all products)
AT^SCFG	-	Extended configuration setting (not supported by all products)

For further details about the commands see [2].

### 2.9.1.3 Flow chart

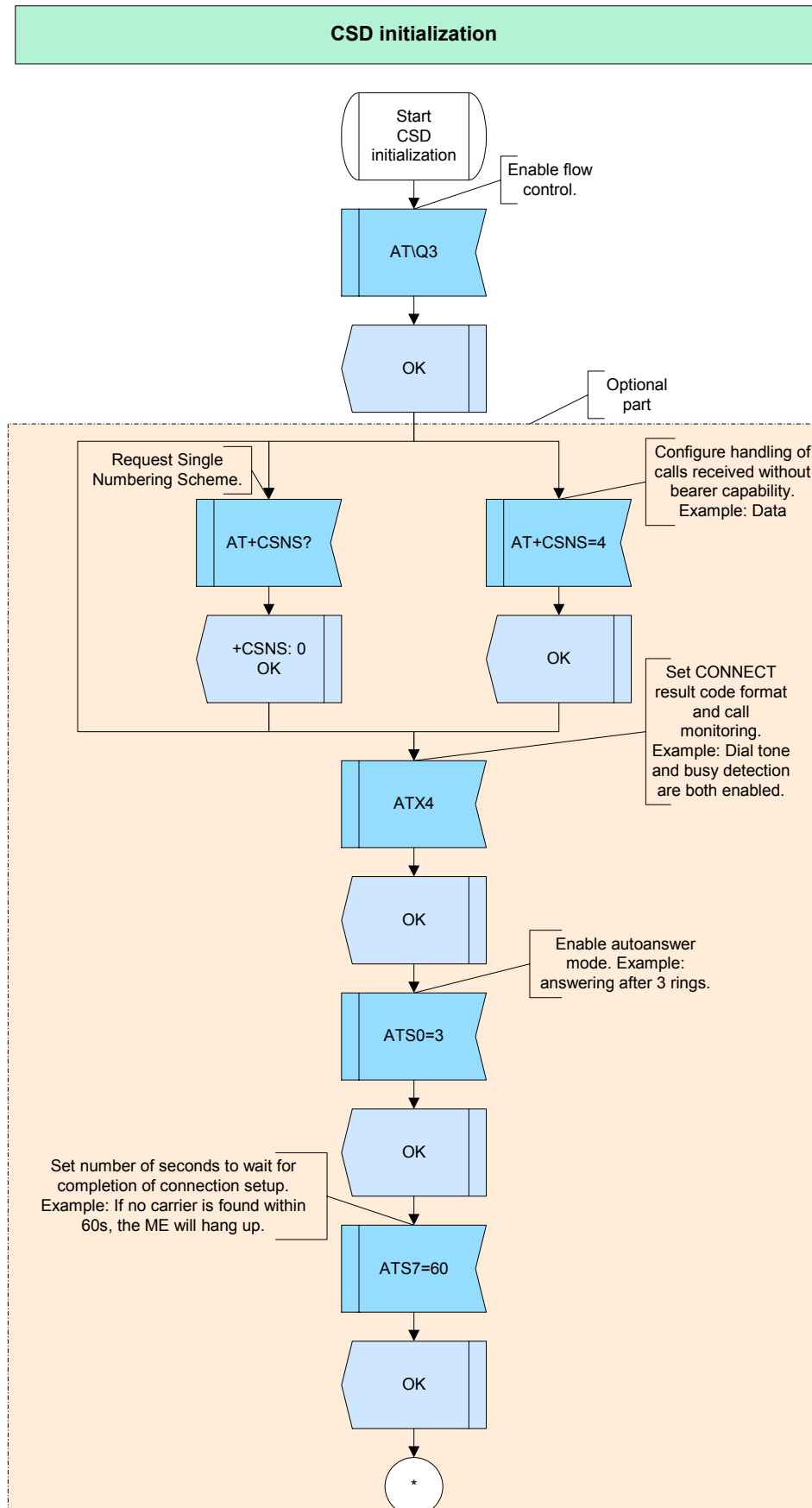


Figure 53: CSD initialization - part 1

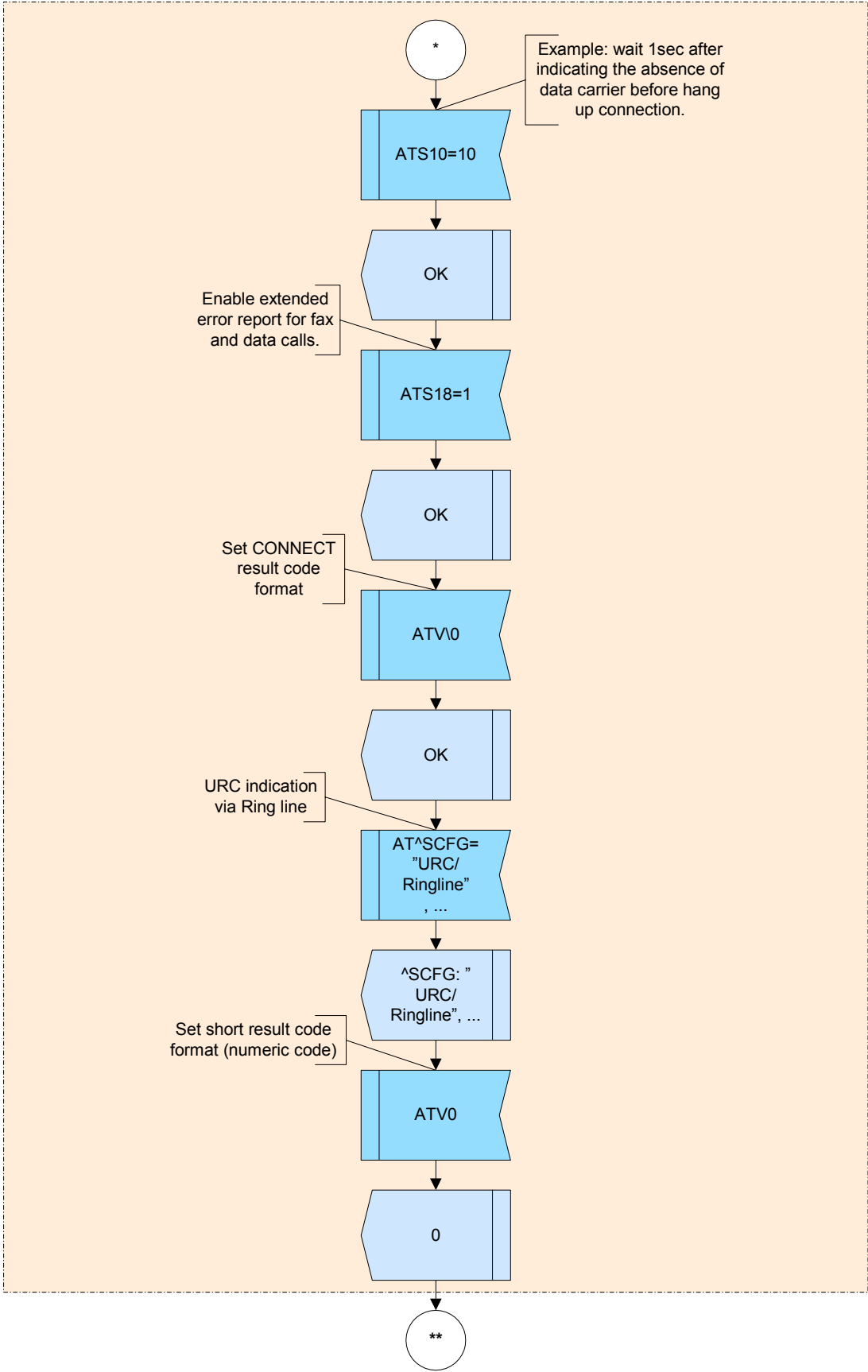


Figure 54: CSD initialization - part 2

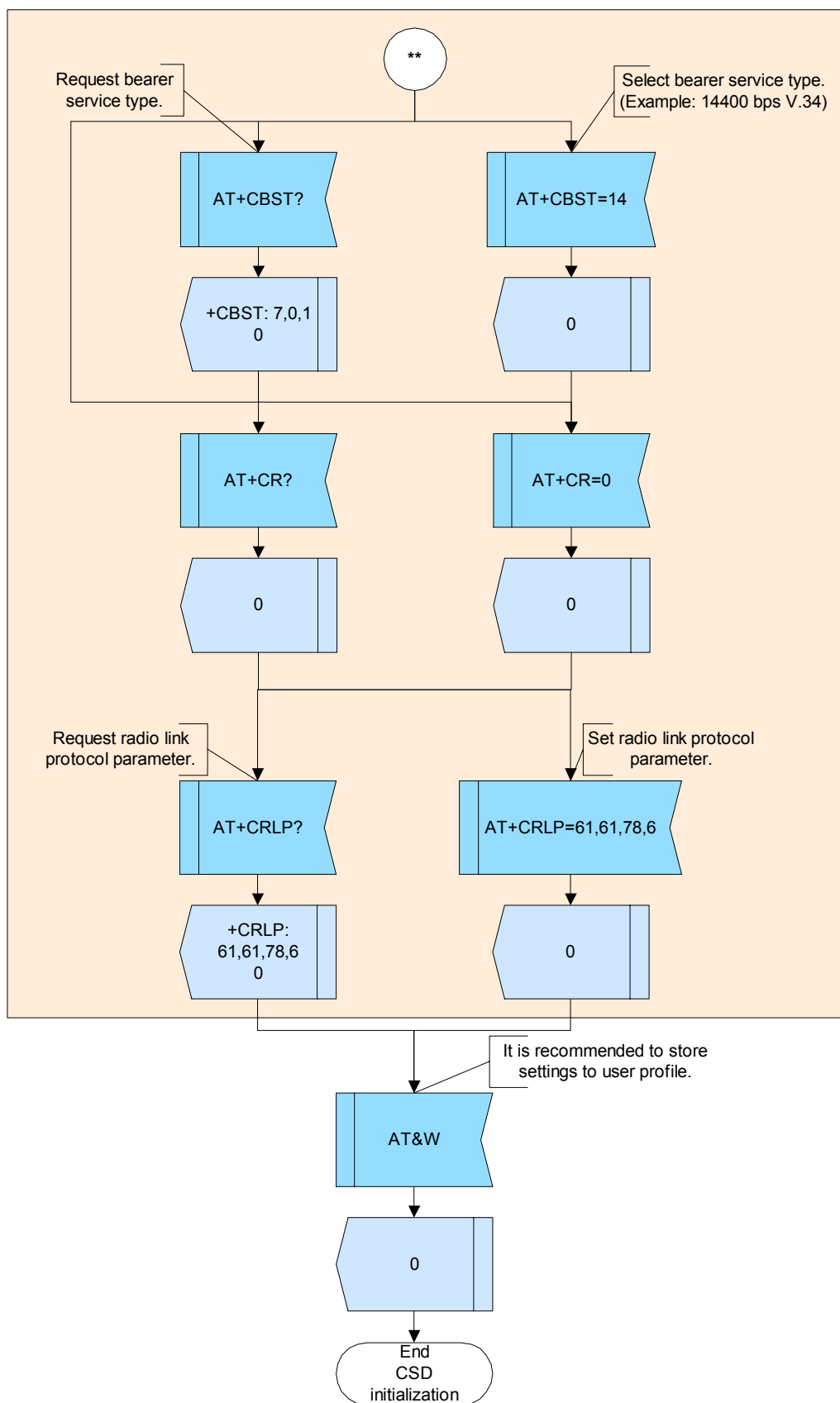


Figure 55: CSD initialization - part 3

#### 2.9.1.4 Hints

- Data capabilities can be used only if activated on the SIM card. To take advantage of voice, data and fax a separate phone number must be available for each service.
- Not all network providers support all data rates. So you may need to ask your provider to find out what services are available.
- Generally, only AT+CBST=0 (auto bauding) and AT+CBST = 7 (9600 bps, [V.110]) are supported and provide reliable performance. All other settings can be tried, but depending on the network problems may be encountered.

#### 2.9.1.5 Example

\*\*\*\*\*

Comment: CSD initialization

\*\*\*\*\*

\*\*\*\*\*

Comment: Enable hardware flow control.

\*\*\*\*\*

Subscr 2 Send: AT\Q3

Subscr 2 Receive: AT\Q3

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Set single numbering scheme to receive all calls without bearer elements as CSD call.

\*\*\*\*\*

Subscr 2 Send: AT+CSNS=4

Subscr 2 Receive: AT+CSNS=4

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Enable dial tone and busy detection.

\*\*\*\*\*

Subscr 2 Send: ATX4

Subscr 2 Receive: ATX4

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Enable automatic answer mode: answer after 3 rings.

\*\*\*\*\*

Subscr 2 Send: ATS0=3

Subscr 2 Receive: ATS0=3

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Set number of seconds to wait for connection completion to 60sec.

\*\*\*\*\*

Subscr 2 Send: ATS7=60

Subscr 2 Receive: ATS7=60

Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Set waiting time after absence of data carrier before disconnect ME to 1 sec.

\*\*\*\*\*

Subscr 2 Send: ATS10=10

Subscr 2 Receive: ATS10=10

Subscr 2    Receive: OK

\*\*\*\*\*

Comment: Enable extended error report for CSD and FAX calls.

\*\*\*\*\*

Subscr 2    Send: ATS18=1

Subscr 2    Receive: ATS18=1

Subscr 2    Receive: OK

\*\*\*\*\*

Comment: URC indication in data mode via RING line (not supported by all products)

\*\*\*\*\*

Subscr 1    Send: AT^SCFG="URC/Datamode/Ringline","on"

Subscr 1    Receive: AT^SCFG="URC/Datamode/Ringline","on"

Subscr 1    Receive: ^SCFG: "URC/Datamode/Ringline","on"

Subscr 1    Receive:

Subscr 1    Receive: OK

\*\*\*\*\*

Comment: Set short result code format. Note that due to this setting the response OK will be replaced with the numeric code 0. See command ATV in [2] for a list of numeric and verbose result codes.

\*\*\*\*\*

Subscr 2    Send: ATV0

Subscr 2    Receive: ATV0

0

\*\*\*\*\*

Comment: Select data rate to be used for mobile originated CSD calls (9600 bps V.32).

\*\*\*\*\*

Subscr 2    Send: AT+CBST=7

Subscr 2    Receive: AT+CBST=7

0

\*\*\*\*\*

Comment: Disable service reporting control.

\*\*\*\*\*

Subscr 2    Send: AT+CR=0

Subscr 2    Receive: AT+CR=0

0

\*\*\*\*\*

Comment: Set radio link protocol parameter.

\*\*\*\*\*

Subscr 2    Send: AT+CRLP=61,61,78,6

Subscr 2    Receive: AT+CRLP=61,61,78,6

0

\*\*\*\*\*

Comment: Store settings to user profile.

\*\*\*\*\*

Subscr 2    Send: AT&W

Subscr 2    Receive: AT&W

0



## **2.9.2 CSD call handling – general instructions**

Basically, the steps to make voice or a data call are quite similar. The most significant difference is that during a voice call the module is always in command mode, but in a data connection it may either be in command mode (used to send AT commands) or in data mode (used to transfer data).

Once a data connection is established, the ME first enters the data mode (online mode). With the escape sequence +++ you can switch from data to command mode without dropping the line. The command ATO returns from command to data mode.

The escape sequence must be preceded and followed by a pause of at least 1000 ms. The +++ characters must be entered in quick succession, all within 1000 ms.

To end a call, the caller or the called party may use the commands ATH or AT+CHUP. The response to ATH and AT+CHUP is "OK" while the remote party is given "NO CARRIER".

To verify the reason of call release, the command ATS18 can be used.

## **2.9.3 CSD call handling – incoming calls**

### **2.9.3.1 Description**

This chapter describes the handling of incoming CSD calls.

Depending on the basic initialization, an incoming CSD call is indicated either by the URC "RING" (if AT+CR=0) or the extended URC format "+CRING: REL ASYNC" (if AT+CR=1).

An incoming data call can be accepted by entering the command ATA or by using the autoanswer mode if enabled with ATSO=000. Depending on the module's basic initialization, connection setup is indicated by the result code "CONNECT" (if ATX=0) or "CONNECT <text>" (if ATX>0), where <text> gives the transmission speed, for example "CONNECT 9600/RLP". In addition, the CONNECT result code may be preceded by the intermediate result code "+CR: REL ASYNC" if the ME is initialized with AT+CR=1.

In example 3, subscriber 1 has initialized the ME with ATV=0 to suppress the RLP trailer in CONNECT result codes. Note, that some products do not support this command. Subscriber 2 uses the full result code format including text and RLP trailer.

### **2.9.3.2 Used AT commands**

ATA	-	Answer a call
+++	-	Switch from data mode to command mode
ATO	-	Switch from command mode to data mode / PPP online mode (PPP online mode applies to GPRS connection only)
ATH	-	Disconnect existing connection
AT+CHUP	-	Hang up call

For further details about the commands see [2].

### 2.9.3.3 Flow chart

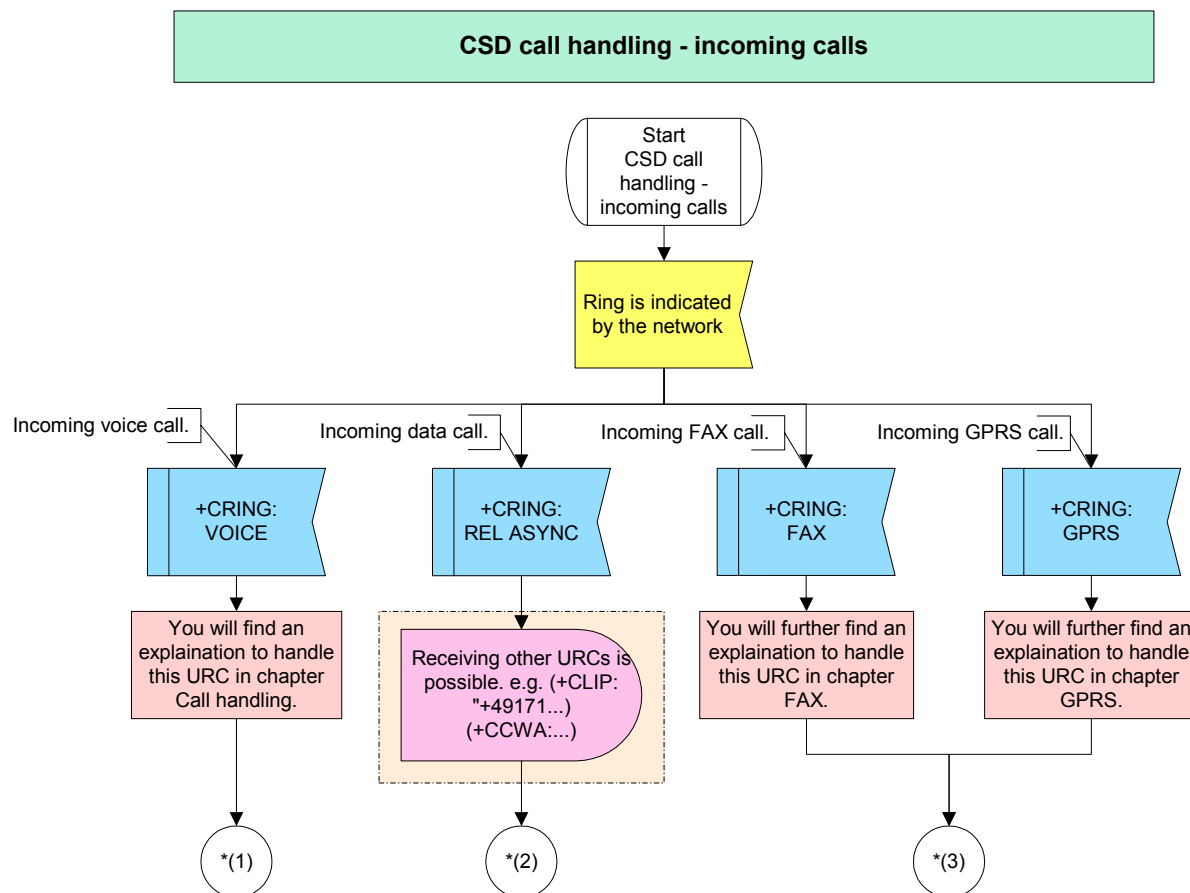


Figure 56: CSD call handling - incoming calls – part 1



### 2.9.3.4 Hints

Not applicable.

### 2.9.3.5 Example

#### Example 1:

\*\*\*\*\*

Comment: CSD call handling - incoming call – reject

\*\*\*\*\*

\*\*\*\*\*

Comment: Subscriber 2 makes CSD call to subscriber 1.

\*\*\*\*\*

Subscr 2 Send: ATD2400022  
Subscr 2 Receive: ATD2400022  
Subscr 1 Receive:  
Subscr 1 Receive: +CRING: REL ASYNC

\*\*\*\*\*

Comment: Subscriber 1 rejects the incoming CSD call.

\*\*\*\*\*

Subscr 1 Send: ATH  
Subscr 1 Receive: ATH  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: +Cause: 8:21  
Subscr 2 Receive: NO CARRIER

#### Example 2:

\*\*\*\*\*

Comment: CSD call handling - incoming call: Answer CSD call manually.

\*\*\*\*\*

\*\*\*\*\*

Comment: Subscriber 2 makes CSD call to subscriber 1.

\*\*\*\*\*

Subscr 2 Send: ATD2400022  
Subscr 2 Receive: ATD2400022  
Subscr 1 Receive:  
Subscr 1 Receive: +CRING: REL ASYNC

\*\*\*\*\*

Comment: Subscriber 1 answers the incoming CSD call.

\*\*\*\*\*

Subscr 1 Send: ATA  
Subscr 1 Receive: ATA  
Subscr 1 Receive:  
Subscr 1 Receive: CONNECT 9600/RLP  
Subscr 2 Receive:  
Subscr 2 Receive: CONNECT 9600/RLP

\*\*\*\*\*

Comment: Subscriber 2 changes from online mode to command mode.

\*\*\*\*\*

Subscr 2 Send: +++  
Subscr 1 Receive: +++  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Subscriber 2 hangs up the CSD call.

\*\*\*\*\*

Subscr 2 Send: ATH  
Subscr 2 Receive: ATH  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: +CAUSE: 8:16  
Subscr 1 Receive: NO CARRIER

### Example 3:

\*\*\*\*\*

Comment: CSD call handling - incoming call: Answer CSD call automatically.

\*\*\*\*\*

\*\*\*\*\*

Comment: Subscriber 2 makes CSD call to subscriber 1.

\*\*\*\*\*

Subscr 2 Send: ATD00441522400080  
Subscr 2 Receive: ATD00441522400080

\*\*\*\*\*

Comment: Subscriber 1 answers the incoming CSD call after 3 rings automatically.

\*\*\*\*\*

Subscr 1 Receive:  
Subscr 1 Receive: +CRING: REL ASYNC  
Subscr 1 Receive:  
Subscr 1 Receive: +CRING: REL ASYNC  
Subscr 1 Receive:  
Subscr 1 Receive: +CRING: REL ASYNC  
Subscr 2 Receive:  
Subscr 2 Receive: CONNECT 9600/RLP  
Subscr 1 Receive:  
Subscr 1 Receive: CONNECT 9600

\*\*\*\*\*

Comment: Subscriber 1 changes from online mode to command mode.

\*\*\*\*\*

Subscr 1 Send: +++  
Subscr 2 Receive: +++  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Subscriber 1 changes back to online mode.

\*\*\*\*\*

Subscr 1 Send: ATO

---

Subscr 1 Receive: ATO  
Subscr 1 Receive: CONNECT 9600

\*\*\*\*\*

Comment: Subscriber 1 change again to command mode.  
\*\*\*\*\*

Subscr 1 Send: +++  
Subscr 2 Receive: +++  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Subscriber 1 hangs up the CSD call.  
\*\*\*\*\*

Subscr 1 Send: ATH  
Subscr 1 Receive: ATH  
Subscr 1 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: +CAUSE: 8:16  
Subscr 2 Receive: NO CARRIER

## **2.9.4 CSD call handling – outgoing CSD calls**

### **2.9.4.1 Description**

This chapter describes the handling of outgoing CSD calls. To dial out you may use the commands ATD, ATDI and ATDL. Do not attach a semicolon “;” at the end of the dial string. Dialing from the phonebooks is not supported for data connections.

When dialing a data call number, the following responses can be returned:

CONNECT (if ATX0) or CONNECT <text> (if ATX>0)  
NO CARRIER  
BUSY  
NO DIALTONE

The response is given when the connection has been set up successfully ("CONNECT"), or when it fails ("NO CARRIER", "BUSY", "NO DIALTONE"). The settings of AT^SM20 do not apply to data calls.

If the module is initialized with AT+CR=1, the additional intermediate result “+CR: REL ASYNC” appears before the CONNECT result code.

When the TA-TE link is reserved, i.e. when the module is in data mode, any URCs, for example an incoming SMS, will be indicated by a BREAK only. The URC itself will be transmitted as soon as the TA-TE link is free again. This means, the URC will be output either when the user switches from data to command mode with +++, or when the line is dropped.

### **2.9.4.2 Used AT commands**

ATD	-	Mobile originated call to dial a number
+++	-	Switch from data mode to command mode
ATO	-	Switch from command mode to data mode / PPP online mode
ATH	-	Disconnect existing connection
AT+CHUP	-	Hang up call

For further details about the commands see [2].



### 2.9.4.3 Flow chart

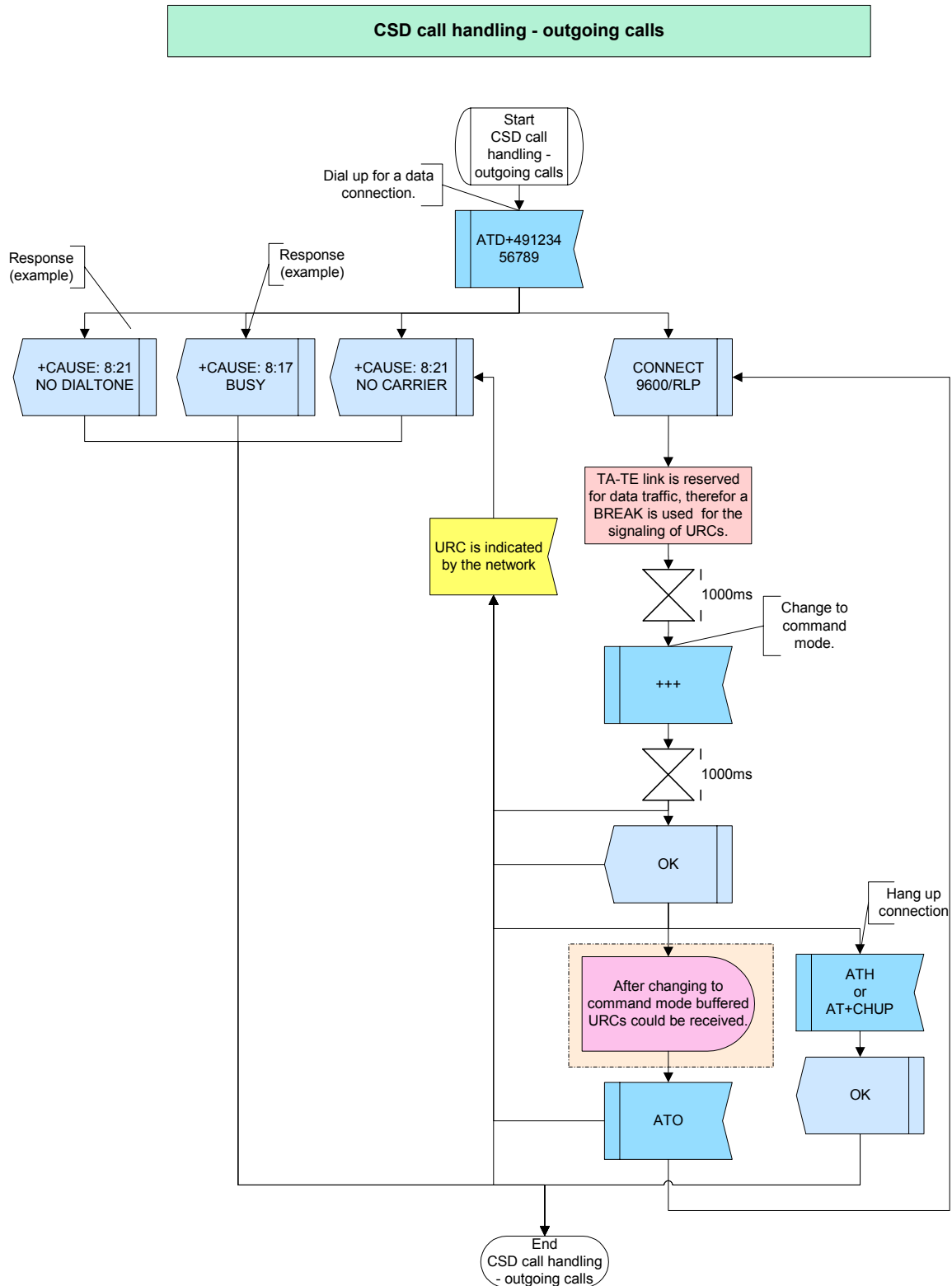


Figure 58: CSD call handling - outgoing calls

### 2.9.4.4 Hints

Not applicable.

## 2.9.4.5 Example

### Example 1:

```
*****
Comment: CSD call handling - outgoing calls 1
*****
*****
Comment: Subscriber 1 makes a CSD call to subscriber 2.
*****

Subscr 1   Send: ATD2400022
Subscr 1   Receive: ATD2400022
Subscr 2   Receive:
Subscr 2   Receive: +CRING: REL ASYNC

*****
Comment: Subscriber 2 rejects the incoming call.
*****

Subscr 2   Send: ATH
Subscr 2   Receive: ATH
Subscr 2   Receive: OK
Subscr 1   Receive:
Subscr 1   Receive: +CAUSE: 8:21
Subscr 1   Receive: NO CARRIER
```

### Example 2:

```
*****
Comment: CSD call handling - outgoing calls 2
*****
*****
Comment: Subscriber 1 makes a CSD call to subscriber 2.
*****

Subscr 1   Send: ATD2400022
Subscr 1   Receive: ATD2400022
Subscr 2   Receive:
Subscr 2   Receive: +CRING: REL ASYNC

*****
Comment: Subscriber 2 answers the incoming call.
*****

Subscr 2   Send: ATA
Subscr 2   Receive: ATA
Subscr 2   Receive:
Subscr 2   Receive: CONNECT 9600/RLP
Subscr 1   Receive:
Subscr 1   Receive: CONNECT 9600/RLP

*****
Comment: Subscriber 1 changes to command mode.
*****

Subscr 1   Send: +++
Subscr 1   Receive:
Subscr 1   Receive: OK
Subscr 2   Receive: +++
```

\*\*\*\*\*

Comment: Subscriber 1 hangs up connection.

\*\*\*\*\*

Subscr 1    Send: ATH  
Subscr 1    Receive: ATH  
Subscr 1    Receive: OK  
Subscr 2    Receive:  
Subscr 2    Receive: +CAUSE: 8:16  
Subscr 2    Receive: NO CARRIER

## **2.9.5 Further scenarios for outgoing CSD calls**

### **2.9.5.1 Description**

The following scenario considers all AT commands used by the two remote parties involved in the data connection and, in addition, describes the handling of further waiting voice and data calls.

When a third subscriber calls one of the other two (while the called subscriber has not enabled Call waiting) the call from the third subscriber is not signaled to the called subscriber.

### **2.9.5.2 Used AT commands**

ATD	-	Mobile originated call to dial a number
ATH	-	Disconnect existing connection
ATA	-	Answer a call
+++	-	Switch from data mode to command mode
ATO	-	Switch from command mode to data mode / PPP online mode

For further details about the commands see [2].

### 2.9.5.3 Flow chart

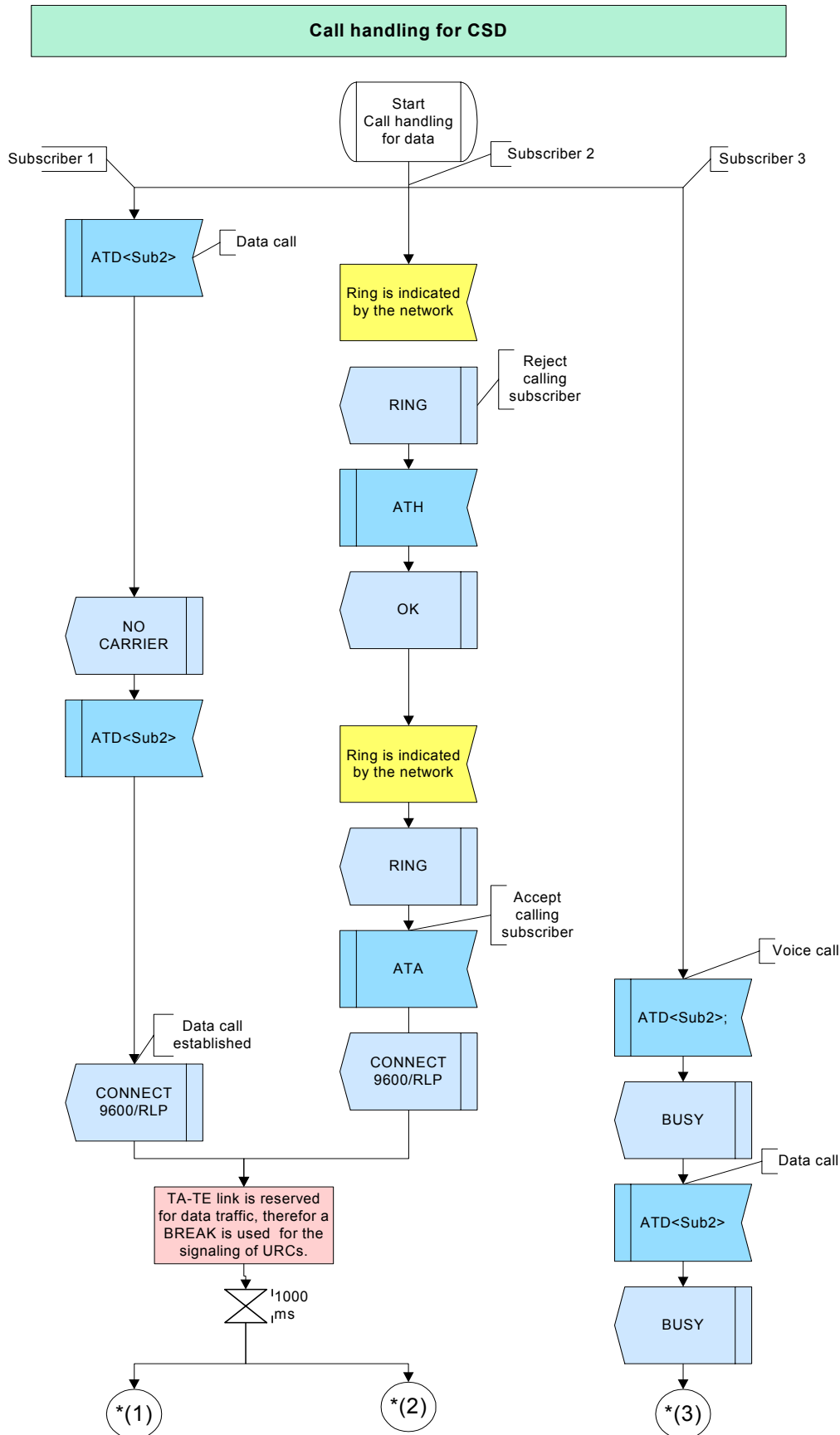


Figure 59: Call handling for CSD – part 1

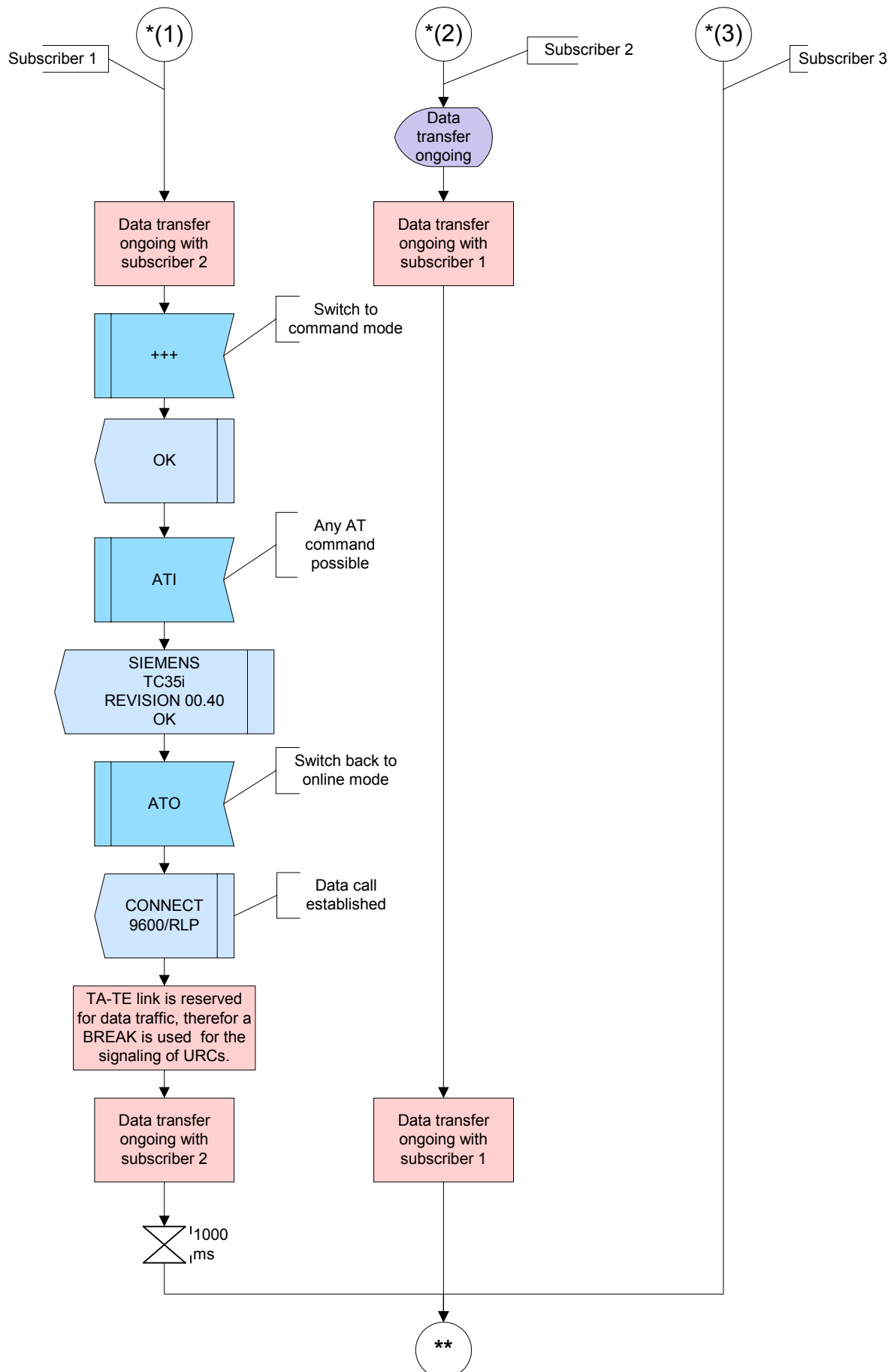


Figure 60: Call handling for CSD - part 2

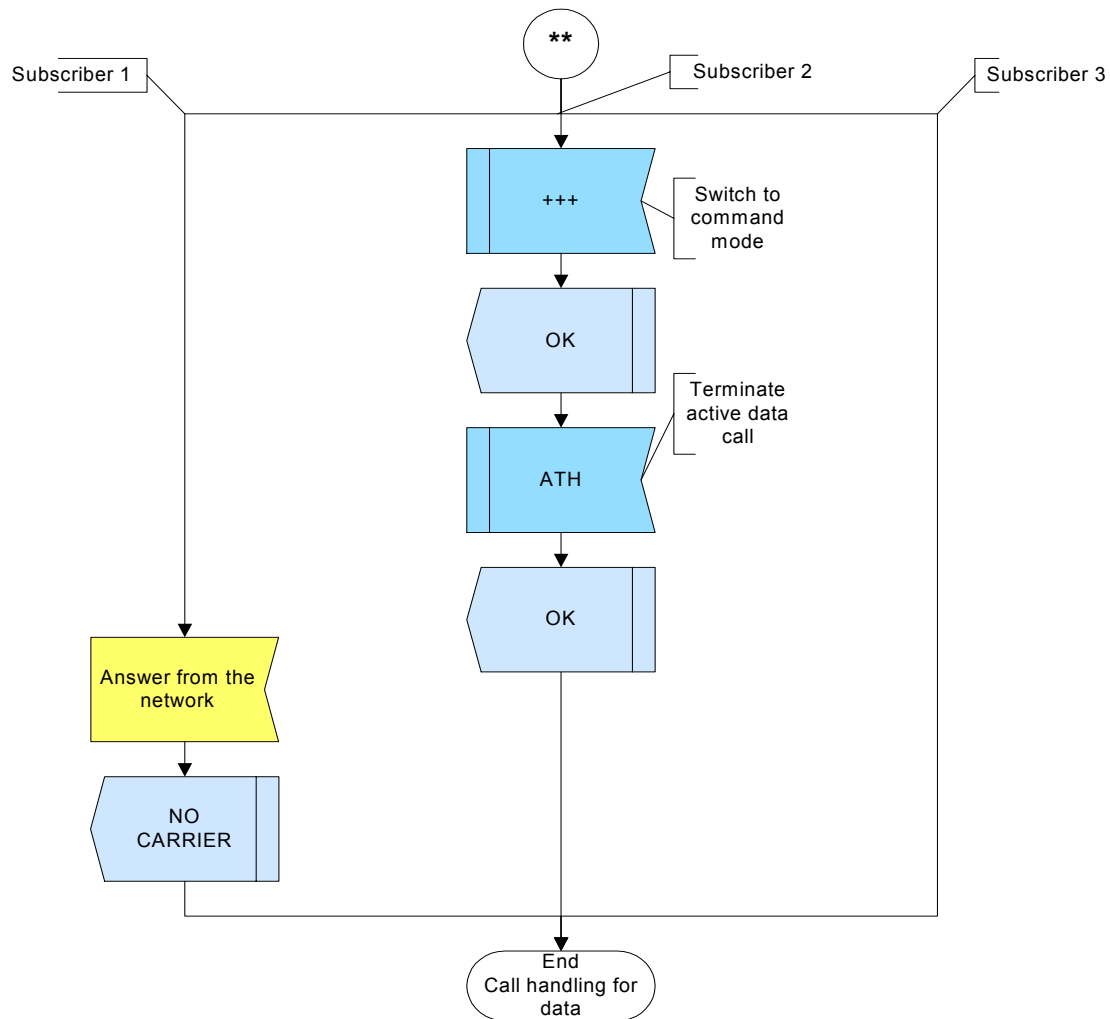


Figure 61: Call handling for CSD - part 3

#### 2.9.5.4 Hints

Not applicable.

#### 2.9.5.5 Example

\*\*\*\*\*

Comment: Call handling

\*\*\*\*\*

\*\*\*\*\*

Comment: Establish data call Sub1-->Sub2

\*\*\*\*\*

Subscr 1 Send: ATD<Sub2>

\*\*\*\*\*

Comment: Sub2: Waiting for RING

\*\*\*\*\*

Subscr 1 Receive: ATD<Sub2>

Subscr 2 Receive:

Subscr 2 Receive: RING

\*\*\*\*\*

Comment: Sub2: Reject waiting call of Sub1

\*\*\*\*\*

Subscr 2 Send: ATH  
Subscr 2 Receive: ATH  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: NO CARRIER

\*\*\*\*\*  
Comment: Establish data call Sub1-->Sub2  
\*\*\*\*\*

Subscr 1 Send: ATD<Sub2>

\*\*\*\*\*  
Comment: Sub2: Waiting for RING  
\*\*\*\*\*

Subscr 1 Receive: ATD<Sub2>  
Subscr 2 Receive:  
Subscr 2 Receive: RING

\*\*\*\*\*  
Comment: Sub2: Accept waiting call of Sub1  
\*\*\*\*\*

Subscr 2 Send: ATA  
Subscr 2 Receive: ATA  
Subscr 2 Receive:  
Subscr 2 Receive: CONNECT 9600/RLP  
Subscr 1 Receive:  
Subscr 1 Receive: CONNECT 9600/RLP

\*\*\*\*\*  
Comment: Try to establish voice call Sub3-->Sub2 without enabled call waiting  
\*\*\*\*\*

Subscr 3 Send: ATD<Sub2>;  
Subscr 3 Receive: ATD<Sub2>;  
Subscr 3 Receive:  
Subscr 3 Receive: BUSY

\*\*\*\*\*  
Comment: Try to establish data call Sub3-->Sub2 without enabled call waiting  
\*\*\*\*\*

Subscr 3 Send: ATD<Sub2>  
Subscr 3 Receive: ATD<Sub2>  
Subscr 3 Receive:  
Subscr 3 Receive: BUSY

\*\*\*\*\*  
Comment: Sub1&2: Send data  
\*\*\*\*\*

Subscr 1 Send: hello from subscriber1;  
Subscr 2 Receive: hello from subscriber1;  
Subscr 2 Send: hello from subscriber2;  
Subscr 1 Receive: hello from subscriber2;  
\*\*\*\*\*

Comment: Switch back to command mode (Sub1)



\*\*\*\*\*

Subscr 1 Send: +++  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 2 Receive: +++

\*\*\*\*\*

Comment: Any AT-command  
\*\*\*\*\*

Subscr 1 Send: ATI  
Subscr 1 Receive: ATI  
Subscr 1 Receive: SIEMENS  
Subscr 1 Receive: TC35i  
Subscr 1 Receive: REVISION 02.07  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Switch back to online mode (Sub1)  
\*\*\*\*\*

Subscr 1 Send: ATO  
Subscr 1 Receive: ATO  
Subscr 1 Receive: CONNECT 9600/RLP

\*\*\*\*\*

Comment: Sub1&2: send data  
\*\*\*\*\*

Subscr 1 Send: hello again from subscriber1;  
Subscr 2 Receive: hello again from subscriber1;  
Subscr 2 Send: hello again from subscriber2;  
Subscr 1 Receive: hello again from subscriber2;

\*\*\*\*\*

Comment: Switch back to command mode (Sub2)  
\*\*\*\*\*

Subscr 2 Send: +++  
Subscr 1 Receive: +++  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Disconnect the active call  
\*\*\*\*\*

Subscr 2 Send: ATH  
Subscr 2 Receive: ATH  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: NO CARRIER

## 2.10 GPRS

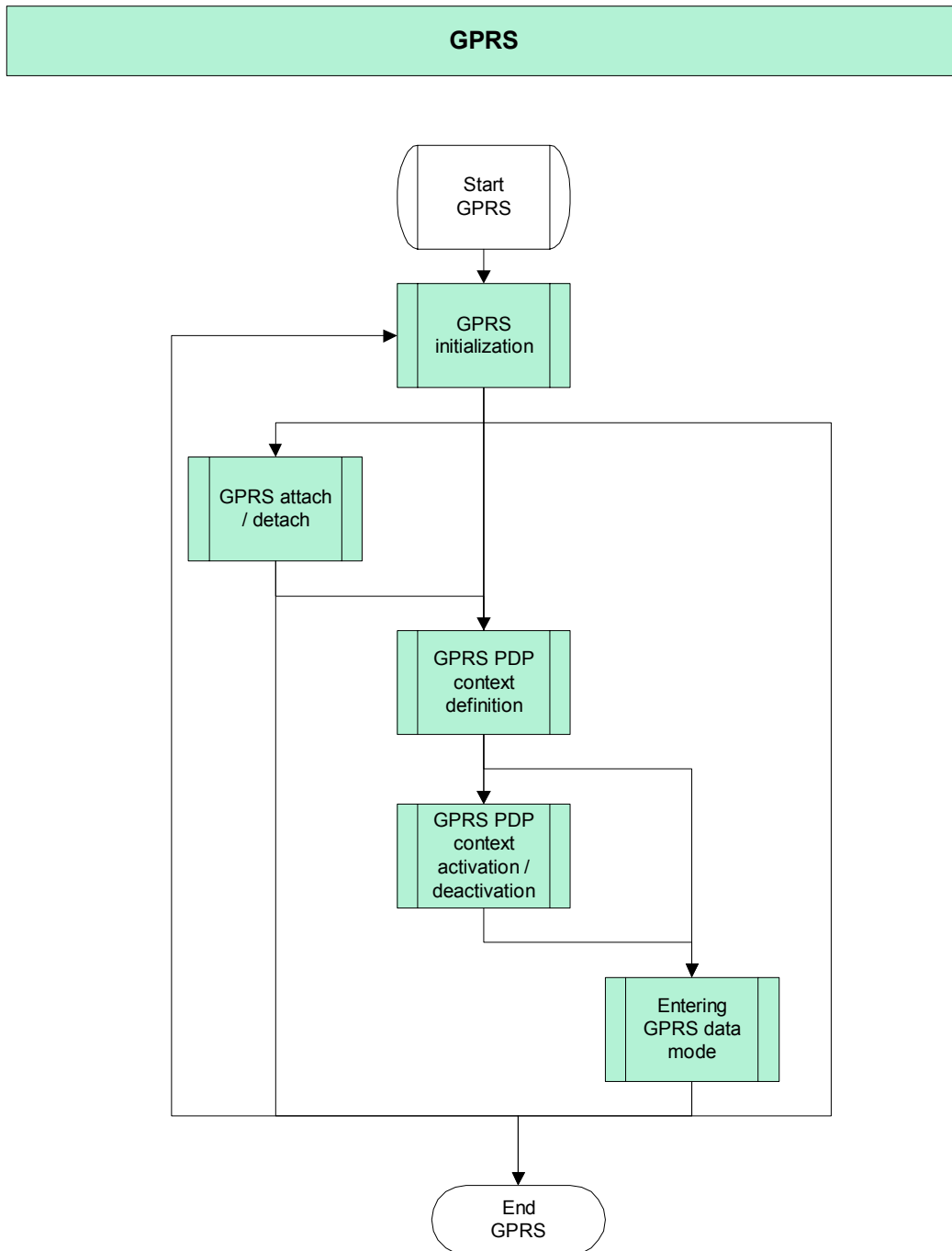


Figure 62: GPRS

Before using the GPRS service (transmit data) several steps have to be run through: At first all necessary initialization commands must be executed. Next the module must be attached to the GPRS service. From that moment onwards the device is reachable by the network, but no data transmission is yet possible. Before activating the PDP context, network provider specific context parameters have to be defined. Afterwards the context can be activated and the module can enter the GPRS data mode. From now on data can be exchanged between module and network.

The context deactivation and GPRS detach should be performed in the reverse order.

## **2.10.1 GPRS initialization**

### **2.10.1.1 Description**

This chapter describes initial settings suggested for using GPRS.

You can query the status of GPRS network registration with AT+CGREG. With AT+CGSMS you can specify the service or service preferences the MT shall use when sending MO SMS messages. The authentication type for the PPP connection will be set with AT^SGAUTH. The default value is 3 (PAP and CHAP). To configure the LLC-PDU-length and the GPRS multislot class use AT^SGCONF.

If supported by your product you can use the AT^SCFG command for the following GPRS related settings. See [2] to find out whether AT^SCFG is available and includes settings for GPRS. Note that AT^SCFG settings illustrated in the examples are valid only if GSM character set is active.

- "GPRS/ATS0/withAttach" (<gaa>)  
Specifies whether or not ME will automatically attempt to perform a GPRS attach after receiving the command ATS0=<n> with parameter n>0.
- "GPRS/RingOnIncomingData (<groid>)"  
Specifies if RING line shall be activated when ME receives GPRS IP packets during CYCLIC SLEEP mode AT+CFUN=7 or 8. This solution ensures that incoming GPRS IP packets will prompt the application to wake up from power saving.
- "URC/Ringline/ActiveTime" (<urat>)"  
Specifies duration of RING activation to indicate URCs or incoming GPRS IP packets.

### **2.10.1.2 Used AT commands**

AT+CGREG	-	GPRS Network registration status
AT+CGSMS	-	Select Service for MO SMS messages
AT^SGAUTH	-	Set type of authentication for PPP connection
AT^SGCONF	-	Configuration of GPRS related parameters
AT^SCFG	-	Extended Configuration setting (not supported by all products)

For further details about the commands see [2].

### 2.10.1.3 Flow chart

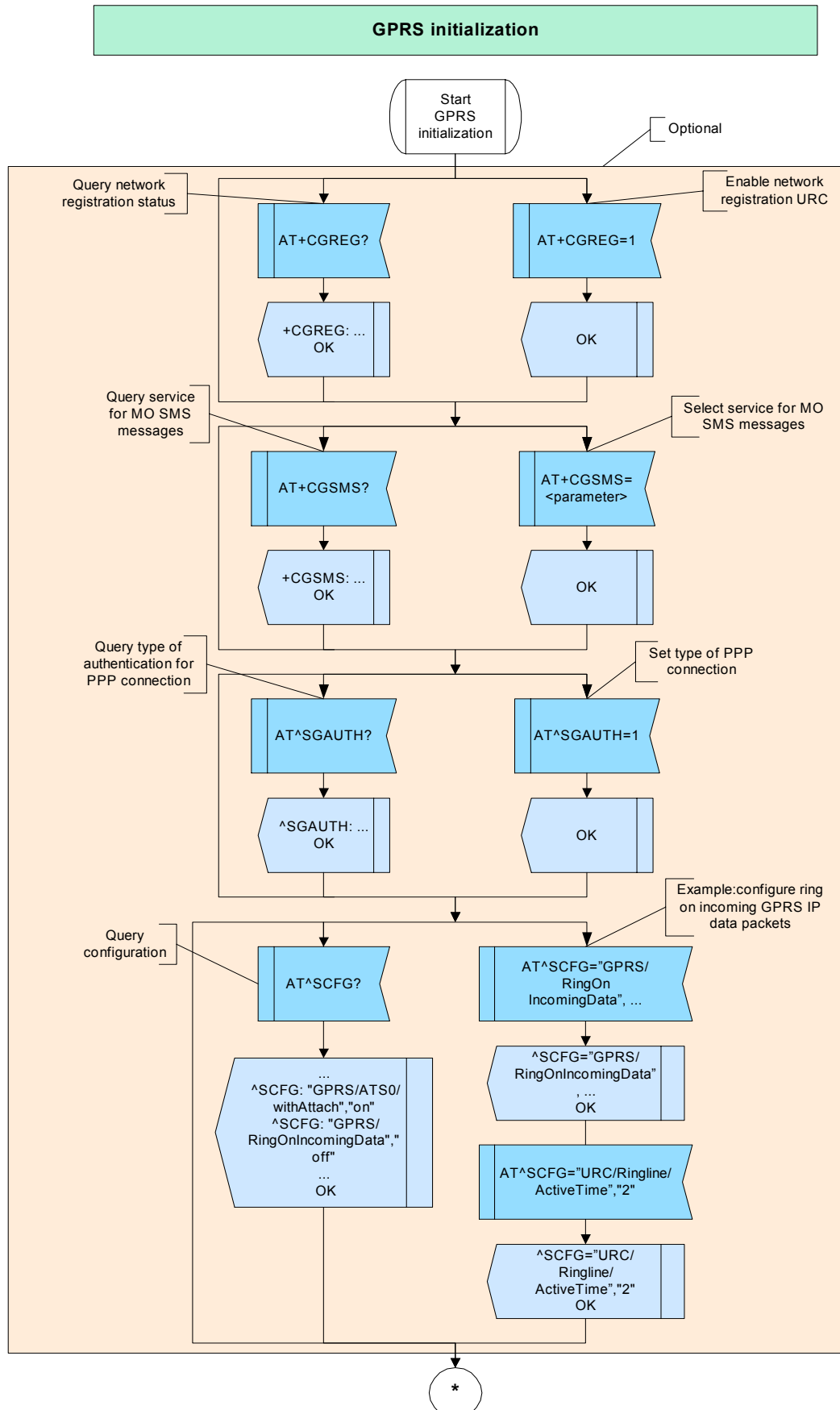


Figure 63: GPRS initialization - part 1

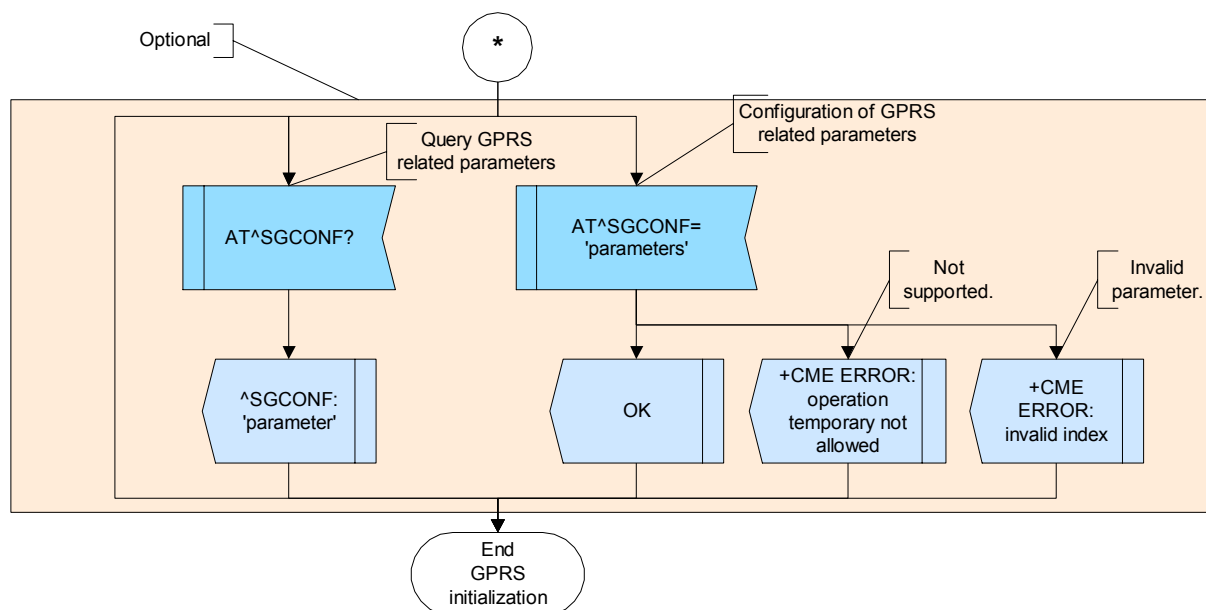


Figure 64: GPRS initialization - part 2

### 2.10.1.4 Hints

- Please consider that GPRS related command parameters cannot be stored with AT&W.

### 2.10.1.5 Example

\*\*\*\*\*

Comment: GPRS initialization

\*\*\*\*\*

\*\*\*\*\*

Comment: Query network registration status.

\*\*\*\*\*

Subscr 1 Send: AT+CGREG?  
Subscr 1 Receive: AT+CGREG?  
Subscr 1 Receive: +CGREG: 0,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable network registration URC.

\*\*\*\*\*

Subscr 1 Send: AT+CGREG=1  
Subscr 1 Receive: AT+CGREG=1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Query service for MO SMS messages (3 → GSM preferred).

\*\*\*\*\*

Subscr 1 Send: AT+CGSMS?  
Subscr 1 Receive: AT+CGSMS?  
Subscr 1 Receive: +CGSMS: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

---

Comment: Select service for SMS messages (0 → SMS over GPRS).

\*\*\*\*\*

Subscr 1 Send: AT+CGSMS=0  
Subscr 1 Receive: AT+CGSMS=0  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Query type of authentication for PPP connection (3 → PAP/ CHAP)

\*\*\*\*\*

Subscr 1 Send: AT^SGAUTH?  
Subscr 1 Receive: AT^SGAUTH?  
Subscr 1 Receive: ^SGAUTH: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set type to PAP.

\*\*\*\*\*

Subscr 1 Send: AT^SGAUTH=1  
Subscr 1 Receive: AT^SGAUTH=1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Query various ME parameter (not supported by all products).

\*\*\*\*\*

Subscr 1 Send: AT^SCFG?  
Subscr 1 Receive: AT^SCFG?  
Subscr 1 Receive: ^SCFG: "Audio/AMR","00101"  
Subscr 1 Receive: ^SCFG: "GPRS/ATS0/withAttach","on"  
Subscr 1 Receive: ^SCFG: "GPRS/RingOnIncomingData","off"  
Subscr 1 Receive: ^SCFG: "PowerSaver/Mode9/Timeout","20"  
Subscr 1 Receive: ^SCFG: "Radio/Band/HandOver","0"  
Subscr 1 Receive: ^SCFG: "URC/CallStatus/CIEV","restricted"  
Subscr 1 Receive: ^SCFG: "URC/CallStatus/SLCC","verbose"  
Subscr 1 Receive: ^SCFG: "URC/Datamode/Ringline","off"  
Subscr 1 Receive: ^SCFG: "URC/Ringline","local"  
Subscr 1 Receive: ^SCFG: "URC/Ringline/ActiveTime","1"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Ring on incoming GPRS IP data packets (not supported by all products).

\*\*\*\*\*

Subscr 1 Send: AT^SCFG="GPRS/RingOnIncomingData","on"  
Subscr 1 Receive: AT^SCFG="GPRS/RingOnIncomingData","on"  
Subscr 1 Receive: ^SCFG: "GPRS/RingOnIncomingData","on"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: RING line active time (not supported by all products).

\*\*\*\*\*

Subscr 1 Send: AT^SCFG="URC/Ringline/ActiveTime","2"  
Subscr 1 Receive: AT^SCFG="URC/Ringline/ActiveTime","2"  
Subscr 1 Receive: ^SCFG: "URC/Ringline/ActiveTime","2"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Configuration of GPRS related parameters (ERROR).

\*\*\*\*\*

Subscr 1 Send: AT^SGCONF=1521,8  
Subscr 1 Receive: AT^SGCONF=1521,8  
Subscr 1 Receive: +CME ERROR: invalid index

\*\*\*\*\*

Comment: Configuration of GPRS related parameters.

\*\*\*\*\*

Subscr 1 Send: AT^SGCONF=1520,8  
Subscr 1 Receive: AT^SGCONF=1520,8  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Query the parameters of the configuration (not supported by all products).

\*\*\*\*\*

Subscr 1 Send: AT^SGCONF?  
Subscr 1 Receive: AT^SGCONF?  
Subscr 1 Receive: ^SGCONF: 1520,8  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## **2.10.2 GPRS attach / detach**

### **2.10.2.1 Description**

This chapter describes the AT+CGATT command that enables the ME to attach or to detach from the GPRS service. If the ME is already in the requested state, the command is ignored and OK response is returned.

Any active PDP Contexts will automatically be deactivated, if the ME detaches from the GPRS service.

### **2.10.2.2 Used AT commands**

AT+CGATT - GPRS attach and detach

For further details about the commands see [2].



### 2.10.2.3 Flow chart

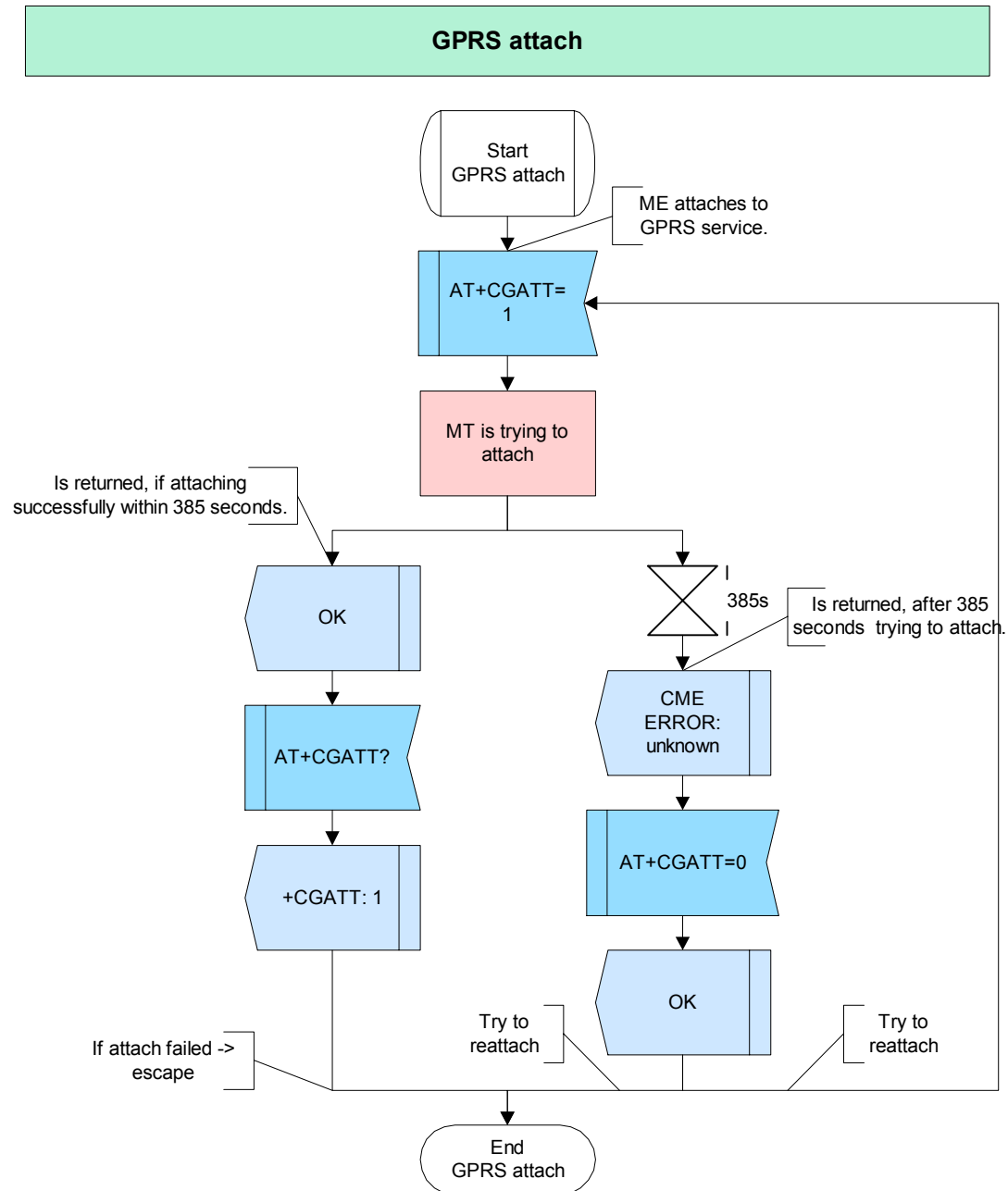


Figure 65: GPRS attach

**GPRS detach**

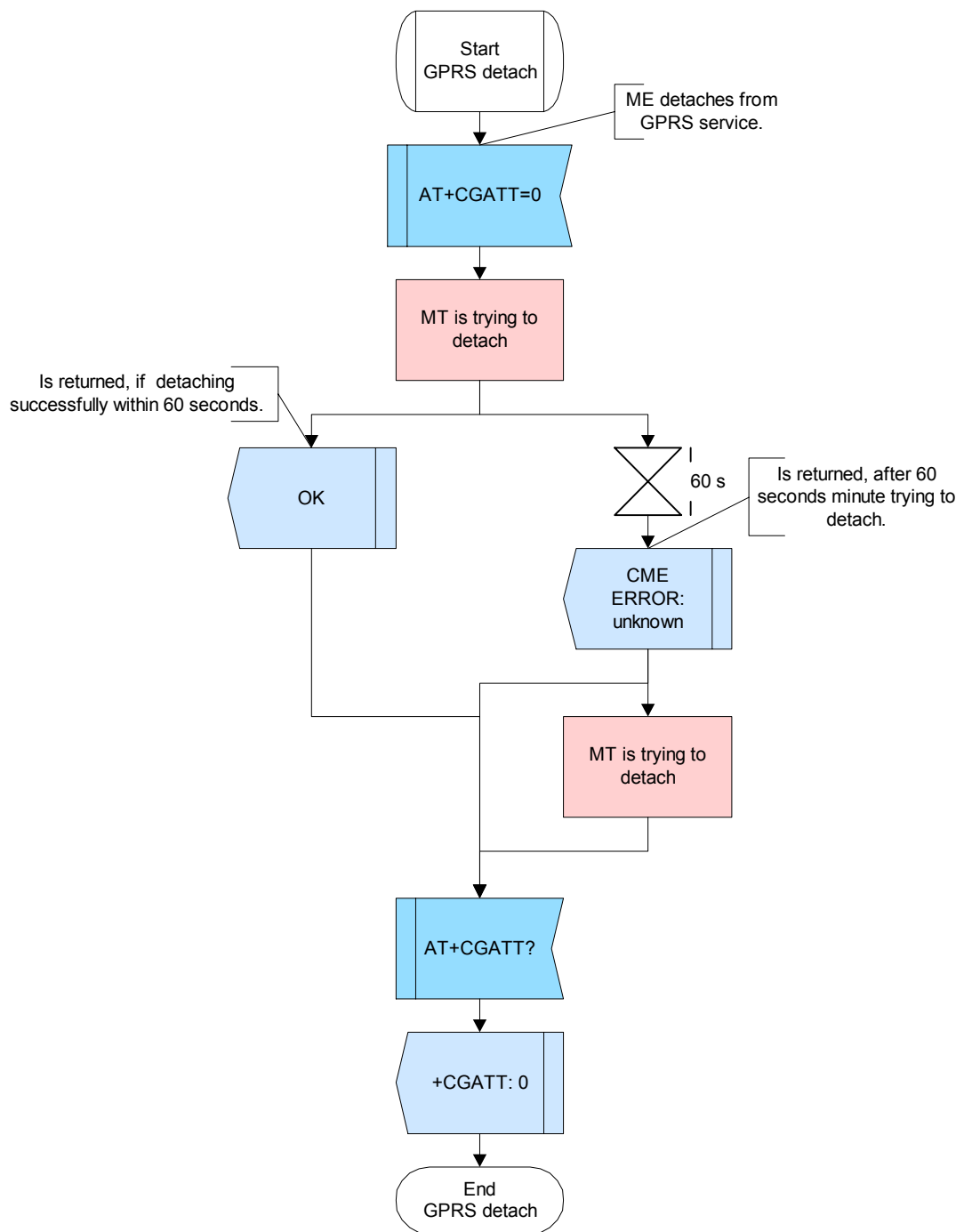


Figure 66: GPRS detach

#### 2.10.2.4 Hints

- If the ME is not able to attach for more than 5 minutes or to detach for more than 1 minute, the command returns „ERROR“ or „+CME ERROR: unknown“, but the ME is still trying to attach/ detach.

### 2.10.2.5 Example

\*\*\*\*\*

Comment: GPRS attach/ detach

\*\*\*\*\*

\*\*\*\*\*

Comment: Attach to GPRS service

\*\*\*\*\*

Subscr 1 Send: AT+CGATT=1

Subscr 1 Receive: AT+CGATT=1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request attached state

\*\*\*\*\*

Subscr 1 Send: AT+CGATT?

Subscr 1 Receive: AT+CGATT?

Subscr 1 Receive: +CGATT: 1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Detach from GPRS service

\*\*\*\*\*

Subscr 1 Send: AT+CGATT=0

Subscr 1 Receive: AT+CGATT=0

Subscr 1 Receive:

Subscr 1 Receive: OK

## **2.10.3 GPRS context definition**

### **2.10.3.1 Description**

Exact settings of GPRS context and Quality of Service Profiles are provisioned by the network provider and must be requested before defining the GPRS context. Every PDP context has a context identifier <cid>. The context identifiers are numbered sequentially and have to start with value 1.

"AT+CGDCONT" is used to define a context ID and specify the PDP type and Access Point Name (APN). The PDP type describes the protocol to be used between the ME and the network. The APN specifies the gateway between mobile network and the internet.

Optionally, a Quality of Service Profile (Minimum acceptable and Requested) can be defined for every defined PDP Context with the commands "AT+CGQREQ" and "AT+CGQMIN". The required parameters depend on the network provider.

For further details see [2] and [4]

### **2.10.3.2 Used AT commands**

AT+CGDCONT	-	Define PDP Context
AT+CGQMIN	-	Quality of Service Profile (Minimum acceptable)
AT+CGQREQ	-	Quality of Service Profile (Requested)

For further details about the commands see [2].

### 2.10.3.3 Flow chart

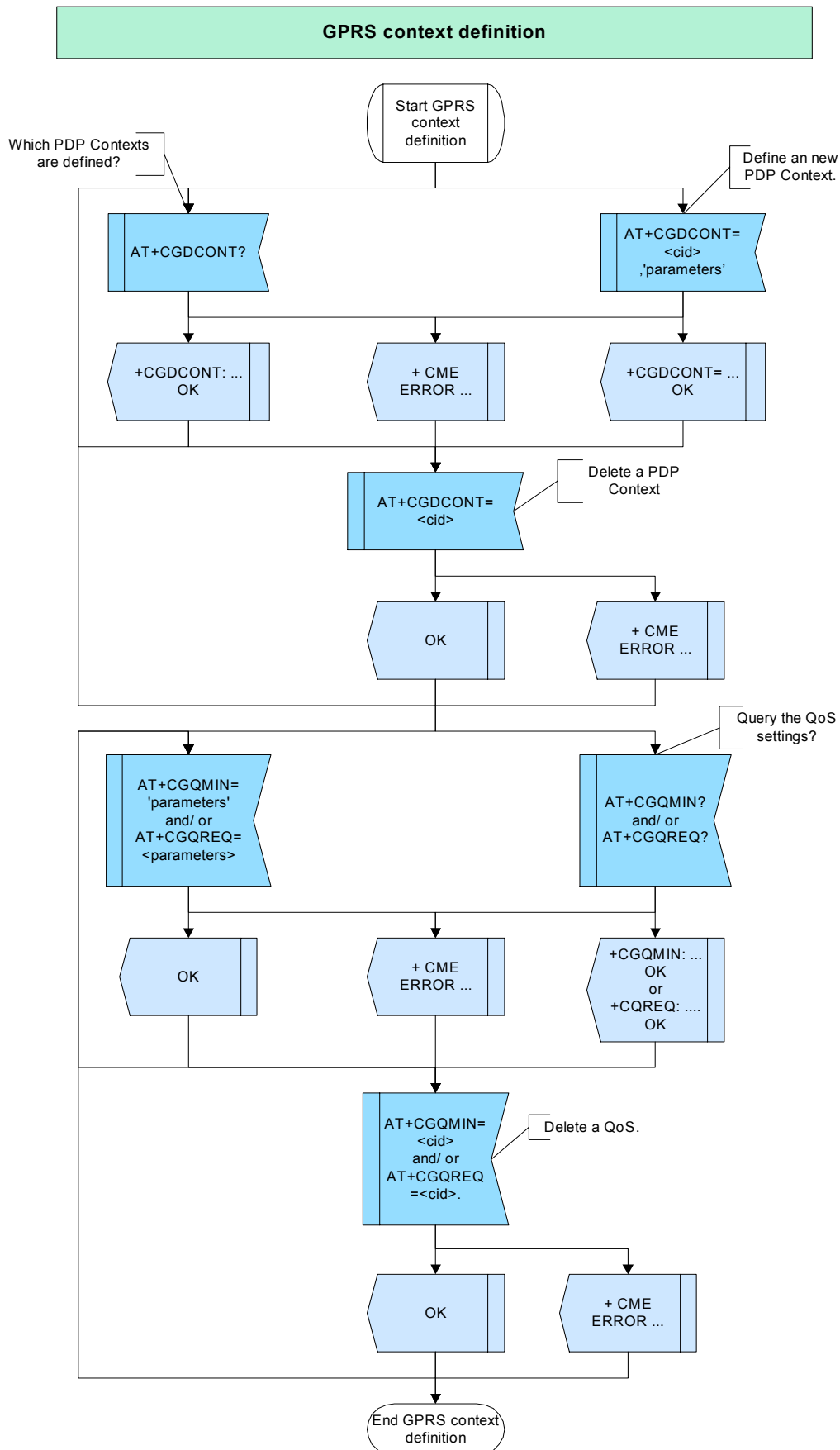


Figure 67: GPRS context definition

### 2.10.3.4 Hints

- Please consider that some providers do not support all of the settings enabled by AT+CGQREQ and AT+CGQMIN.

### 2.10.3.5 Example

\*\*\*\*\*

Comment: GPRS context definition

\*\*\*\*\*

\*\*\*\*\*

Comment: Request defined PDP contexts.

\*\*\*\*\*

Subscr 1 Send: AT+CGDCONT?

Subscr 1 Receive: AT+CGDCONT?

Subscr 1 Receive: +CGDCONT: 2,"IP","www.siemens.com","",0,0

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Define new PDP context.

\*\*\*\*\*

Subscr 1 Send: AT+CGDCONT=1,IP,www.siemens.de

Subscr 1 Receive: AT+CGDCONT=1,IP,www.siemens.de

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Define new PDP context.

\*\*\*\*\*

Subscr 1 Send: AT+CGDCONT=2,IP,www.siemens.com

Subscr 1 Receive: AT+CGDCONT=2,IP,www.siemens.com

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request defined PDP contexts.

\*\*\*\*\*

Subscr 1 Send: AT+CGDCONT?

Subscr 1 Receive: AT+CGDCONT?

Subscr 1 Receive: +CGDCONT: 1,"IP","www.siemens.de","",0,0

Subscr 1 Receive: +CGDCONT: 2,"IP","www.siemens.com","",0,0

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Deletet PDP context cid=1.

\*\*\*\*\*

Subscr 1 Send: AT+CGDCONT=1

Subscr 1 Receive: AT+CGDCONT=1

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request defined PDP contexts.

\*\*\*\*\*

Subscr 1 Send: AT+CGDCONT?

Subscr 1 Receive: AT+CGDCONT?

Subscr 1 Receive: +CGDCONT: 2,"IP","www.siemens.com","",0,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request QoS minimum acceptable.

\*\*\*\*\*

Subscr 1 Send: AT+CGQMIN?  
Subscr 1 Receive: AT+CGQMIN?  
Subscr 1 Receive: +CGQMIN: 2,0,0,0,0,31  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Define QoS for PDP context cid=2.

\*\*\*\*\*

Subscr 1 Send: AT+CGQMIN=2,0,0,0,0,31  
Subscr 1 Receive: AT+CGQMIN=2,0,0,0,0,31  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Define QoS for PDP context cid=1.

\*\*\*\*\*

Subscr 1 Send: AT+CGQMIN=1,0,0,0,0,31  
Subscr 1 Receive: AT+CGQMIN=1,0,0,0,0,31  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request QoS minimum acceptable.

\*\*\*\*\*

Subscr 1 Send: AT+CGQMIN?  
Subscr 1 Receive: AT+CGQMIN?  
Subscr 1 Receive: +CGQMIN: 1,0,0,0,0,31  
Subscr 1 Receive: +CGQMIN: 2,0,0,0,0,31  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Delete QoS for PDP context cid=1.

\*\*\*\*\*

Subscr 1 Send: AT+CGQMIN=1  
Subscr 1 Receive: AT+CGQMIN=1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request QoS minimum acceptable.

\*\*\*\*\*

Subscr 1 Send: AT+CGQMIN?  
Subscr 1 Receive: AT+CGQMIN?  
Subscr 1 Receive: +CGQMIN: 2,0,0,0,0,31  
Subscr 1 Receive: OK

---

## **2.10.4 GPRS PDP Context activation/ deactivation**

### **2.10.4.1 Description**

This chapter describes how to activate and deactivate a specified PDP Context. If a PDP Context is already in the requested state, the state of this context remains unchanged.

If the ME is not yet attached to the GPRS service, the attach will be done before the context activation is executed. If no <cid> is specified (e.g. AT+CGACT=1 or AT+CGACT=0), all defined contexts become activated/ deactivated.

In many networks "AT+CGACT=1" does not work any longer (see Hints).

The command "AT+CGPADDR" shows the PDP address, which was assigned to the module during the activation process. The address may be static or dynamic.

### **2.10.4.2 Used AT commands**

AT+CGPADDR	-	Show PDP address
AT+CGACT	-	PDP Context activate or deactivate
ATH	-	Disconnect existing connection

For further details about the commands see [2].



### 2.10.4.3 Flow Chart

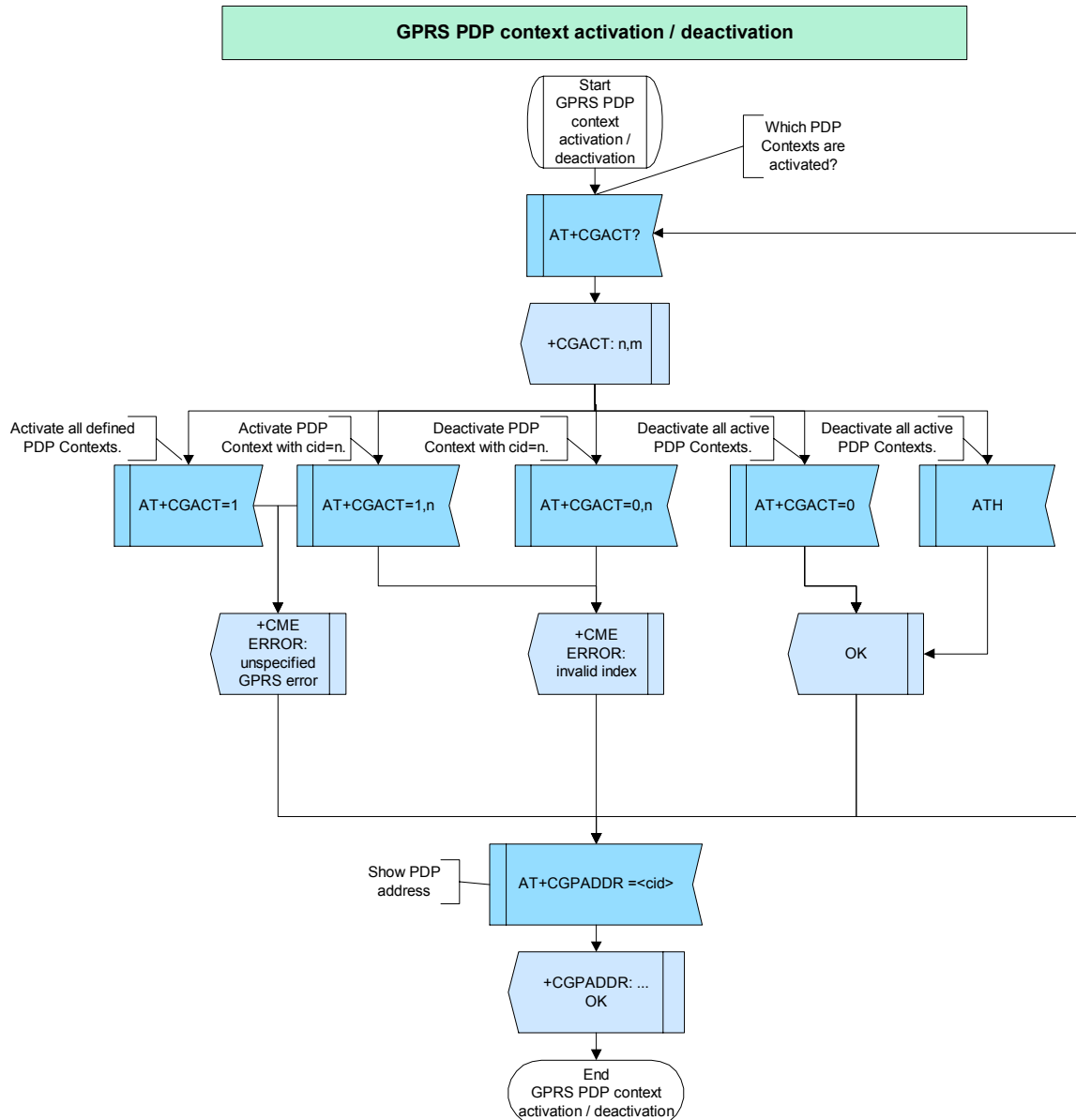


Figure 68: GPRS PDP context activation / deactivation

### 2.10.4.4 Hints

- In many networks the GPRS context activation command does not work any longer. Many networks require user name and password for context activation. However these parameters are only handed to module during the PPP traffic and not by AT command. Since the PPP traffic only starts when entering the data mode, it is necessary to enter data mode before the actual PDP context activation request is sent to the network. Use `ATD*99***<cid>#` to do so.
- If the MT is not GPRS attached when the activation form of the `AT+CGACT` or `AT+CGDATA` command is executed, it performs a GPRS attach and then attempts to activate the specified context.

#### 2.10.4.5 Example

\*\*\*\*\*

Comment PDP context activate/deactivate

\*\*\*\*\*

\*\*\*\*\*

Comment Request activated PDP contexts

\*\*\*\*\*

Subscr 1 Send: AT+CGACT?

Subscr 1 Receive: AT+CGACT?

Subscr 1 Receive: +CGACT: 1,0

Subscr 1 Receive: +CGACT: 2,1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment Activate PDP context cid=2

\*\*\*\*\*

Subscr 1 Send: AT+CGACT=1,2

Subscr 1 Receive: AT+CGACT=1,2

Subscr 1 Receive: OK

\*\*\*\*\*

Comment Request activated PDP contexts

\*\*\*\*\*

Subscr 1 Send: AT+CGACT?

Subscr 1 Receive: AT+CGACT?

Subscr 1 Receive: +CGACT: 1,0

Subscr 1 Receive: +CGACT: 2,1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment Deactivate all PDP contexts

\*\*\*\*\*

Subscr 1 Send: AT+CGACT=0

Subscr 1 Receive: AT+CGACT=0

Subscr 1 Receive: OK

\*\*\*\*\*

Comment Request activated PDP contexts

\*\*\*\*\*

Subscr 1 Send: AT+CGACT?

Subscr 1 Receive: AT+CGACT?

Subscr 1 Receive: +CGACT: 1,0

Subscr 1 Receive: +CGACT: 2,0

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment Show PDP address

\*\*\*\*\*

Subscr 1 Send: AT+CGPADDR=?  
Subscr 1 Receive: AT+CGPADDR=?  
Subscr 1 Receive: +CGPADDR: (1,2)  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Activate all PDP contexts

\*\*\*\*\*

Subscr 1 Send: AT+CGACT=1  
Subscr 1 Receive: AT+CGACT=1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Request activated PDP contexts

\*\*\*\*\*

Subscr 1 Send: AT+CGACT?  
Subscr 1 Receive: AT+CGACT?  
Subscr 1 Receive: +CGACT: 1,1  
Subscr 1 Receive: +CGACT: 2,1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Show PDP address without <cid>

\*\*\*\*\*

Subscr 1 Send: AT+CGPADDR=  
Subscr 1 Receive: AT+CGPADDR=  
Subscr 1 Receive: +CGPADDR: 1,"10.10.0.33"  
Subscr 1 Receive: +CGPADDR: 2,"10.10.1.33"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Deactivate PDP context cid=1

\*\*\*\*\*

Subscr 1 Send: AT+CGACT=0,1  
Subscr 1 Receive: AT+CGACT=0,1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Request activated PDP contexts

\*\*\*\*\*

Subscr 1 Send: AT+CGACT?  
Subscr 1 Receive: AT+CGACT?  
Subscr 1 Receive: +CGACT: 1,0  
Subscr 1 Receive: +CGACT: 2,1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Show PDP address cid=2

\*\*\*\*\*

Subscr 1 Send: AT+CGPADDR=2  
Subscr 1 Receive: AT+CGPADDR=2  
Subscr 1 Receive: +CGPADDR: 2,"10.10.1.33"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Deactivate all PDP contexts

\*\*\*\*\*

Subscr 1 Send: ATH  
Subscr 1 Receive: ATH  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Request activated PDP contexts

\*\*\*\*\*

Subscr 1 Send: AT+CGACT?  
Subscr 1 Receive: AT+CGACT?  
Subscr 1 Receive: +CGACT: 1,0  
Subscr 1 Receive: +CGACT: 2,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Request defined PDP contexts

\*\*\*\*\*

Subscr 1 Send: AT+CGDCONT?  
Subscr 1 Receive: AT+CGDCONT?  
Subscr 1 Receive: +CGDCONT: 1,"IP","www.siemens.de","",0,0  
Subscr 1 Receive: +CGDCONT: 2,"IP","www.siemens.com","",0,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## **2.10.5 Entering GPRS data mode**

### **2.10.5.1 Description**

There are several ways to go into GPRS data mode. The best approach is using the command `ATD*99***<cid>#`. The command `AT+CGDATA=PPP,<cid>`, however, is provided for reference purposes only.

The PDP context (parameter <cid>) must be defined before via `AT+CGDCONT`.

If `ATD*99***<cid>#` or `AT+CGDATA` are entered without specifying a parameter, default parameters will be used.

When entering the GPRS data mode, PPP traffic between the module and the application is transferred. Therefore the application must be capable of handling PPP protocol.

### **2.10.5.2 Used AT commands**

<code>AT+CGDATA / ATD*99***1#</code>	-	Enter GPRS data mode
<code>+++</code>	-	Switch from data mode or PPP online mode to command mode
<code>ATO / AT+CGDATA</code>	-	Switch from command mode to data mode

For further details about the commands see [2].

### 2.10.5.3 Flow chart

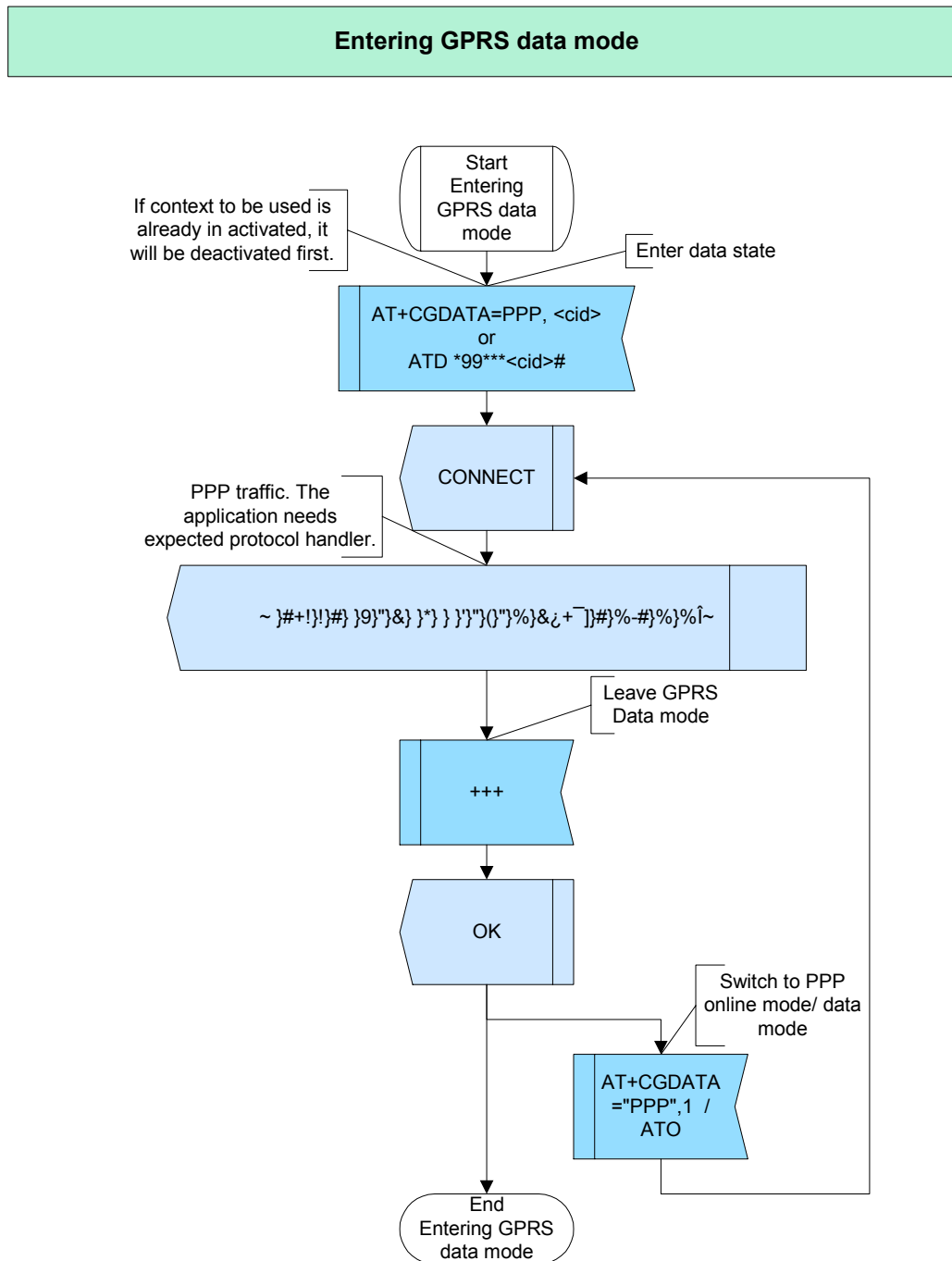


Figure 69: Entering GPRS data mode

### 2.10.5.4 Hints

- Even though specified the command ATD\*99# will not be accepted by many networks, because the default context does not contain the network specific parameters. Rather, use ATD\*99\*\*\*<cid># because this will activate the defined context with all required parameters.
- When the module is not attached and/or PDP Context activated, when trying to enter the GPRS data mode, the module first performs a GPRS attach, then attempts to activate the specified context and enters the GPRS data mode.

### 2.10.5.5 Example

\*\*\*\*\*

Comment: Entering GPRS data mode

\*\*\*\*\*

\*\*\*\*\*

Comment: Enter GPRS data mode by using PDP Context cid=1

\*\*\*\*\*

Subscr 1 Send: ATD\*99\*\*\*1#

Subscr 1 Receive: ATD\*99\*\*\*1#

Subscr 1 Receive: CONNECT

\*\*\*\*\*

Comment: PPP traffic

\*\*\*\*\*

Subscr 1 Receive: ~'255'!#192'!} }9}"&} }\*} } }"}({"}%}&9G}1}}#}%194'#}%Y'196'~

\*\*\*\*\*

Comment: Leave GPRS data mode

\*\*\*\*\*

Subscr 1 Send: +++

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Switch back to GPRS data mode

\*\*\*\*\*

Subscr 1 Send: AT+CGDATA="PPP",1

Subscr 1 Receive: AT+CGDATA="PPP",1

Subscr 1 Receive: CONNECT

\*\*\*\*\*

Comment: PPP traffic

\*\*\*\*\*

Subscr 1 Receive: ~'255'!#192'!} }9}"&} }\*} } }"}({"}%}&9G}1}}#}%194'#}%Y'196'~  
~'255'!#192'!} }9}"&} }\*} } }"}({"}%}&9G}1}}#}%194'#}%Y'196'~  
~'255'!#192'!} }9}"&} }\*} } }"}({"}%}&9G}1}}#}%194'#}%Y'196'~

\*\*\*\*\*

Comment: Leave GPRS data mode

\*\*\*\*\*

Subscr 1 Send: +++

Subscr 1 Receive:

Subscr 1 Receive: OK

## 2.11 SMS

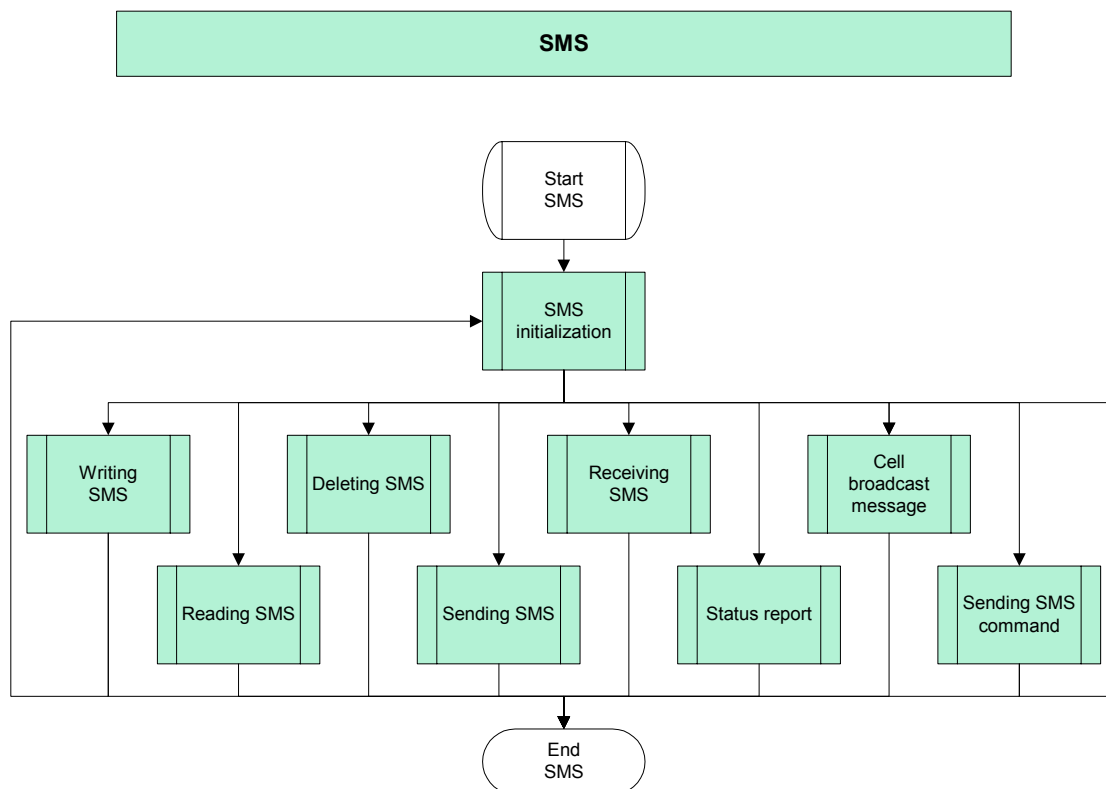


Figure 70: SMS

SMS is a service to transfer short messages between a GSM MS and an SME via an SC. Siemens GSM modules support two modes: text mode and PDU mode. The minimal requirements to send a short message are:

- Service center address of your provider
- Destination address
- Content of your message

To write or send short messages in text mode the ME must be configured to use text mode, and the service center address must be set. For further settings see chapters 2.11.1, 2.11.2 and 2.11.4.

Writing or sending a short message in PDU mode requires all attributes the short message to be coded in PDU. A PDU consists of the following parts:

- **Service Center Address** encodes the length of address field, the SCA type and the SCA
- **First Octet** encodes the message type indicator, reject-duplicates, more messages to send, validity period format, user data header indicator, status report request and status report indication
- **Message Reference**
- **Destination-Address** encodes the destination address, the length of destination address field and the type of destination address
- **Protocol-Identifier**
- **DataCoding-Scheme**
- **Validity Period**
- **User-Data-Length**
- **User-Data** encodes the user data header and user data

For detailed explanation of all fields and parameters see [8].



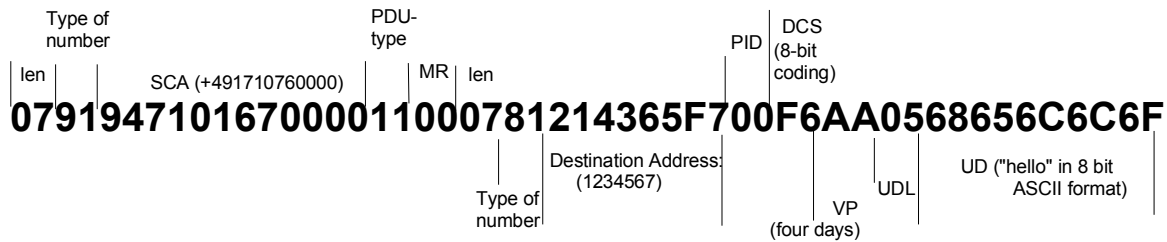


Figure 71: PDU example

## 2.11.1 SMS initialization

### 2.11.1.1 Description

This chapter summarizes all the AT commands suggested to set up the ME for using SMS.

- Siemens GSM modules support two character sets: the GSM default alphabet defined in GSM 03.38 (7 bit) and the UCS2 character set. UCS2 is a 16-bit universal multiple-octet coded character set, defined in ISO/IEC10646. To choose one of them use the command AT+CSCS.
- To set the SMS message format use AT+CMGF. Choose AT+CMGF=1 for text mode, or AT+CMGF=0 for PDU mode.
- If text mode is activated, you can enable the presentation of text mode parameters in the result codes of SMS reading and listing commands by using "AT+CSDH".
- To change the text mode parameters use AT+CSMP. You can set the following SMS parameters: first octet, service center time stamp, validity period and the protocol identifier.
- Basically, the service center address supplied by the service provider must be specified. In text mode (AT+CMGF=1), this is done by using the AT+CSCA command. If you use PDU mode it is possible to code the service center address in your PDU. Therefore, in PDU mode, setting the service center address with AT+CSCA is optional.
- If you want to use SMS features specified in GSM 07.05 Phase 2+, you need to enable Phase 2+ functionality with "AT+CSMS".
- To be notified by a URC, when the module receives a short message, a cell broadcast message or status report use AT+CNMI to enable the presentation of URCs.
- To be notified by a URC, when the SMS storage is full, use AT^SMGO to enable the presentation of URCs.
- Use AT+CPMS to select the preferred storage for short messages. If the preferred storage is "MT" you can determine the storage sequence with "AT^SSMSS". This gives you the choice of using first either the SIM or the ME storage.
- With AT+CGSMS you can select preferences for transmitting MO short messages over GPRS or circuit switched services.
- AT^SSCONF allows you to enable or disable the presentation of the parameters <ra> and <tor> for status reports in the result codes of SMS reading and listing commands.
- If you want to receive cell broadcast messages activate the URC presentation for CBS with AT+CNMI and subscribe to a CBS channel with AT+CSCB.
- The AT^SM20 command specifies different modes of responses returned when sending and writing short messages:  
AT^SM20=,0 causes the ME return "+CMS ERROR: <err>" when writing or sending of short messages fails.  
AT^SM20=,1 (factory default) causes the ME to return "OK" no matter whether or not the SMS command was successfully executed.

Some of the above settings can be stored to the user profile. See [2] for a list of settings storable with AT&W.

---

### **2.11.1.2 Used AT commands**

AT+CSCS	-	Set TE character set
AT+CSCA	-	SMS service center address
AT+CSMS	-	Select Message Service
AT+CNMI	-	New SMS message indications
AT^SMGO	-	Set or query SMS overflow presentation mode or query SMS overflow
AT^SM20	-	Set M20 Compatibility
AT+CPMS	-	Preferred SMS message storage
AT^SSMSS	-	Set Short Message Storage Sequence
AT+CGSMS	-	Select service for MO SMS messages
AT^SSCONF	-	SMS Configuration
AT+CMGF	-	Select SMS message format
AT+CSDH	-	Show SMS text mode parameters
AT+CSMP	-	Set SMS text mode parameters
AT&W	-	Store current configuration to user defined profile

For further details about the commands see [2].

### 2.11.1.3 Flow chart

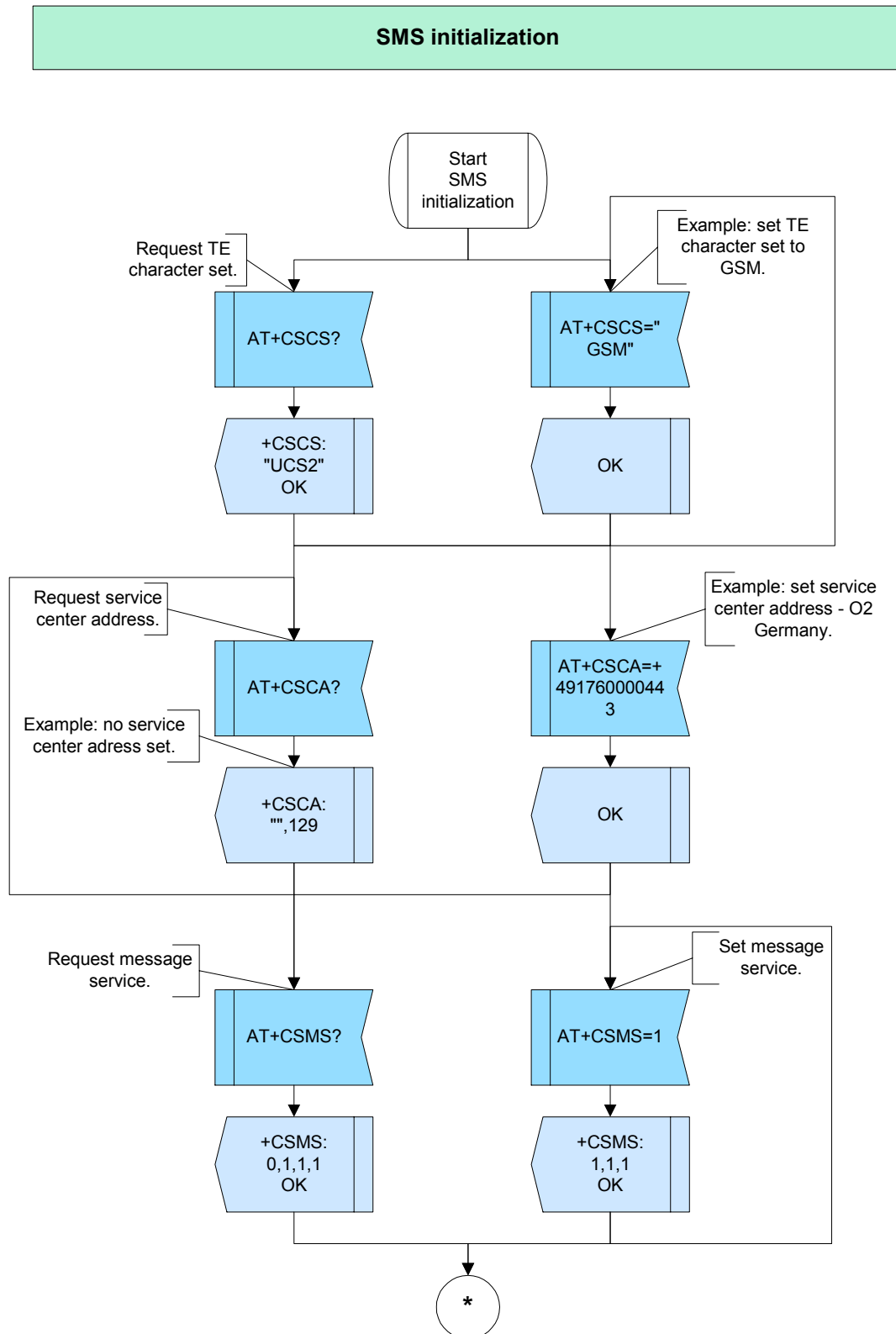


Figure 72: SMS initialization - part 1

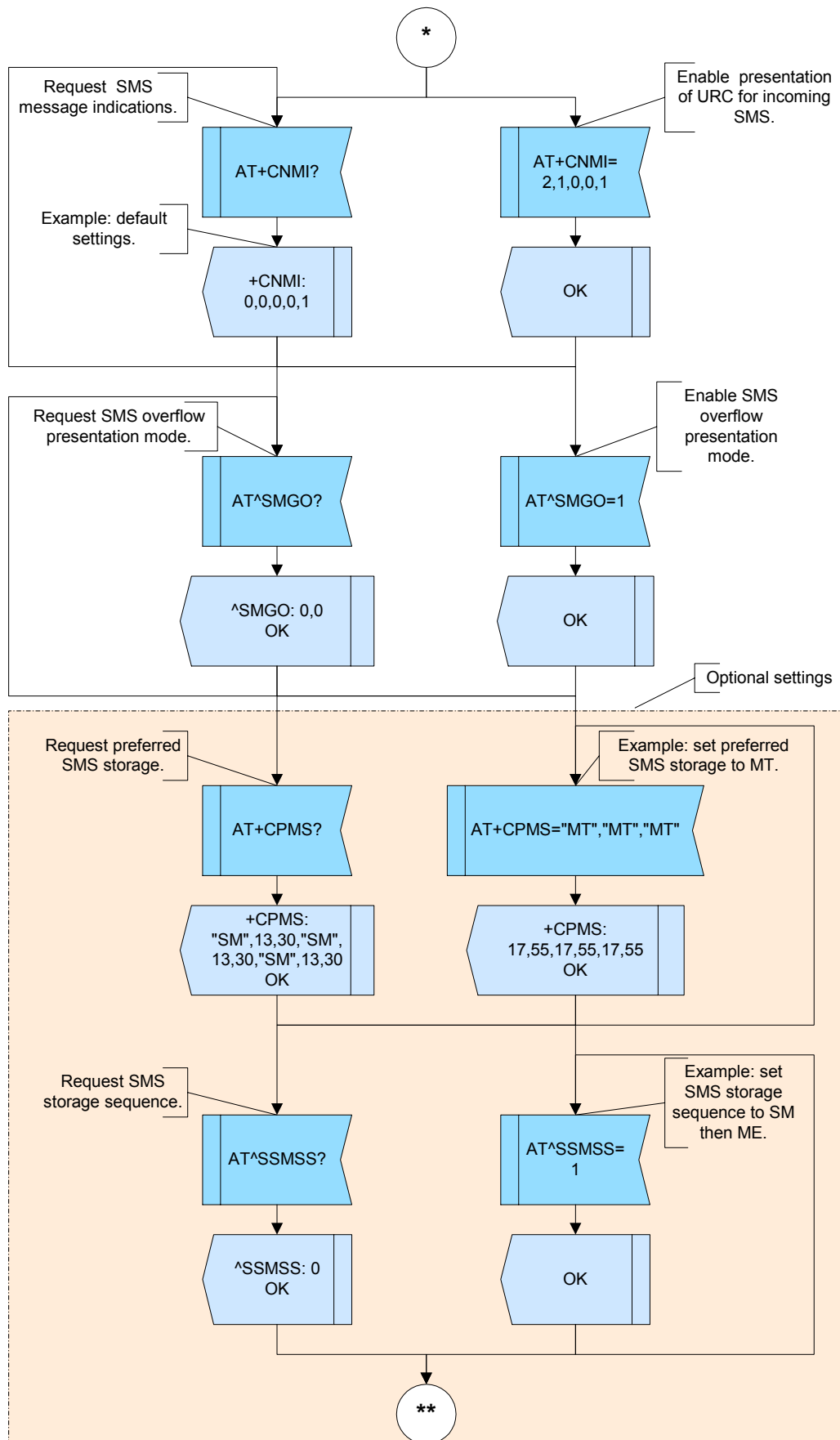


Figure 73: SMS initialization - part 2

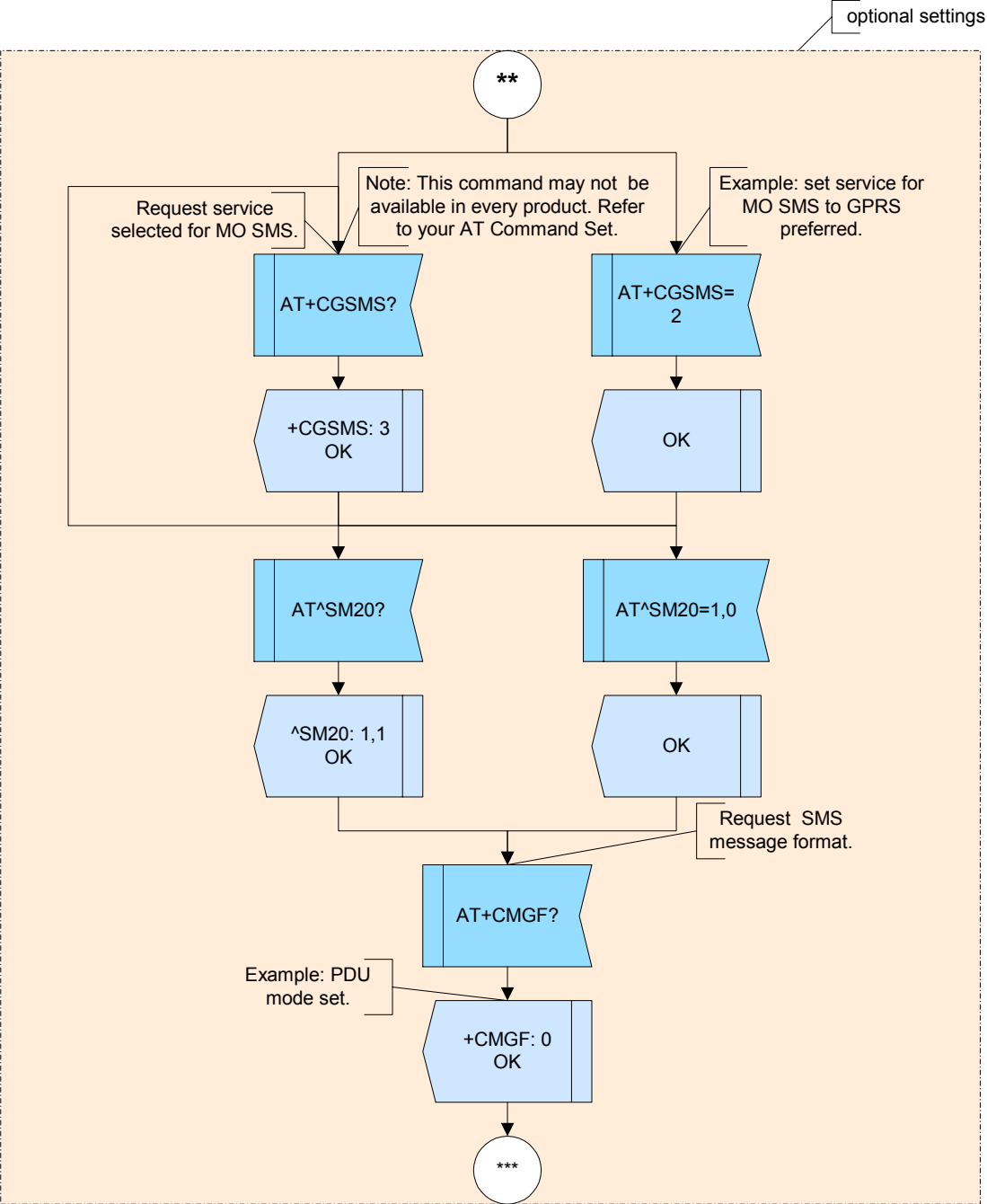


Figure 74: SMS initialization - part 3

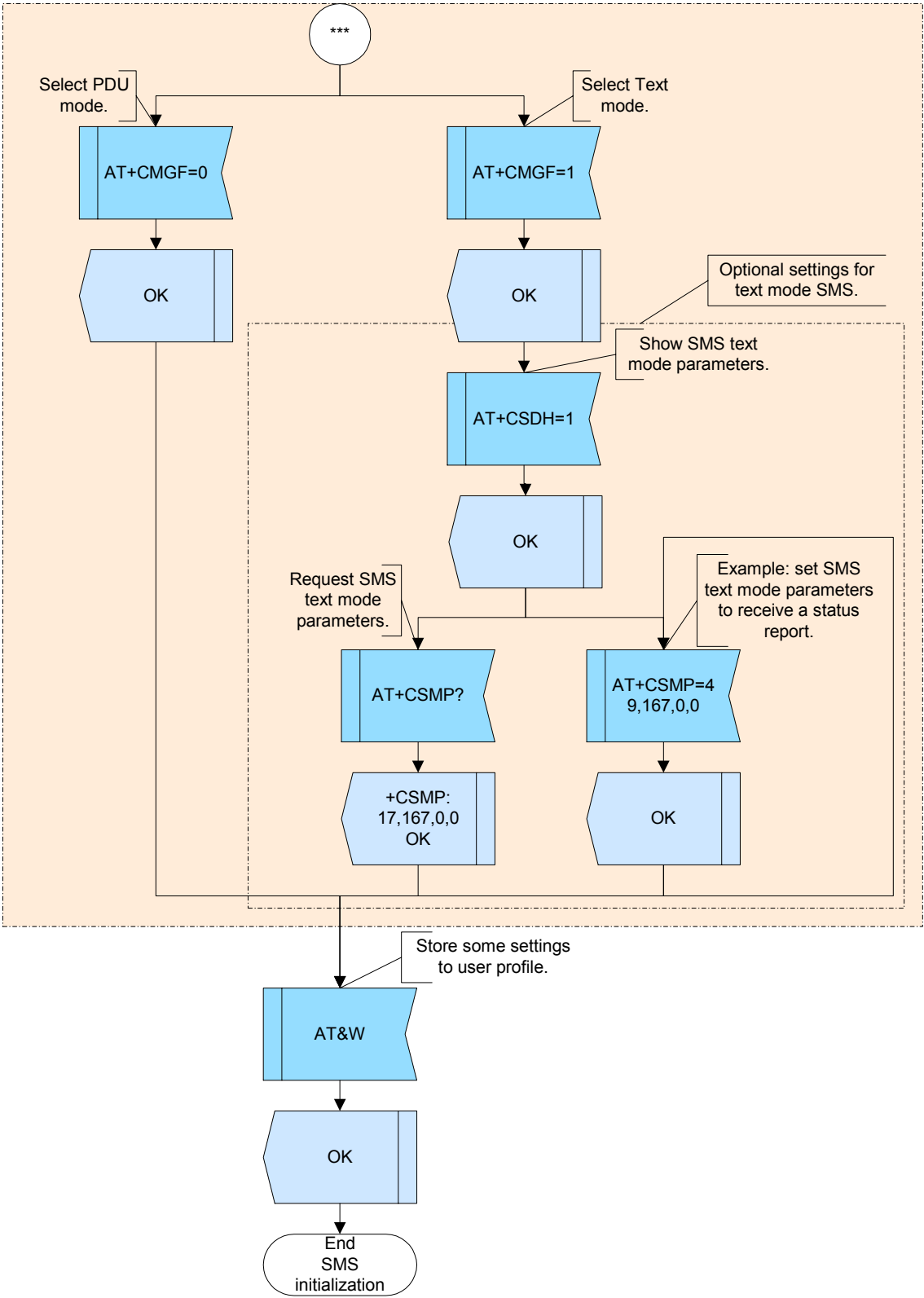


Figure 75: SMS initialization - part 4

SMS initialization (cell broadcast)

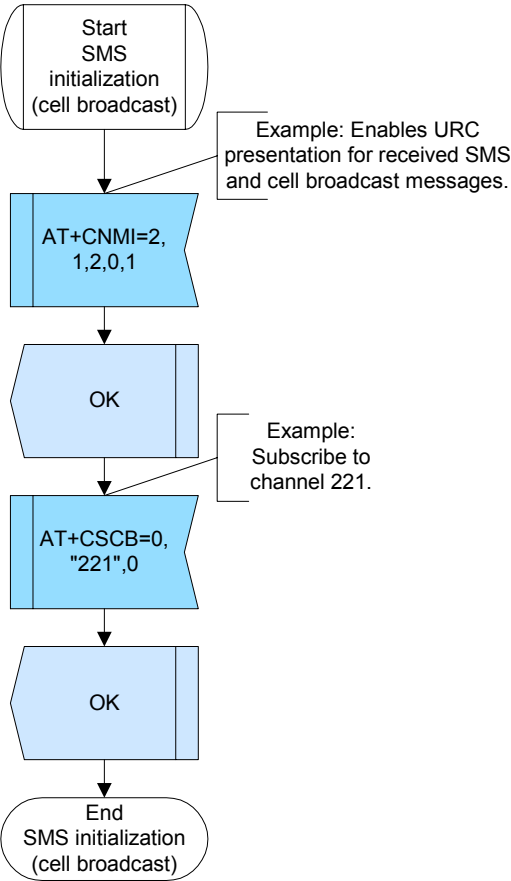


Figure 76: SMS initialization (cell broadcast)

SMS initialization (status report)

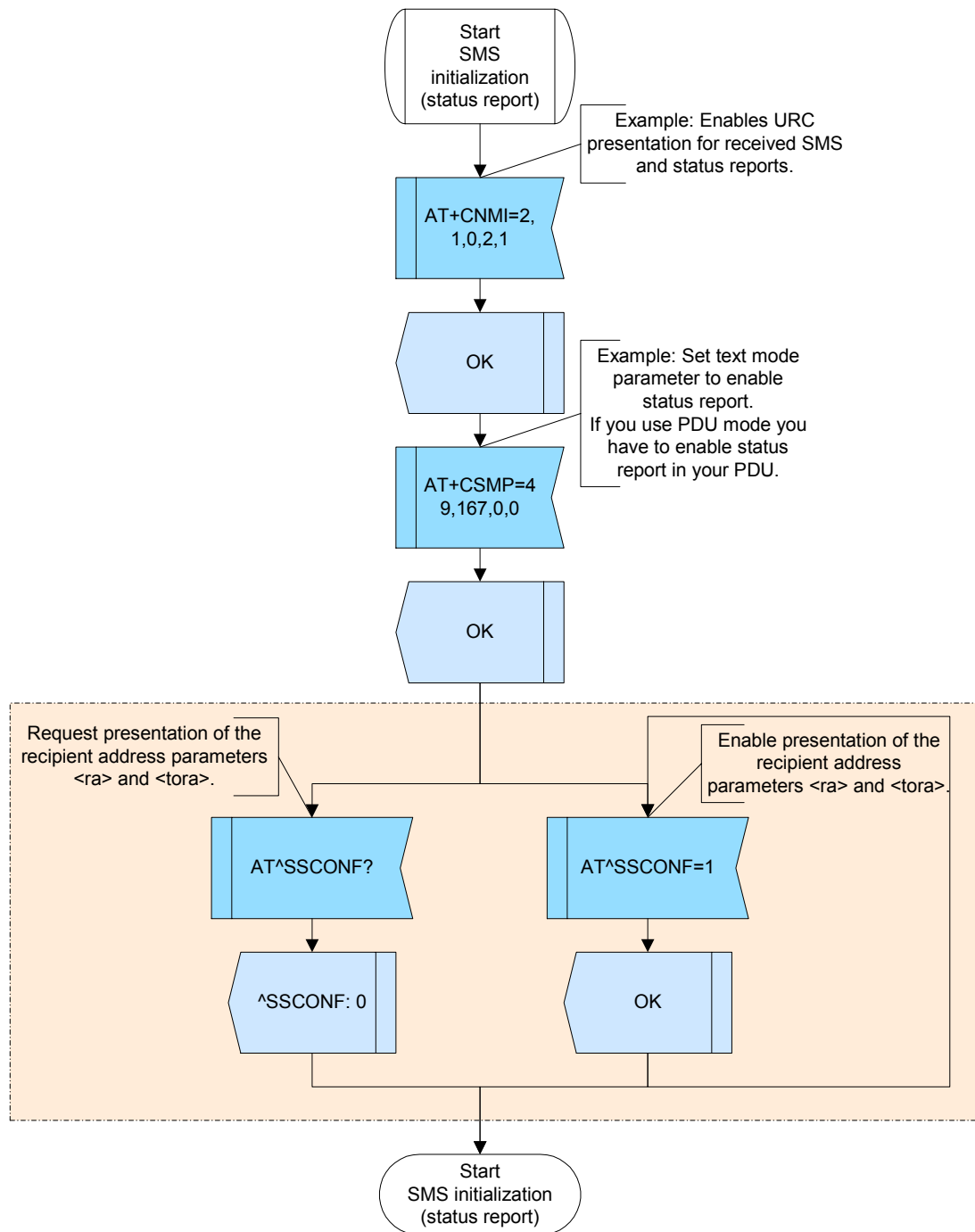


Figure 77: SMS initialization (status report)



#### 2.11.1.4 Hints

GCF-CC note: The GSM character set must be supported. For further details see [2]

GCF-CC note: GCF test cases verify the initialization of Cell Broadcast settings. Therefore, we recommend that the necessary settings be included in your application.  
Some applications store all short messages to a local memory since it offers more space. Please consider that some GCF test cases verify if short messages are properly stored on the SIM or on the ME RAM.

#### 2.11.1.5 Example

\*\*\*\*\*

Comment: SMS initialization

\*\*\*\*\*

\*\*\*\*\*

Comment: Request TE character set.

\*\*\*\*\*

Subscr 1 Send: AT+CSCS?

Subscr 1 Receive: AT+CSCS?

Subscr 1 Receive: +CSCS: "UCS2"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set TE character set to GSM.

\*\*\*\*\*

Subscr 1 Send: AT+CSCS="GSM"

Subscr 1 Receive: AT+CSCS="GSM"

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request service center address.

\*\*\*\*\*

Subscr 1 Send: AT+CSCA?

Subscr 1 Receive: AT+CSCA?

Subscr 1 Receive: +CSCA: "",129

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set service center address. Example: address of O2 Germany.

\*\*\*\*\*

Subscr 1 Send: AT+CSCA="+491760000443

Subscr 1 Receive: AT+CSCA="+491760000443

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request message service.

\*\*\*\*\*

Subscr 1 Send: AT+CSMS?  
Subscr 1 Receive: AT+CSMS?  
Subscr 1 Receive: +CSMS: 0,1,1,1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set message service to phase 2+.

\*\*\*\*\*

Subscr 1 Send: AT+CSMS=1  
Subscr 1 Receive: AT+CSMS=1  
Subscr 1 Receive: +CSMS: 1,1,1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request SMS message indication.

\*\*\*\*\*

Subscr 1 Send: AT+CNMI?  
Subscr 1 Receive: AT+CNMI?  
Subscr 1 Receive: +CNMI: 0,0,0,0,1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set SMS message indication.

\*\*\*\*\*

Subscr 1 Send: AT+CNMI=2,1,0,0,1  
Subscr 1 Receive: AT+CNMI=2,1,0,0,1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request SMS overflow presentation.

\*\*\*\*\*

Subscr 1 Send: AT^SMGO?  
Subscr 1 Receive: AT^SMGO?  
Subscr 1 Receive: ^SMGO: 0,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable SMS overflow presentation.

\*\*\*\*\*

Subscr 1 Send: AT^SMGO=1  
Subscr 1 Receive: AT^SMGO=1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request preferred SMS storage.

\*\*\*\*\*

Subscr 1 Send: AT+CPMS?  
Subscr 1 Receive: AT+CPMS?  
Subscr 1 Receive: +CPMS: "SM",12,30,"ME",1,25,"MT",13,55  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set preferred SMS storage to MT,MT,MT.

\*\*\*\*\*

Subscr 1 Send: AT+CPMS="MT","MT","MT"  
Subscr 1 Receive: AT+CPMS="MT","MT","MT"  
Subscr 1 Receive: +CPMS: 13,55,13,55,13,55  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request SMS storage sequence.

\*\*\*\*\*

Subscr 1 Send: AT^SSMSS?  
Subscr 1 Receive: AT^SSMSS?  
Subscr 1 Receive: ^SSMSS: 0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set SMS storage sequence to SM then ME.

\*\*\*\*\*

Subscr 1 Send: AT^SSMSS=1  
Subscr 1 Receive: AT^SSMSS=1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request selected service for MO SMS.

\*\*\*\*\*

Subscr 1 Send: AT+CGSMS?  
Subscr 1 Receive: AT+CGSMS?  
Subscr 1 Receive: +CGSMS: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set service for MO SMS to GPRS preferred.

\*\*\*\*\*

Subscr 1 Send: AT+CGSMS=2  
Subscr 1 Receive: AT+CGSMS=2  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request M20 compatibility settings.

\*\*\*\*\*

Subscr 1 Send: AT^SM20?

Subscr 1 Receive: AT^SM20?

Subscr 1 Receive: ^SM20: 1,1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set Siemens mobile phones compatibility.

\*\*\*\*\*

Subscr 1 Send: AT^SM20=1,0

Subscr 1 Receive: AT^SM20=1,0

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request SMS message format.

\*\*\*\*\*

Subscr 1 Send: AT+CMGF?

Subscr 1 Receive: AT+CMGF?

Subscr 1 Receive: +CMGF: 1

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set SMS message format to PDU mode.

\*\*\*\*\*

Subscr 1 Send: AT+CMGF=0

Subscr 1 Receive: AT+CMGF=0

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Store some settings to user profile.

\*\*\*\*\*

Subscr 1 Send: AT&W

Subscr 1 Receive: AT&W

Subscr 1 Receive: OK

---

## **2.11.2 Writing SMS**

### **2.11.2.1 Description**

This chapter describes all the steps required to write a short message to the memory. You can do this by using text mode, or by using PDU mode. If you want to write your short message in text mode, first use AT+CSMP to set some parameters. When using PDU mode you have to create the PDU by an external tool or your application first.

### **2.11.2.2 Used AT commands**

AT+CMGF	-	Select SMS message format
AT^SMGO	-	Set or query SMS overflow presentation mode or query SMS overflow
AT+CSMP	-	Set SMS text mode parameters
AT+CMGW	-	Write SMS message to memory

For further details about the commands see [2].

### 2.11.2.3 Flow chart

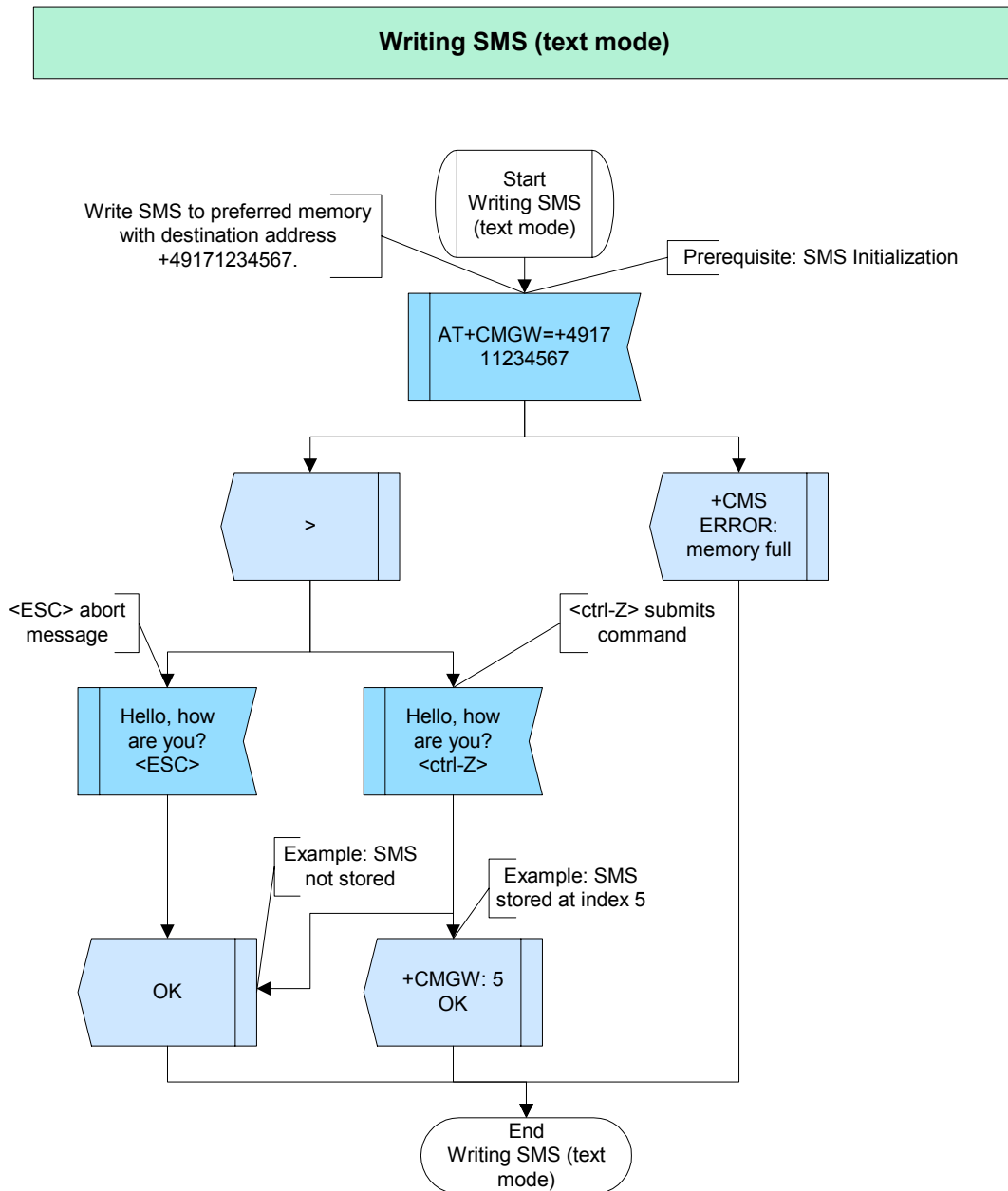


Figure 78: Writing SMS (text mode)

## Writing SMS (PDU mode)

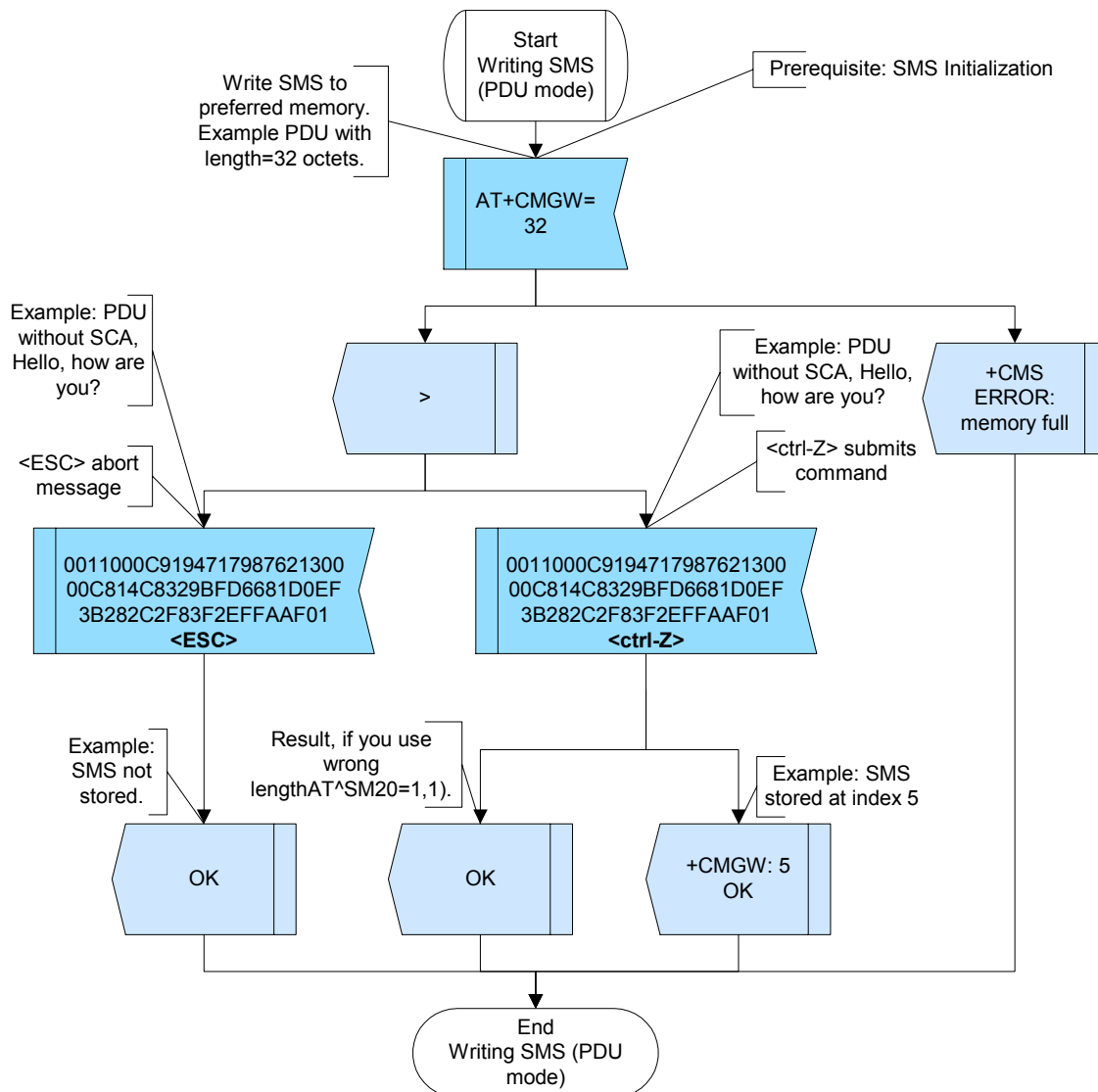


Figure 79: Writing SMS (PDU mode)

### 2.11.2.4 Hints

- Tools to decode and encode PDUs can be found in the Internet.

### 2.11.2.5 Example

#### Example 1:

\*\*\*\*\*

Comment: Writing SMS (text mode)

\*\*\*\*\*

\*\*\*\*\*

Comment: Write SMS in text mode to memory

\*\*\*\*\*

```
Subscr 1    Send: AT+CMGW=+491797782631
Subscr 1    Receive: AT+CMGW=+491797782631
Subscr 1    Receive: >
Subscr 1    Send: Hello, how are you?
Subscr 1    Receive: Hello, how are you?'26'
Subscr 1    Receive: +CMGW: 30
Subscr 1    Receive:
Subscr 1    Receive: OK
```

\*\*\*\*\*

Comment: Attempt to write SMS in text mode to memory if memory is full

\*\*\*\*\*

```
Subscr 1    Send: AT+CMGW=+491797782631
Subscr 1    Receive: AT+CMGW=+491797782631
Subscr 1    Receive: +CMS ERROR: memory full
```

### Example 2:

\*\*\*\*\*

Comment: Writing SMS (PDU mode)

\*\*\*\*\*

\*\*\*\*\*

Comment: Try to write SMS in PDU mode with wrong length to memory

\*\*\*\*\*

```
Subscr 1    Send: AT+CMGW=50
Subscr 1    Receive: AT+CMGW=50
Subscr 1    Receive: >
Subscr 1    Send: 0011000A9171798762130000A713C8329BFD6681D0EF3B282C2F83F2EFA0F
Subscr 1    Receive:
0011000A9171798762130000A713C8329BFD6681D0EF3B282C2F83F2EFA0F'26'
Subscr 1    Receive:
Subscr 1    Receive: OK
```

\*\*\*\*\*

Comment: Write SMS in PDU mode to memory

\*\*\*\*\*

```
Subscr 1    Send: AT+CMGW=30
Subscr 1    Receive: AT+CMGW=30
Subscr 1    Receive: >
Subscr 1    Send: 0011000A9171798762130000A713C8329BFD6681D0EF3B282C2F83F2EFA0F
Subscr 1    Receive:
0011000A9171798762130000A713C8329BFD6681D0EF3B282C2F83F2EFA0F'26'
Subscr 1    Receive: +CMGW: 30
Subscr 1    Receive:
Subscr 1    Receive: OK
```

\*\*\*\*\*

Comment: Attempt to write SMS in PDU mode to memory if memory is full

\*\*\*\*\*

```
Subscr 1    Send: AT+CMGW=30
Subscr 1    Receive: AT+CMGW=30
Subscr 1    Receive: +CMS ERROR: memory full
```



---

## **2.11.3 Deleting SMS**

### **2.11.3.1 Description**

This chapter describes all the steps required to delete a short message from the preferred memory chosen by the init setting (using AT+CPMS).

The AT+CMGL command can be used optionally before deleting the SMS.

### **2.11.3.2 Used AT commands**

AT+CMGL	-	List SMS messages from preferred store (optional)
AT+CMGD	-	Delete SMS message (mandatory)

For further details about the commands see [2].

### 2.11.3.3 Flow chart

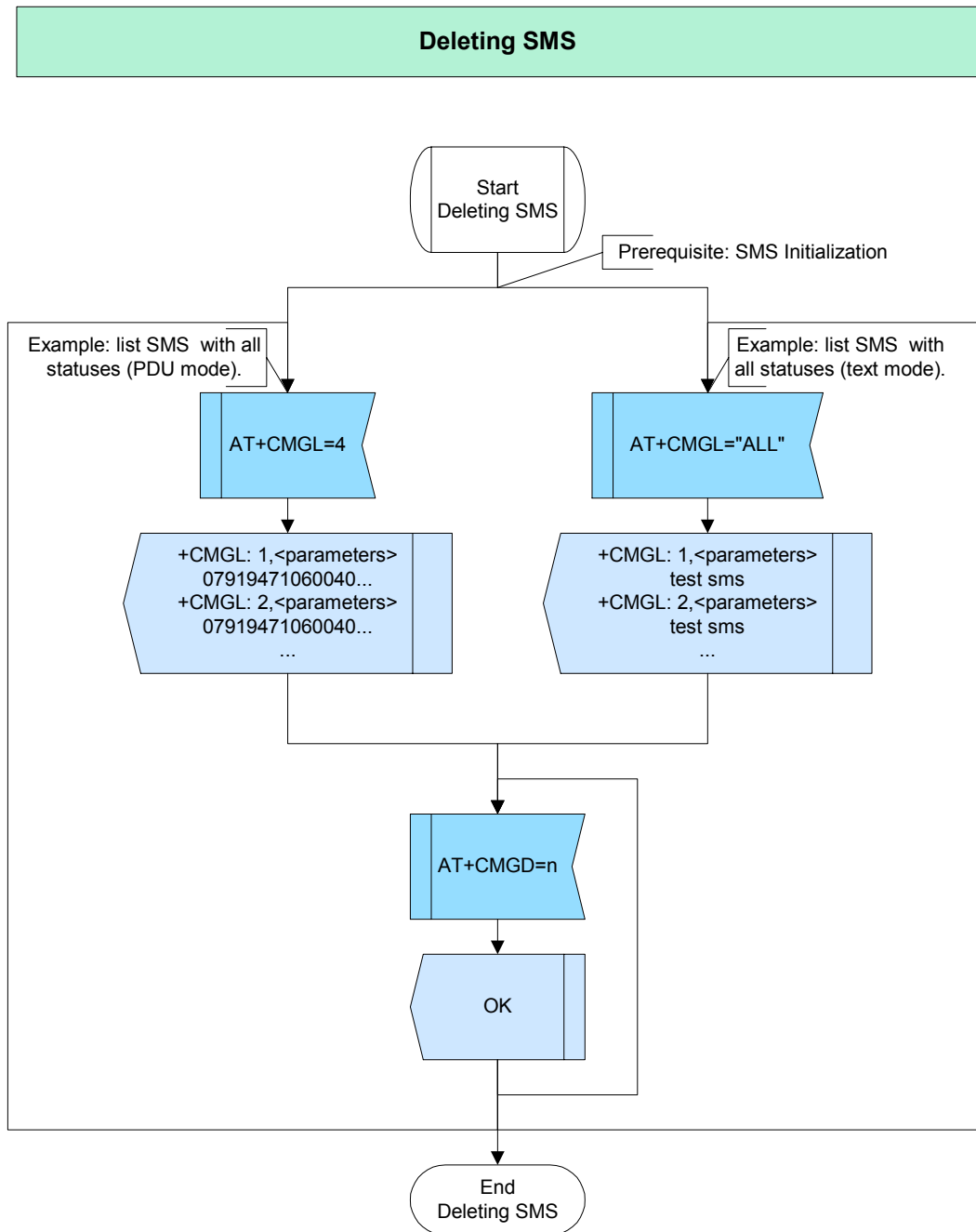


Figure 80: Deleting SMS

### 2.11.3.4 Hints

- A short message can be deleted anytime, however in general, if not deleting the complete memory, it is necessary to know the index. Therefore it is often recommended to execute the AT+CMGL command before deletion.
- You can delete short messages regardless of their state, for example received unread messages, received read messages etc.
- If no SMS is stored, an empty list and "OK" will be returned.

### 2.11.3.5 Example

\*\*\*\*\*

Comment: Deleting SMS

\*\*\*\*\*

\*\*\*\*\*

Comment: List SMS with all statuses (PDU mode)

\*\*\*\*\*

Subscr 1 Send: AT+CMGL=4

Subscr 1 Receive: AT+CMGL=4

Subscr 1 Receive: +CMGL: 6,2,,30

Subscr 1 Receive:

0011000A9171798762130000A713C8329BFD6681D0EF3B282C2F83F2EFFA0F

Subscr 1 Receive: +CMGL: 11,1,,36

Subscr 1 Receive:

0791947106004013240C9194715982699000003080413115748013C8329BFD6681D0EF3B282C2F

83F2EFFA0F

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Delete SMS at index 1

\*\*\*\*\*

Subscr 1 Send: AT+CMGD=1

Subscr 1 Receive: AT+CMGD=1

Subscr 1 Receive: OK

---

## **2.11.4 Sending SMS**

### **2.11.4.1 Description**

This chapter describes the steps required to send a short message. There are two ways:

- One way is sending a stored message from memory. This applies only to messages stored as "STO SEND" or "STO UNSENT".
- Another way is to create a new short message in PDU or text mode using the AT+CMGS command. In this case, the message will be sent directly.

### **2.11.4.2 Used AT commands**

AT+CMGS	-	Send SMS message
AT+CMSS	-	Send SMS message from storage

For further details about the commands see [2].

2.11.4.3 Flow Chart

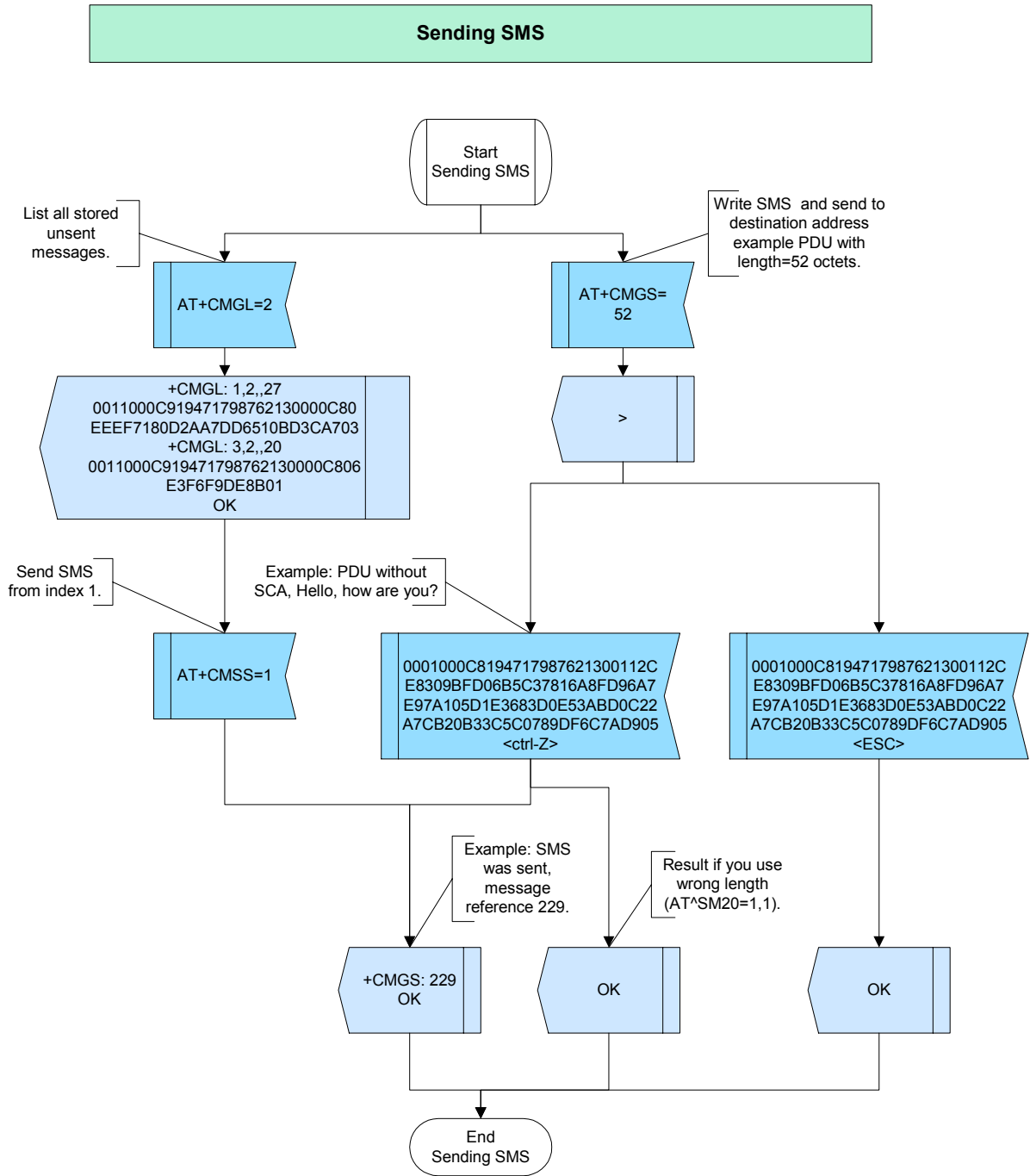


Figure 81: Sending SMS

2.11.4.4 Hints

Not applicable.

### 2.11.4.5 Example

\*\*\*\*\*

Comment: Sending SMS

\*\*\*\*\*

\*\*\*\*\*

Comment: List all stored unsent messages (PDU mode)

\*\*\*\*\*

Subscr 1 Send: AT+CMGL=2

Subscr 1 Receive: AT+CMGL=2

Subscr 1 Receive: +CMGL: 5,2,,31

Subscr 1 Receive:

0031000C919471798762130000C813C8329BFD6681D0EF3B282C2F83F2EFFA0F

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Send message at index 5

\*\*\*\*\*

Subscr 1 Send: AT+CMSS=5

Subscr 1 Receive: AT+CMSS=5

Subscr 1 Receive:

Subscr 1 Receive: +CMSS: 121

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Send a new message created in PDU mode <ctrl-Z>

\*\*\*\*\*

Subscr 1 Send: AT+CMGS=30

Subscr 1 Receive: AT+CMGS=30

Subscr 1 Receive: >

Subscr 1 Send:

0011000A9171798762130000A713C8329BFD6681D0EF3B282C2F83F2EFFA0F'26'

Subscr 1 Receive:

0011000A9171798762130000A713C8329BFD6681D0EF3B282C2F83F2EFFA0F'26'

Subscr 1 Receive:

Subscr 1 Receive: +CMGS: 122

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Try to send a SMS in PDU mode with wrong length

\*\*\*\*\*

Subscr 1 Send: AT+CMGS=25

Subscr 1 Receive: AT+CMGS=25

Subscr 1 Receive: >

Subscr 1 Send:

0011000A9171798762130000A713C8329BFD6681D0EF3B282C2F83F2EFFA0F'26'

Subscr 1 Receive:

0011000A9171798762130000A713C8329BFD6681D0EF3B282C2F83F2EFFA0F'26'

Subscr 1 Receive: +CMS ERROR: unknown error

## **2.11.5 Reading SMS**

### **2.11.5.1 Description**

This chapter describes all the steps required to read a short message. There are several ways:

- You can list all short messages from the specified storage using AT+CMGL or AT^SMGL. The only difference between both commands is that the standard command AT+CMGL changes the state of the listed messages from status "REC UNREAD" to "REC READ", while the Siemens defined command leaves the status unchanged.
- Also, you can read a short message by using AT+CMGR and AT^SMGR. Both commands serve to read a message from a specific index of the preferred memory. As stated above, the standard command AT+CMGR changes the state of a read message from status "REC UNREAD" to "REC READ", while the Siemens defined command leaves the status unchanged.

### **2.11.5.2 Used AT commands**

AT+CMGL	-	List SMS messages from preferred storage
AT^SMGL	-	List SMS messages from preferred storage (does not change status)
AT+CMGR	-	Read SMS message
AT^SMGR	-	Read SMS message (does not change status)

For further details about the commands see [2].

2.11.5.3 Flow Chart

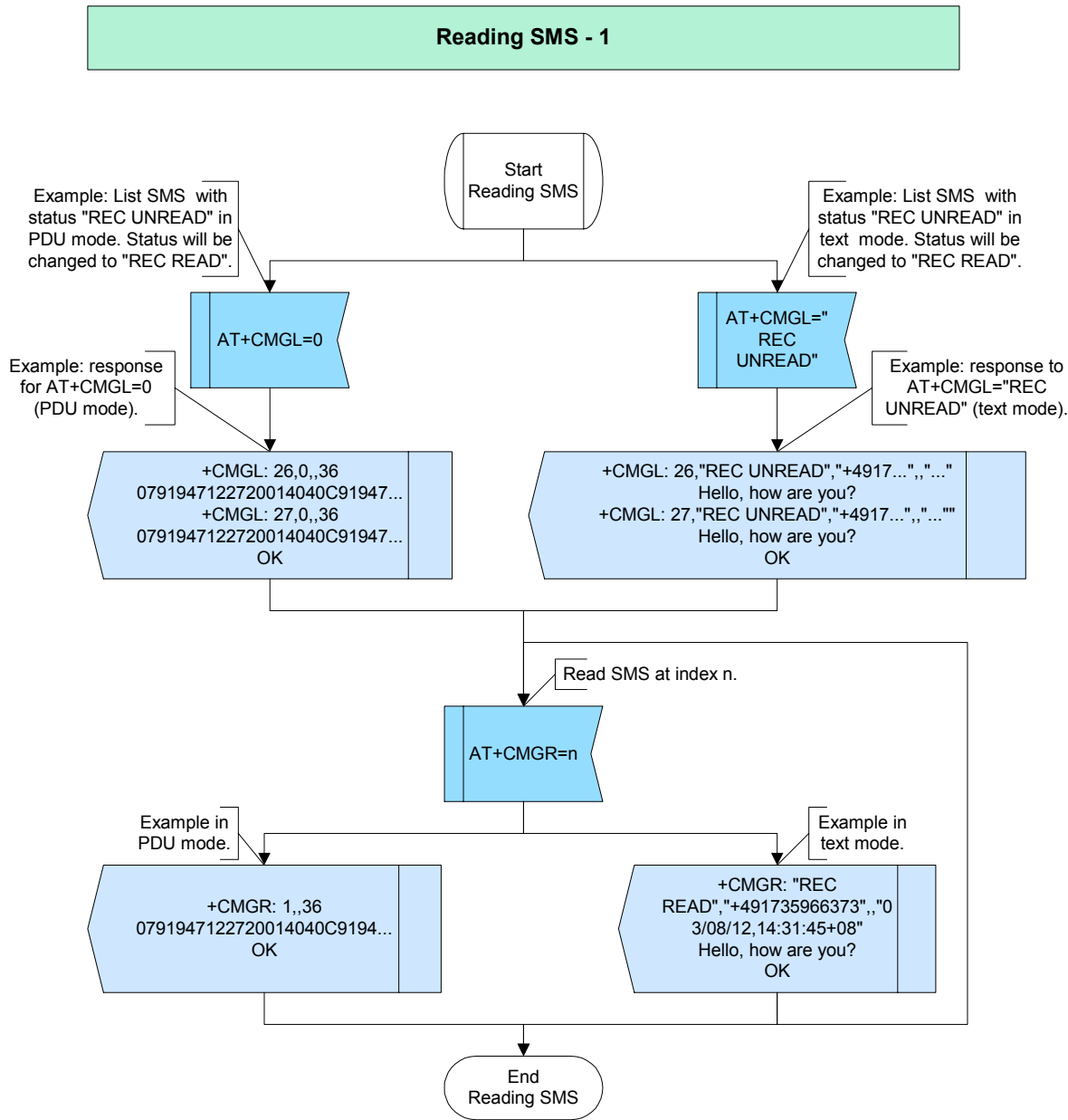


Figure 82: Reading SMS – 1



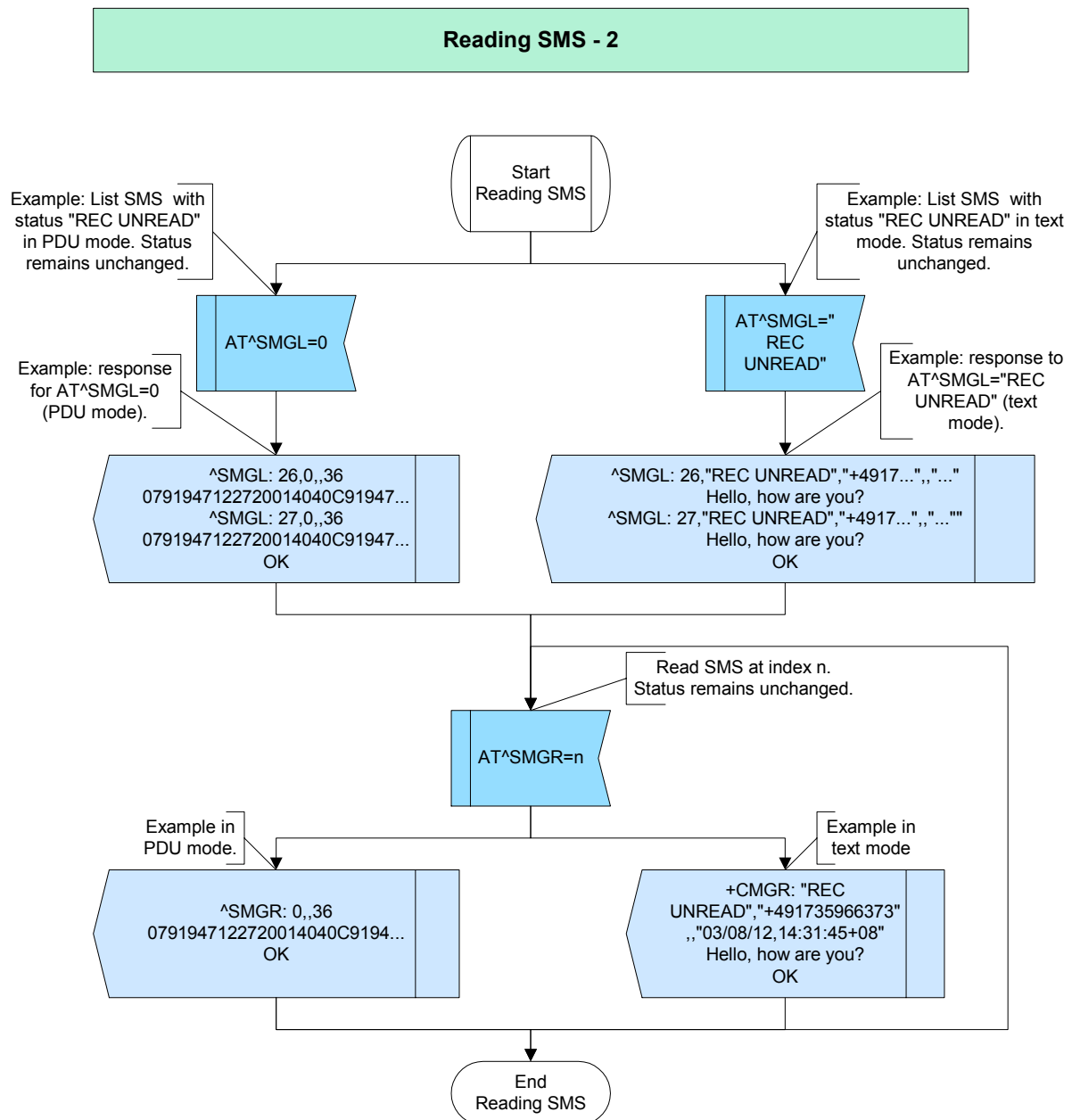


Figure 83: Reading SMS - 2

#### 2.11.5.4 Hints

- Of course, if the index of a short message is known you need not list all messages before reading.

#### 2.11.5.5 Example

\*\*\*\*\*

Comment: Reading SMS

\*\*\*\*\*

\*\*\*\*\*

Comment: List all received unread short message in text mode

Comment: Status "REC UNREAD" remains unchanged

\*\*\*\*\*

Subscr 1 Send: AT^SMGL="REC UNREAD"

Subscr 1 Receive: AT^SMGL="REC UNREAD"

Subscr 1 Receive: ^SMGL: 1,"REC UNREAD", "+491795289609", "03/08/13,19:18:46+08"

---

Subscr 1 Receive: Hello, how are you?  
Subscr 1 Receive: ^SMGL: 2,"REC UNREAD","+491795289609",,"03/08/13,19:20:00+08"  
Subscr 1 Receive: Hi, did you receive my last message?  
Subscr 1 Receive: ^SMGL: 3,"REC UNREAD","+491795289609",,"03/08/13,19:21:47+08"  
Subscr 1 Receive: Hi, did you call me yesterday?  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read short message at index 1  
Comment: Status "REC UNREAD" remains unchanged

\*\*\*\*\*

Subscr 1 Send: AT^SMGR=1  
Subscr 1 Receive: AT^SMGR=1  
Subscr 1 Receive: ^SMGR: "REC UNREAD","+491795289609",,"03/08/13,19:18:46+08"  
Subscr 1 Receive: Hello, how are you?  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: List all received unread short message in text mode  
Comment: Status "REC UNREAD" changes to "REC READ"

\*\*\*\*\*

Subscr 1 Send: AT+CMGL="REC UNREAD"  
Subscr 1 Receive: AT+CMGL="REC UNREAD"  
Subscr 1 Receive: +CMGL: 1,"REC UNREAD","+491795289609",,"03/08/13,19:18:46+08"  
Subscr 1 Receive: Hello, how are you?  
Subscr 1 Receive: +CMGL: 2,"REC UNREAD","+491795289609",,"03/08/13,19:20:00+08"  
Subscr 1 Receive: Hi, did you receive my last message?  
Subscr 1 Receive: +CMGL: 3,"REC UNREAD","+491795289609",,"03/08/13,19:21:47+08"  
Subscr 1 Receive: Hi, did you call me yesterday?  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: List all received read short message in text mode

\*\*\*\*\*

Subscr 1 Send: AT+CMGL="REC READ"  
Subscr 1 Receive: AT+CMGL="REC READ"  
Subscr 1 Receive: +CMGL: 1,"REC READ","+491795289609",,"03/08/13,19:18:46+08"  
Subscr 1 Receive: Hello, how are you?  
Subscr 1 Receive: +CMGL: 2,"REC READ","+491795289609",,"03/08/13,19:20:00+08"  
Subscr 1 Receive: Hi, did you receive my last message?  
Subscr 1 Receive: +CMGL: 3,"REC READ","+491795289609",,"03/08/13,19:21:47+08"  
Subscr 1 Receive: Hi, did you call me yesterday?  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read short message from index 3

\*\*\*\*\*

Subscr 1 Send: AT+CMGR=3  
Subscr 1 Receive: AT+CMGR=3  
Subscr 1 Receive: +CMGR: "REC READ","+491795289609",,"03/08/13,19:21:47+08"  
Subscr 1 Receive: Hi, did you call me yesterday?  
Subscr 1 Receive:  
Subscr 1 Receive: OK

---

## **2.11.6 Receiving SMS**

### **2.11.6.1 Description**

This chapter takes you through all the steps involved in receiving short messages. To be notified of received short messages switch on the URC presentation with AT+CNMI (see chapter 2.11.1 "SMS initialization").

Two kinds of URCs are available to indicate a new SMS. Which one is used depends on the settings made with AT+CNMI.

- If URC "+CMTI: ..." is presented, the information contains the storage type and the index where the received message was stored. You can then proceed to read the message from the indicated index, using one of the SMS reading commands.
- If URC "+CMT: ..." is presented you have to acknowledge the reception of the short message by using AT+CNMA.

If SMS overflow presentation is enabled with AT^SMGO (see chapter 2.11.1 "SMS initialization"), the URC "^SMGO: 1" or "^SMGO: 2" will be presented, when the SMS storage is full. This notification is to inform you that you need to clear the SMS storage before you can receive the next short message.

### **2.11.6.2 Used AT commands**

AT+CMGR	-	Read SMS message
AT+CNMA	-	New SMS message acknowledge to ME/TE, only phase 2+

For further details about the commands see [2].

### 2.11.6.3 Flow Chart

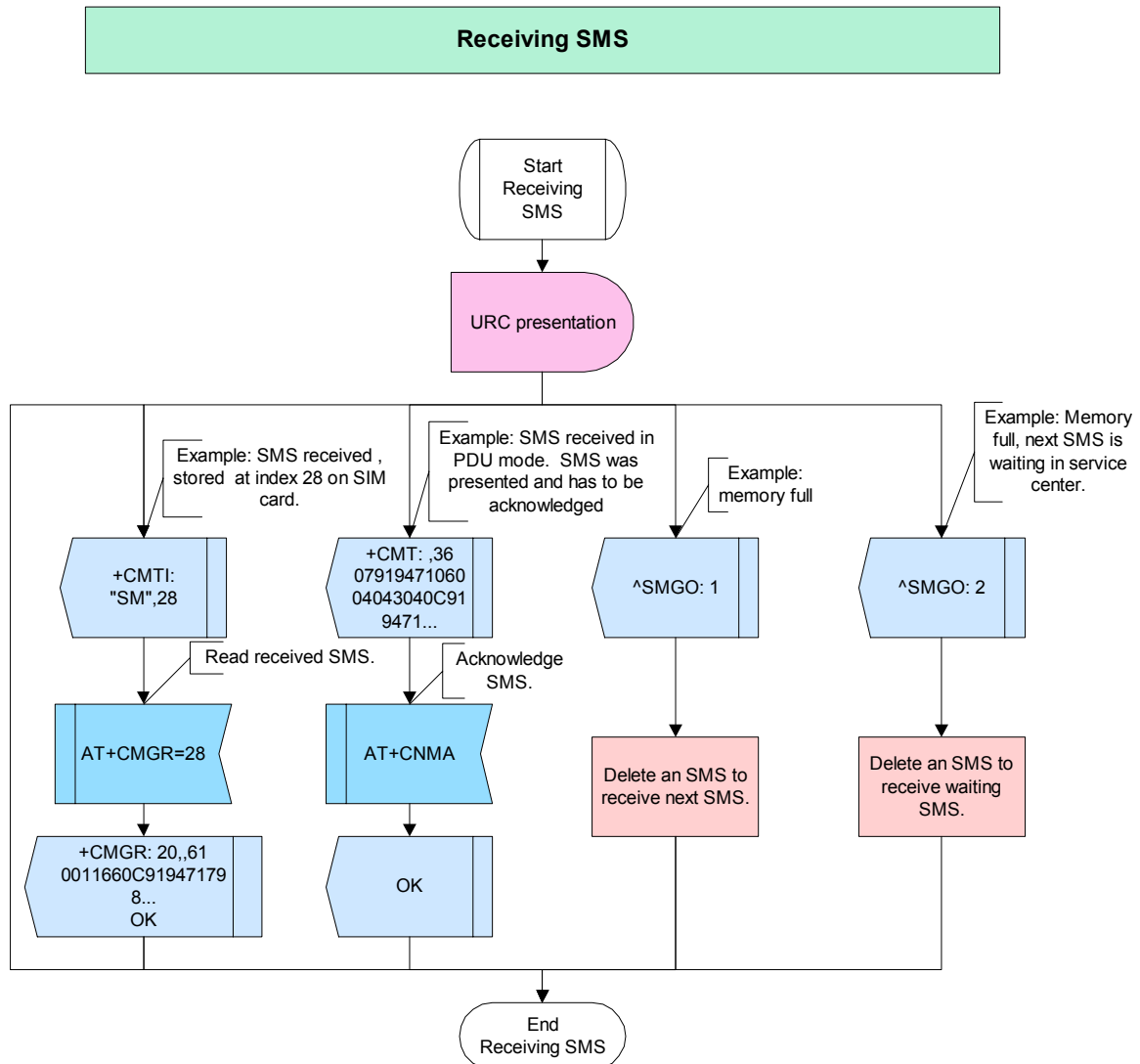


Figure 84: Receiving SMS

### 2.11.6.4 Hints

Not applicable.

### 2.11.6.5 Example

\*\*\*\*\*

Comment: Receiving SMS

\*\*\*\*\*

\*\*\*\*\*

Comment: Request SMS storage capacity (subscriber 1)

\*\*\*\*\*

Subscr 1 Send: AT+CPMS?

Subscr 1 Receive: AT+CPMS?

Subscr 1 Receive: +CPMS: "SM",27,30,"SM",27,30,"SM",27,30

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set URC presentation mode (indication of memory location)

\*\*\*\*\*

Subscr 1 Send: AT+CNMI=2,1  
Subscr 1 Receive: AT+CNMI=2,1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Subscriber 2 send a new SMS to subscriber 1

\*\*\*\*\*

Subscr 2 Send: AT+CMGS=+491797782631  
Subscr 2 Receive: AT+CMGS=+491797782631  
Subscr 2 Receive: >  
Subscr 2 Send: new SMS to subscriber 1  
Subscr 2 Receive: new SMS to subscriber 1  
Subscr 2 Receive:  
Subscr 2 Receive: +CMGS: 218  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: +CMTI: "SM",28

\*\*\*\*\*

Comment: Read new received SMS

\*\*\*\*\*

Subscr 1 Send: AT+CMGR=28  
Subscr 1 Receive: AT+CMGR=28  
Subscr 1 Receive: +CMGR: "REC UNREAD", "+491795289609", "03/08/14,14:44:38+08"  
Subscr 1 Receive: new SMS to subscriber 1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set URC presentation mode (SMS is routed directly to TE) is depending on message class

\*\*\*\*\*

Subscr 1 Send: AT+CNMI=2,2  
Subscr 1 Receive: AT+CNMI=2,2  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Subscriber 2 send a new SMS to subscriber 1

\*\*\*\*\*

Subscr 2 Send: AT+CMGS=+491797782631  
Subscr 2 Receive: AT+CMGS=+491797782631  
Subscr 2 Receive: >  
Subscr 2 Send: second SMS to subscriber 1  
Subscr 2 Receive: second SMS to subscriber 1  
Subscr 2 Receive:  
Subscr 2 Receive: +CMGS: 219  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: +CMT: "+491795289609", "03/08/14,14:44:49+08"  
Subscr 1 Receive: second SMS to subscriber 1

\*\*\*\*\*

Comment: Acknowledge received SMS

\*\*\*\*\*

Subscr 1 Send: AT+CNMA  
Subscr 1 Receive: AT+CNMA  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set URC presentation mode (indication of memory location)

\*\*\*\*\*

Subscr 1 Send: AT+CNMI=2,1  
Subscr 1 Receive: AT+CNMI=2,1  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Subscriber 2 send two more messages to provoke storage overflow presentation

\*\*\*\*\*

Subscr 2 Send: AT+CMGS=+491797782631  
Subscr 2 Receive: AT+CMGS=+491797782631  
Subscr 2 Receive: >  
Subscr 2 Send: third SMS to subscriber 1  
Subscr 2 Receive: third SMS to subscriber 1  
Subscr 1 Receive:  
Subscr 1 Receive: +CMTI: "SM",29  
Subscr 2 Send: AT+CMGS=+491797782631  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 2 Send: fourth SMS to subscriber 1  
Subscr 1 Receive:  
Subscr 1 Receive: +CMTI: "SM",30  
Subscr 1 Receive:  
Subscr 1 Receive: ^SMGO: 1  
Subscr 1 Receive:  
Subscr 1 Receive: ^SMGO: 2

\*\*\*\*\*

Comment: Delete SMS at index 30 to receive the waiting one

\*\*\*\*\*

Subscr 1 Send: AT+CMGD=30  
Subscr 1 Receive: AT+CMGD=30  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: ^SMGO: 0  
Subscr 1 Receive:  
Subscr 1 Receive: +CMTI: "SM",30  
Subscr 1 Receive:  
Subscr 1 Receive: ^SMGO: 1

## **2.11.7 Receiving status report**

### **2.11.7.1 Description**

This chapter describes all the steps required to obtain a status report. There are two ways to activate the presentation of status reports:

- When using PDU mode, status reports can be enabled with the first octet of the PDU.
- When using text mode, you can switch it on with the first parameter (<fo>) of AT+CSMP (see chapter 2.11.1 "SMS initialization").

To be notified when a status report is received, activate the URC presentation with AT+CNMI as described in chapter 2.11.6 "Receiving SMS".

### **2.11.7.2 Used AT commands**

AT+CMGR	-	Read SMS message
AT+CNMA	-	New SMS message acknowledge to ME/TE, only phase 2+

For further details about the commands see [2].

### 2.11.7.3 Flow Chart

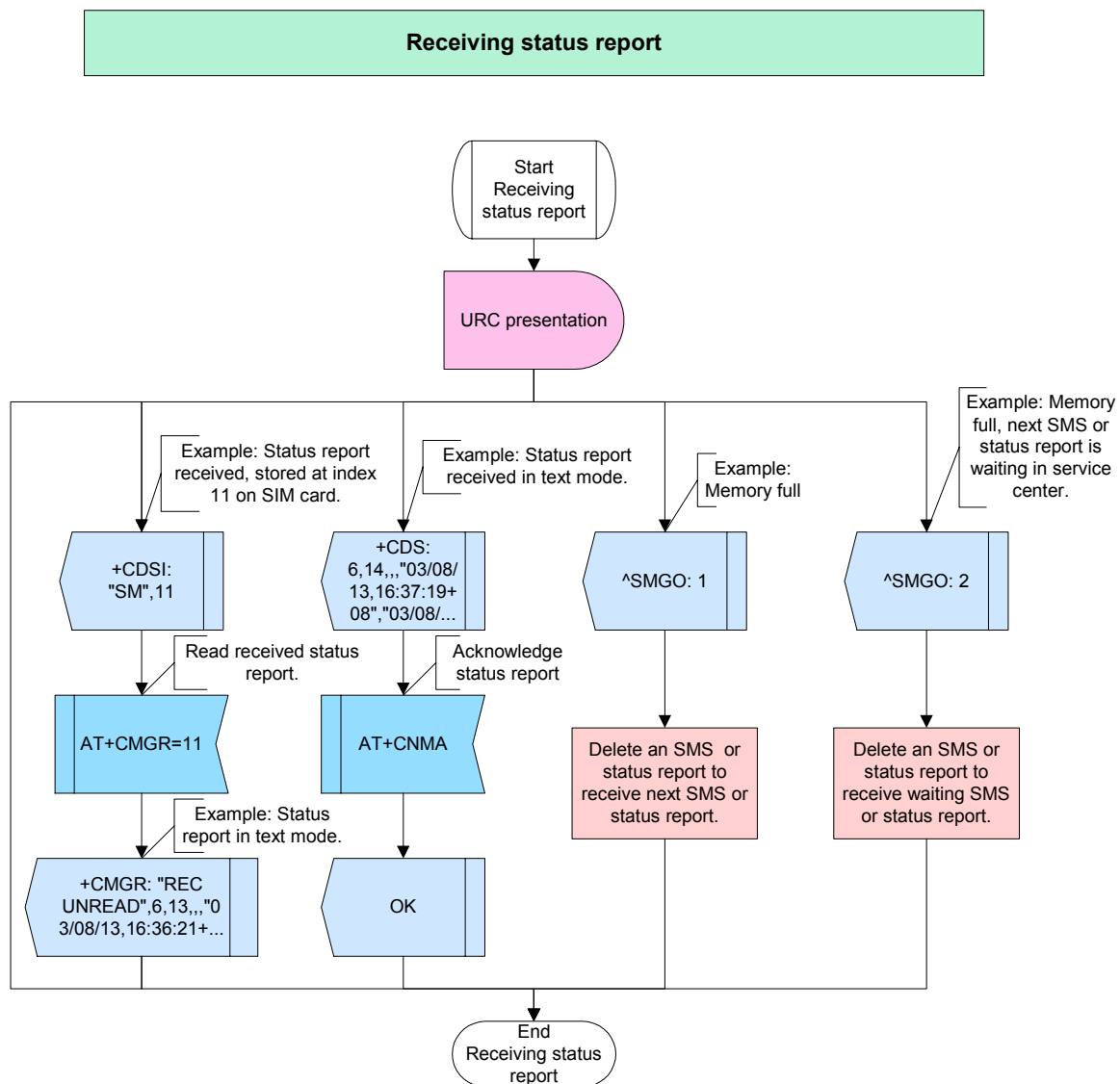


Figure 85: Receiving status report

### 2.11.7.4 Hints

Not applicable.



### 2.11.7.5 Example

\*\*\*\*\*

Comment: Receiving status report

\*\*\*\*\*

\*\*\*\*\*

Comment: Enable URC presentation (status report is routed directly to TE)

\*\*\*\*\*

Subscr 1 Send: AT+CNMI=2,1,0,1

Subscr 1 Receive: AT+CNMI=2,1,0,1

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Set text mode Parameter (enable status report)

\*\*\*\*\*

Subscr 1 Send: AT+CSMP=49,200,0,0

Subscr 1 Receive: AT+CSMP=49,200,0,0

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Send SMS

\*\*\*\*\*

Subscr 1 Send: AT+CMGS=+491797782631

Subscr 1 Receive: AT+CMGS=+491797782631

Subscr 1 Receive: >

Subscr 1 Send: Test SMS

Subscr 1 Receive: Test SMS

Subscr 1 Receive:

Subscr 1 Receive: +CMGS: 121

Subscr 1 Receive:

Subscr 1 Receive: OK

Subscr 1 Receive:

Subscr 1 Receive: +CDS: 6,121,,,"03/08/14,17:14:56+08","03/08/14,17:14:57+08",48

\*\*\*\*\*

Comment: Acknowledge status report

\*\*\*\*\*

Subscr 1 Send: AT+CNMA

Subscr 1 Receive: AT+CNMA

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enable URC presentation (indication of the memory location is routed to TE)

\*\*\*\*\*

Subscr 1 Send: AT+CNMI=2,1,0,2

Subscr 1 Receive: AT+CNMI=2,1,0,2

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Send SMS

\*\*\*\*\*

Subscr 1 Send: AT+CMGS=+491797782631

Subscr 1 Receive: AT+CMGS=+491797782631

---

Subscr 1 Receive: >  
Subscr 1 Send: Test SMS 2  
Subscr 1 Receive: Test SMS 2  
Subscr 1 Receive:  
Subscr 1 Receive: +CMGS: 122  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: +CDSI: "SM",10

\*\*\*\*\*  
Comment: Read status report  
\*\*\*\*\*

Subscr 1 Send: AT+CMGR=10  
Subscr 1 Receive: AT+CMGR=10  
Subscr 1 Receive: +CMGR: "REC  
UNREAD",6,122,,,"03/08/14,17:15:08+08","03/08/14,17:15:10+08",48  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## 2.11.8 Receiving cell broadcast message

### 2.11.8.1 Description

This chapter describes all the steps required to receive a cell broadcast message. First, you need to subscribe to a CBS channel in order to receive CBSs on this channel. To do so, use the command AT+CSCB. For details see chapter 2.11.1 "SMS initialization".

To be notified when a CBS is received, activate the URC presentation with AT+CNMI as described in chapter 2.11.6 "Receiving SMS". The application should be able to display the received message once the URC "+CBS: ..." is presented.

### 2.11.8.2 Used AT commands

AT+CSCB - Select Cell Broadcast message indication  
AT+CNMI - New SMS message indications

For further details about the commands see [2].

### 2.11.8.3 Flow Chart

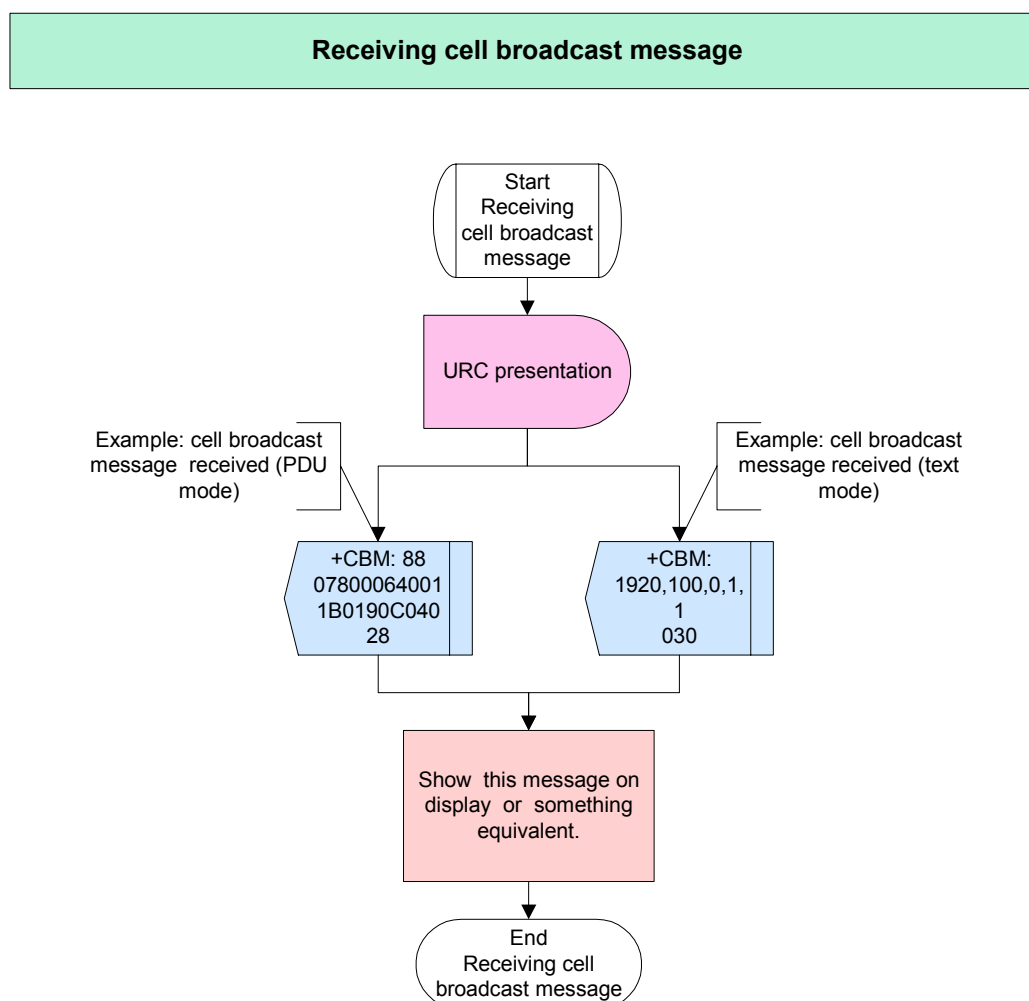


Figure 86: Receiving cell broadcast message

#### 2.11.8.4 Hints

- Which channel is supported depends on your provider, please ask for it.

#### 2.11.8.5 Example

\*\*\*\*\*

Comment: Receive cell broadcast message

\*\*\*\*\*

\*\*\*\*\*

Comment: Enable URC presentation for CBS

\*\*\*\*\*

Subscr 1 Send: AT+CNMI=2,1,2

Subscr 1 Receive: AT+CNMI=2,1,2

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: subscribe to CBS channel 221

\*\*\*\*\*

Subscr 1 Send: AT+CSCB=0,221,0

Subscr 1 Receive: AT+CSCB=0,221,0

Subscr 1 Receive: OK

Subscr 1 Receive:

Subscr 1 Receive: +CBM: 17,221,0,1,1

Subscr 1 Receive: 379019583119

Subscr 1 Receive:

Subscr 1 Receive: +CBM: 17,221,0,1,1

Subscr 1 Receive: 378938583242

Subscr 1 Receive:

Subscr 1 Receive: +CBM: 17,221,0,1,1

Subscr 1 Receive: 379019583119

## 2.12 Phonebook

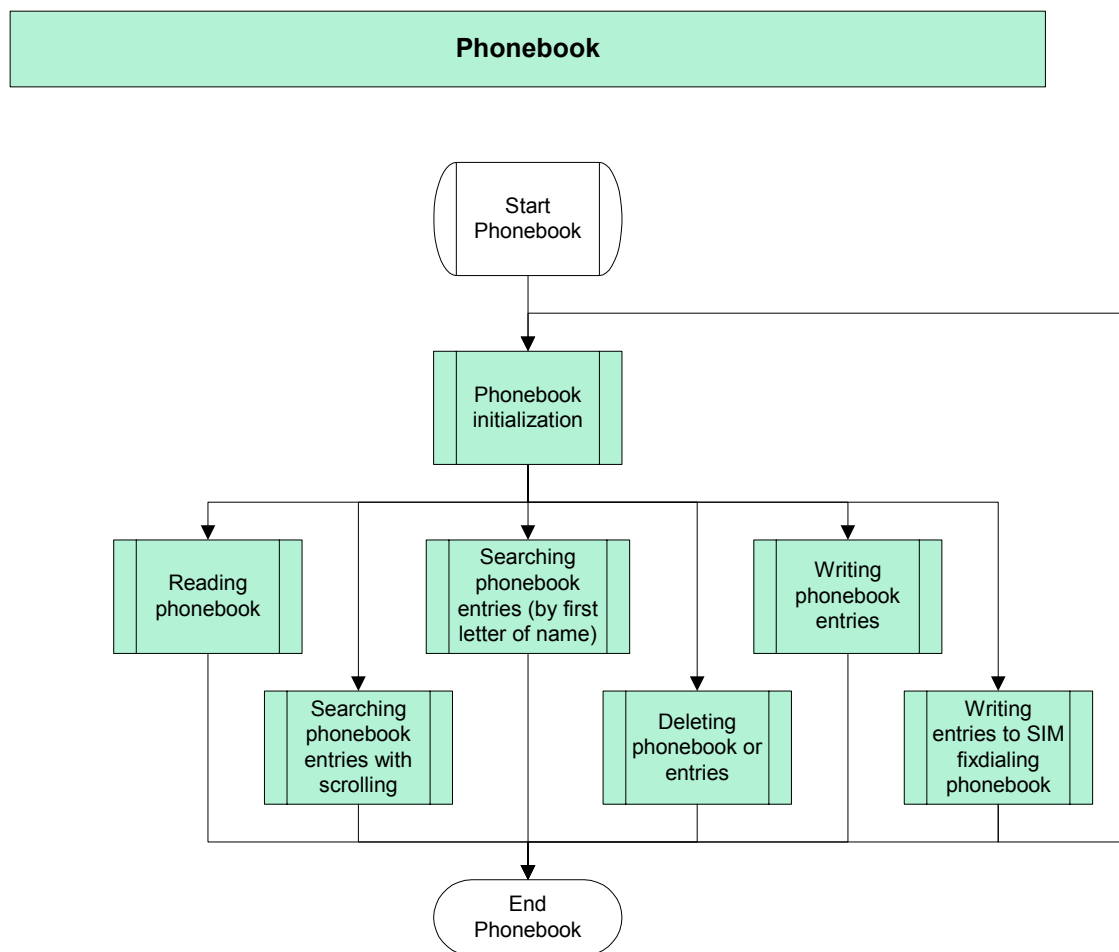


Figure 87: Phonebook

### 2.12.1 Phonebook initialization

#### 2.12.1.1 Description

This chapter describes how to initialize the module for using phonebook functions. Note that all AT commands available for reading or editing any entries are related to the active phonebook storage. To select a phonebook use the command AT+CPBS.

If you wish to write entries to the fixdialing phonebook, it is necessary to enter PIN2 before. You have only 3 attempts to enter the correct PIN2. After 3 wrong attempts PUK2 is required. For detailed information about entering PIN2 see chapter 2.5.5.

#### 2.12.1.2 Used AT commands

AT+CPBS	-	Select phonebook memory storage
AT+CPIN2	-	Enter PIN2

For further details about the commands see [2].

### 2.12.1.3 Flow chart

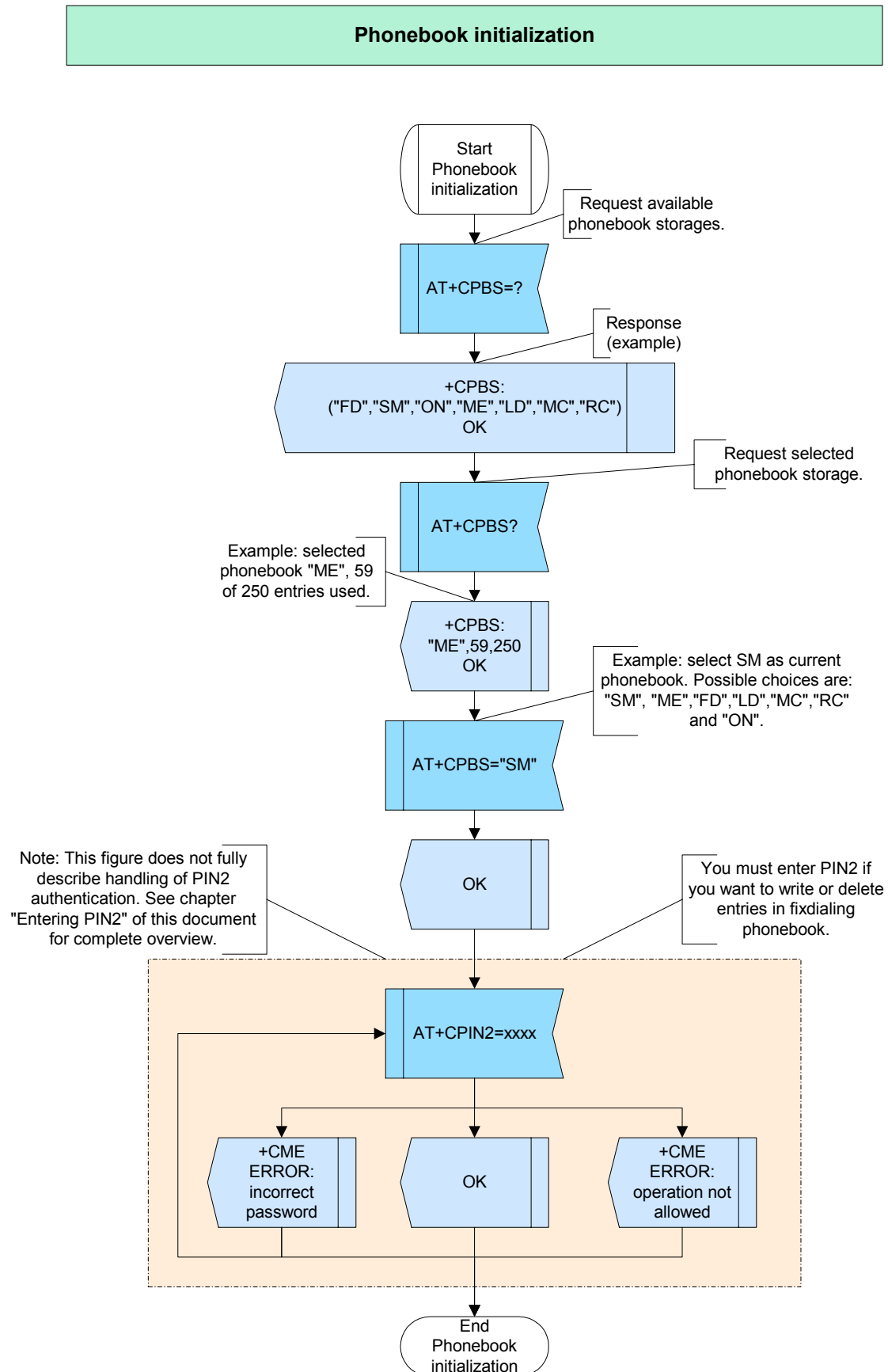


Figure 88: Phonebook initialization

#### 2.12.1.4 Hints

Not applicable.

#### 2.12.1.5 Example

\*\*\*\*\*

Comment: Phonebook initialization

\*\*\*\*\*

\*\*\*\*\*

Comment: Request selected phonebook storage.

\*\*\*\*\*

Subscr 1 Send: AT+CPBS?  
Subscr 1 Receive: AT+CPBS?  
Subscr 1 Receive: +CPBS: "ME",53,250  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Select FD as current phonebook storage.

\*\*\*\*\*

Subscr 1 Send: AT+CPBS="FD"  
Subscr 1 Receive: AT+CPBS="FD"  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong PIN2

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=0000  
Subscr 1 Receive: AT+CPIN2=0000  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Entering correct PIN2.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=1234  
Subscr 1 Receive: AT+CPIN2=1234  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering correct PIN2 second time.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=1234  
Subscr 1 Receive: AT+CPIN2=1234  
Subscr 1 Receive: +CME ERROR: operation not allowed

## **2.12.2 Reading phonebook entries**

### **2.12.2.1 Description**

This chapter describes all the steps used to read one or more entries from your phonebooks. You can read entries sorted by index or sorted by name in alphabetical order. Sorting by name is only supported for the phonebook types "SM", "ME", "FD" (fixdialing phonebook) and "ON" (own number phonebook).

Other phonebooks are "LD" (last dialed numbers), "MC" (list of your missed calls) and "RC" (list of received calls). These phonebooks only support reading by sorted index.

### **2.12.2.2 Used AT commands**

AT+CPBS	-	Select phonebook memory storage
AT^SPBG	-	Read entry from active telephone book via sorted index
AT+CPBR	-	Read current phonebook entries

For further details about the commands see [2].



2.12.2.3 Flow Chart

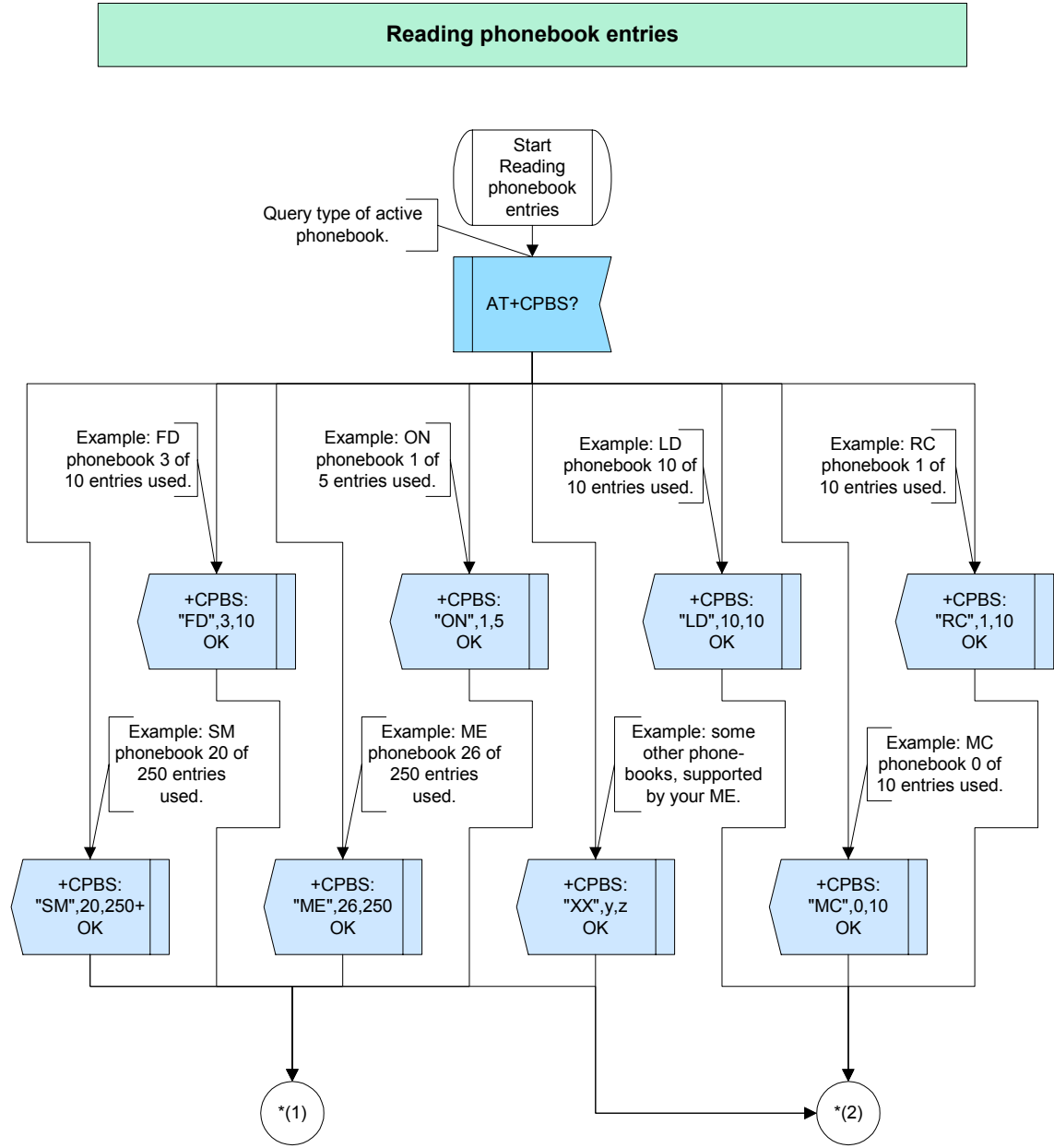


Figure 89: Reading phonebook entries – part 1

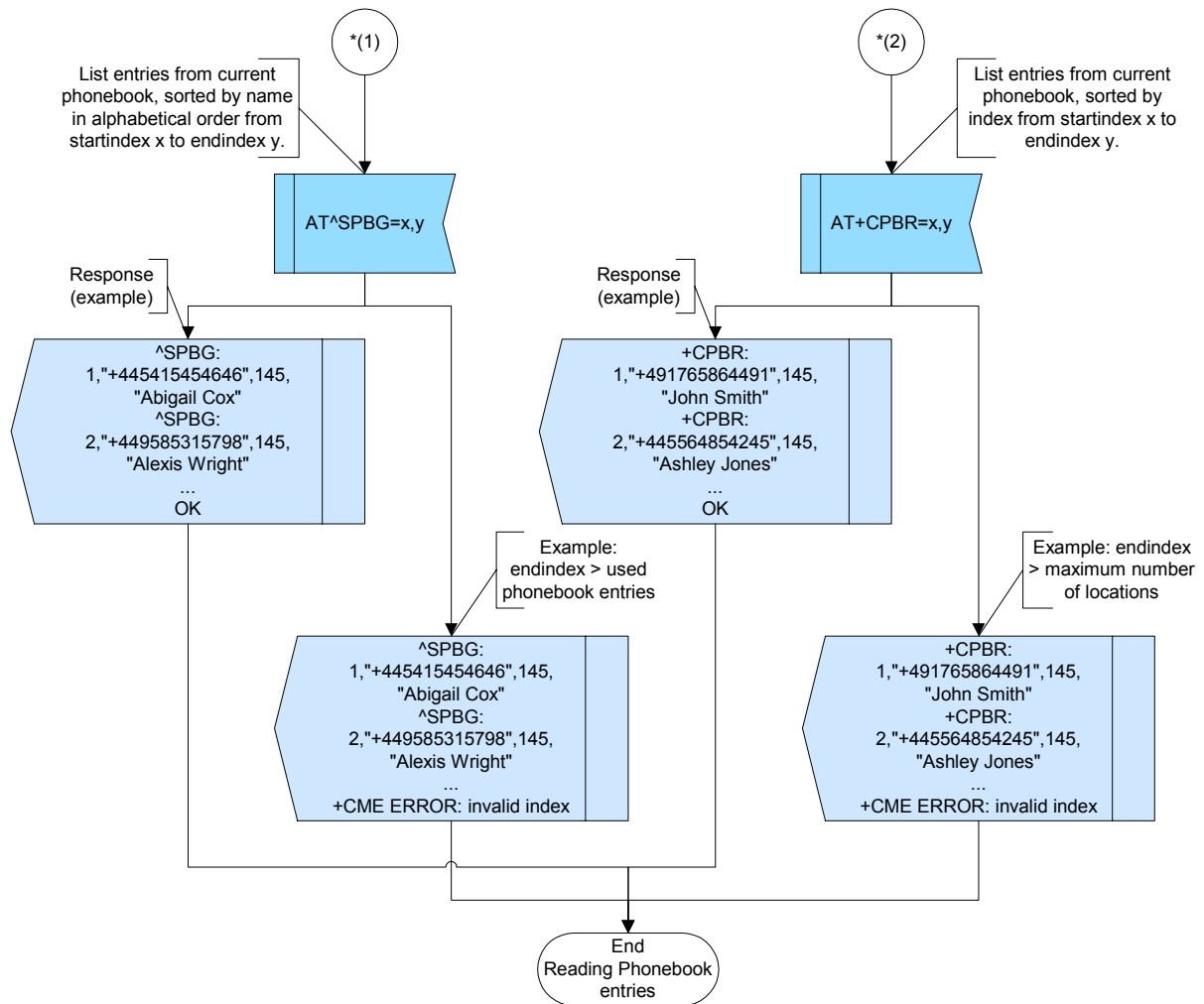


Figure 90: Reading phonebook entries – part 2

### 2.12.2.4 Hints

- For some products an extra parameter for AT^SPBG is available to get the physical index of an entry. For detail please see [2].

### 2.12.2.5 Example

\*\*\*\*\*

Comment: Reading phonebook entries

\*\*\*\*\*

\*\*\*\*\*

Comment: Request selected phonebook and number of entries.

\*\*\*\*\*

Subscr 1 Send: AT+CPBS?

Subscr 1 Receive: AT+CPBS?

Subscr 1 Receive: +CPBS: "SM",9,20

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: List phonebook entries sorted by name.

\*\*\*\*\*

Subscr 1 Send: AT^SPBG=1,8

```
Subscr 1 Receive: AT^SPBG=1,8
Subscr 1 Receive: ^SPBG: 1,"+445415454646",145,"Abigail Cox"
Subscr 1 Receive: ^SPBG: 2,"+449585315798",145,"Alexis Wright"
Subscr 1 Receive: ^SPBG: 3,"+445565656899",145,"Hannah Adams"
Subscr 1 Receive: ^SPBG: 4,"+44556565657",145,"Joe Anderson"
Subscr 1 Receive: ^SPBG: 5,"+491765864491",145,"John Smith"
Subscr 1 Receive: ^SPBG: 6,"+446565689115",145,"Kyla Clark"
Subscr 1 Receive: ^SPBG: 7,"+445636934485",145,"Oscar Thomson"
Subscr 1 Receive: ^SPBG: 8,"+44545896638",145,"Paul Williams"
Subscr 1 Receive:
Subscr 1 Receive: OK
```

\*\*\*\*\*

Comment: List phonebook entries sorted by name (endindex > number of used entries).

\*\*\*\*\*

```
Subscr 1 Send: AT^SPBG=1,20
Subscr 1 Receive: AT^SPBG=1,20
Subscr 1 Receive: ^SPBG: 1,"+445415454646",145,"Abigail Cox"
Subscr 1 Receive: ^SPBG: 2,"+449585315798",145,"Alexis Wright"
Subscr 1 Receive: ^SPBG: 3,"+445565656899",145,"Hannah Adams"
Subscr 1 Receive: ^SPBG: 4,"+44556565657",145,"Joe Anderson"
Subscr 1 Receive: ^SPBG: 5,"+491765864491",145,"John Smith"
Subscr 1 Receive: ^SPBG: 6,"+446565689115",145,"Kyla Clark"
Subscr 1 Receive: ^SPBG: 7,"+445636934485",145,"Oscar Thomson"
Subscr 1 Receive: ^SPBG: 8,"+44545896638",145,"Paul Williams"
Subscr 1 Receive: ^SPBG: 9,"+447982865563",145,"Samantha Young"
Subscr 1 Receive: +CME ERROR: invalid index
```

\*\*\*\*\*

Comment: List phonebook entries sorted by index.

\*\*\*\*\*

```
Subscr 1 Send: AT+CPBR=1,20
Subscr 1 Receive: AT+CPBR=1,20
Subscr 1 Receive: +CPBR: 1,"+491765864491",145,"John Smith"
Subscr 1 Receive: +CPBR: 2,"+44545896638",145,"Paul Williams"
Subscr 1 Receive: +CPBR: 3,"+44556565657",145,"Joe Anderson"
Subscr 1 Receive: +CPBR: 4,"+445636934485",145,"Oscar Thomson"
Subscr 1 Receive: +CPBR: 5,"+445565656899",145,"Hannah Adams"
Subscr 1 Receive: +CPBR: 6,"+447982865563",145,"Samantha Young"
Subscr 1 Receive: +CPBR: 7,"+449585315798",145,"Alexis Wright"
Subscr 1 Receive: +CPBR: 8,"+445415454646",145,"Abigail Cox"
Subscr 1 Receive: +CPBR: 12,"+446565689115",145,"Kyla Clark"
Subscr 1 Receive:
Subscr 1 Receive: OK
```

\*\*\*\*\*

Comment: List phonebook entries sorted by index (endindex > maximum number of locations).

\*\*\*\*\*

```
Subscr 1 Send: AT+CPBR=1,260
Subscr 1 Receive: AT+CPBR=1,260
Subscr 1 Receive: +CPBR: 1,"+491765864491",145,"John Smith"
Subscr 1 Receive: +CPBR: 2,"+44545896638",145,"Paul Williams"
Subscr 1 Receive: +CPBR: 3,"+44556565657",145,"Joe Anderson"
Subscr 1 Receive: +CPBR: 4,"+445636934485",145,"Oscar Thomson"
Subscr 1 Receive: +CPBR: 5,"+445565656899",145,"Hannah Adams"
Subscr 1 Receive: +CPBR: 6,"+447982865563",145,"Samantha Young"
Subscr 1 Receive: +CPBR: 7,"+449585315798",145,"Alexis Wright"
Subscr 1 Receive: +CPBR: 8,"+445415454646",145,"Abigail Cox"
Subscr 1 Receive: +CPBR: 12,"+446565689115",145,"Kyla Clark"
Subscr 1 Receive: +CME ERROR: invalid index
```

---

## **2.12.3 Searching phonebook entries by scrolling up and down**

### **2.12.3.1 Description**

This chapter describes how to search for a phonebook entry by scrolling up and down with AT^SPBS. Every time the write command AT^SPBS=<value> is executed, 3 rows of phonebook records are returned. Each triplet overlaps with the next one, i.e. the last two records of the preceding triplet will be presented on top of the next one.

### **2.12.3.2 Used AT commands**

AT&F	-	Set all current parameters to manufacturer defaults
ATZ	-	Set all current parameters to user defined profile
AT^SPBS	-	Read entry from active telephone book via sorted index

For further details about the commands see [2].

2.12.3.3 Flow chart

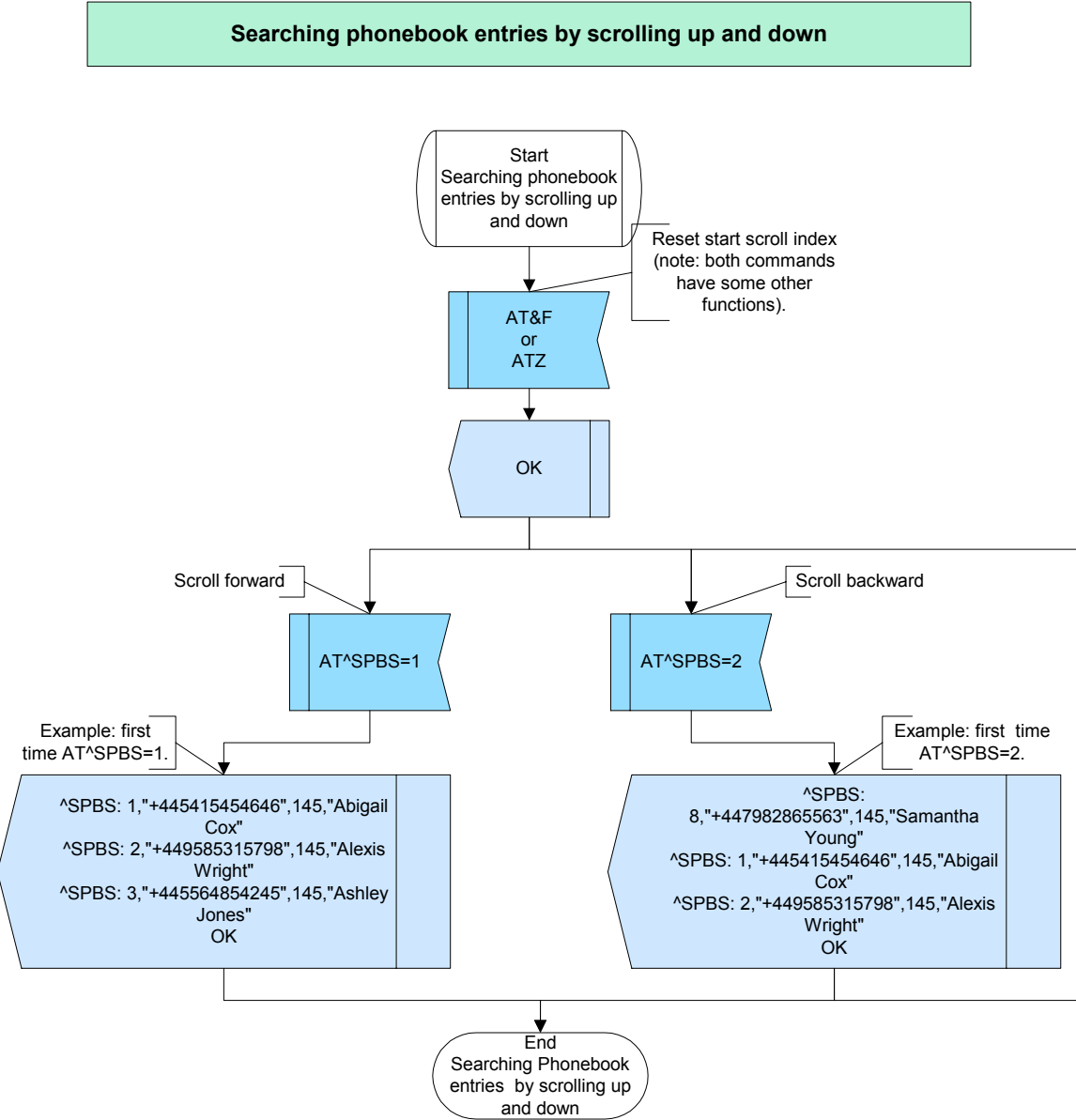


Figure 91: Searching phonebook entries by scrolling up and down

2.12.3.4 Hints

Not applicable.

### 2.12.3.5 Example

\*\*\*\*\*

Comment: Searching phonebook entries by scrolling up and down

\*\*\*\*\*

\*\*\*\*\*

Comment: Reset start scroll index.

\*\*\*\*\*

Subscr 1 Send: ATZ

Subscr 1 Receive: ATZ

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Scrolling forward.

\*\*\*\*\*

Subscr 1 Send: AT^SPBS=1

Subscr 1 Receive: AT^SPBS=1

Subscr 1 Receive: ^SPBS: 1,"+445415454646",145,"Abigail Cox"

Subscr 1 Receive: ^SPBS: 2,"+449585315798",145,"Alexis Wright"

Subscr 1 Receive: ^SPBS: 3,"+445565656899",145,"Hannah Adams"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Scrolling forward.

\*\*\*\*\*

Subscr 1 Send: AT^SPBS=1

Subscr 1 Receive: AT^SPBS=1

Subscr 1 Receive: ^SPBS: 2,"+449585315798",145,"Alexis Wright"

Subscr 1 Receive: ^SPBS: 3,"+445565656899",145,"Hannah Adams"

Subscr 1 Receive: ^SPBS: 4,"+44556565657",145,"Joe Anderson"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Scrolling forward.

\*\*\*\*\*

Subscr 1 Send: AT^SPBS=1

Subscr 1 Receive: AT^SPBS=1

Subscr 1 Receive: ^SPBS: 3,"+445565656899",145,"Hannah Adams"

Subscr 1 Receive: ^SPBS: 4,"+44556565657",145,"Joe Anderson"

Subscr 1 Receive: ^SPBS: 5,"+491765864491",145,"John Smith"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Scrolling backward.

\*\*\*\*\*

Subscr 1 Send: AT^SPBS=2

Subscr 1 Receive: AT^SPBS=2

Subscr 1 Receive: ^SPBS: 2,"+449585315798",145,"Alexis Wright"

Subscr 1 Receive: ^SPBS: 3,"+445565656899",145,"Hannah Adams"

Subscr 1 Receive: ^SPBS: 4,"+44556565657",145,"Joe Anderson"

Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: scroll backward  
\*\*\*\*\*

Subscr 1 Send: AT^SPBS=2  
Subscr 1 Receive: AT^SPBS=2  
Subscr 1 Receive: ^SPBS: 1,"+445415454646",145,"Abigail Cox"  
Subscr 1 Receive: ^SPBS: 2,"+449585315798",145,"Alexis Wright"  
Subscr 1 Receive: ^SPBS: 3,"+445565656899",145,"Hannah Adams"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Scrolling backward.  
\*\*\*\*\*

Subscr 1 Send: AT^SPBS=2  
Subscr 1 Receive: AT^SPBS=2  
Subscr 1 Receive: ^SPBS: 9,"+447982865563",145,"Samantha Young"  
Subscr 1 Receive: ^SPBS: 1,"+445415454646",145,"Abigail Cox"  
Subscr 1 Receive: ^SPBS: 2,"+449585315798",145,"Alexis Wright"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Scrolling backward.  
\*\*\*\*\*

Subscr 1 Send: AT^SPBS=2  
Subscr 1 Receive: AT^SPBS=2  
Subscr 1 Receive: ^SPBS: 8,"+44545896638",145,"Paul Williams"  
Subscr 1 Receive: ^SPBS: 9,"+447982865563",145,"Samantha Young"  
Subscr 1 Receive: ^SPBS: 1,"+445415454646",145,"Abigail Cox"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

---

## **2.12.4 Searching phonebook entries by first letter of name**

### **2.12.4.1 Description**

This chapter describes all the steps used to search a phonebook entry by first letter of name. The function applies only to the following phonebook types: "SM", "ME", "FD".

AT^SPBC returns the index of the searched entry. Please note that the sorted entries are assigned an index of their own which is not identical with the location numbers used in the various phonebooks. Do not use the listed index numbers to dial out or edit entries.

### **2.12.4.2 Used AT commands**

AT^SPBC	-	Search the first entry in the sorted telephone book
AT^SPBG	-	Read entry from active telephone book via sorted index

For further details about the commands see [2].



### 2.12.4.3 Flow Chart

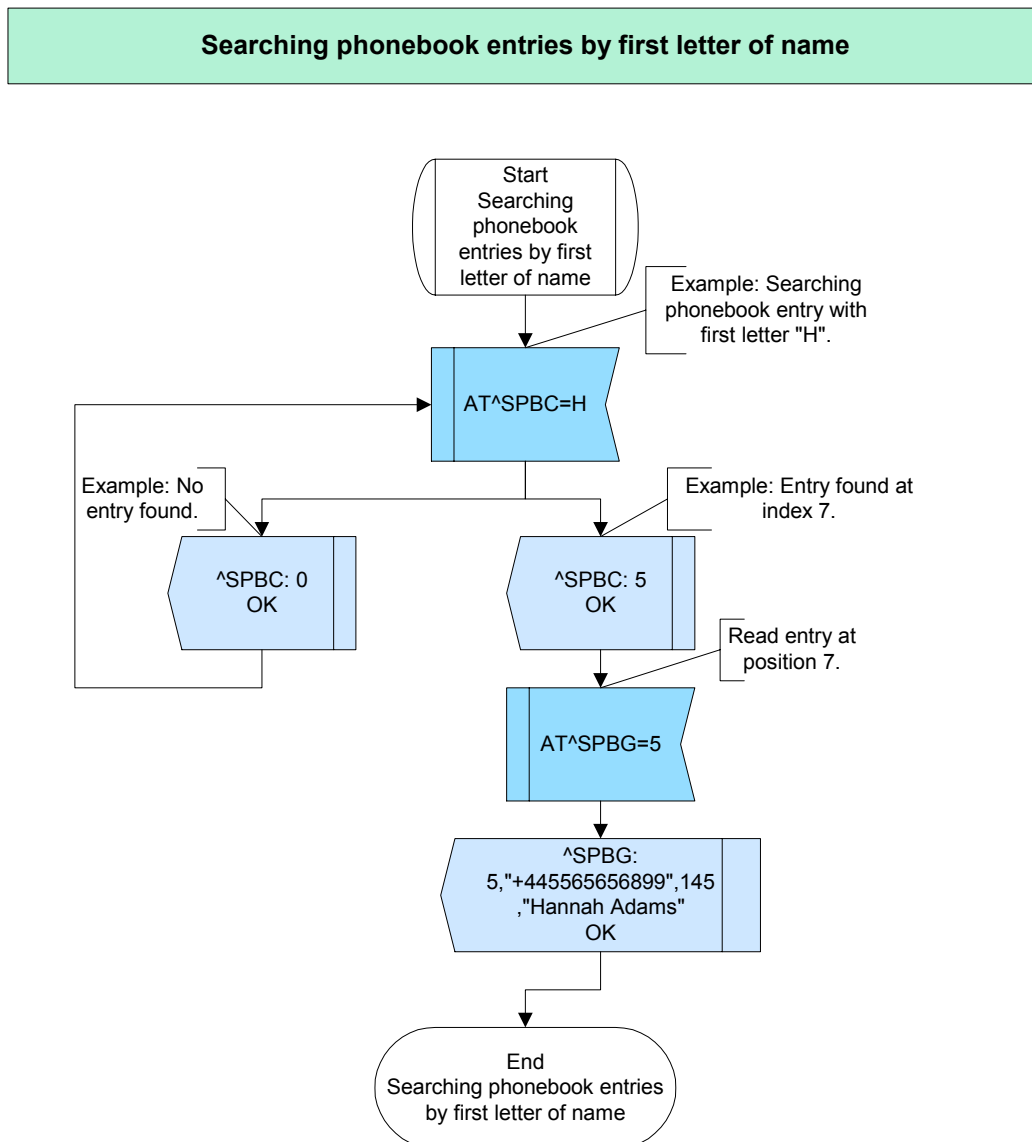


Figure 92: Searching phonebook entries by first letter of name

### 2.12.4.4 Hints

Not applicable.

#### 2.12.4.5 Example

\*\*\*\*\*

Comment: Searching phonebook entries by first letter of name

\*\*\*\*\*

\*\*\*\*\*

Comment: Searching phonebook entry with first letter "H".

\*\*\*\*\*

Subscr 1 Send: AT^SPBC="H"

Subscr 1 Receive: AT^SPBC="H"

Subscr 1 Receive: ^SPBC: 3

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read entry at index 3.

\*\*\*\*\*

Subscr 1 Send: AT^SPBG=3

Subscr 1 Receive: AT^SPBG=3

Subscr 1 Receive: ^SPBG: 3,"+445565656899",145,"Hannah Adams"

Subscr 1 Receive:

Subscr 1 Receive: OK

## **2.12.5 Deleting phonebook or phonebook entries**

### **2.12.5.1 Description**

This chapter describes the steps used to delete an entry of a phonebook or to delete a whole phonebook.

Depending on the type of phonebook there are different ways to delete entries.

- If the active phonebook is "SM", "ME", "FD" or "ON":  
Use the AT+CPBW command and simply enter the location number of the entry to be deleted. To delete the entire phonebook this action must be performed for each single entry.  
If you wish to delete entries in the "FD" phonebook remember that PIN2 authentication must be done before as described in chapter 2.12.7.
- If the active phonebook is "LD", "RC" or "MC":  
There is no way to edit a single entry (AT+CPBW cannot be used). The command AT^SPBD clears all entries stored in the phonebook.  
The "LD" phonebook can also be deleted with AT^SDLD. See [2] for detail.

### **2.12.5.2 Used AT commands**

AT+CPBR	-	Read current phonebook entries
AT+CPBW	-	Write phonebook entry
AT^SPBD	-	Delete the given phonebook

For further details about the commands see [2].

### 2.12.5.3 Flow chart

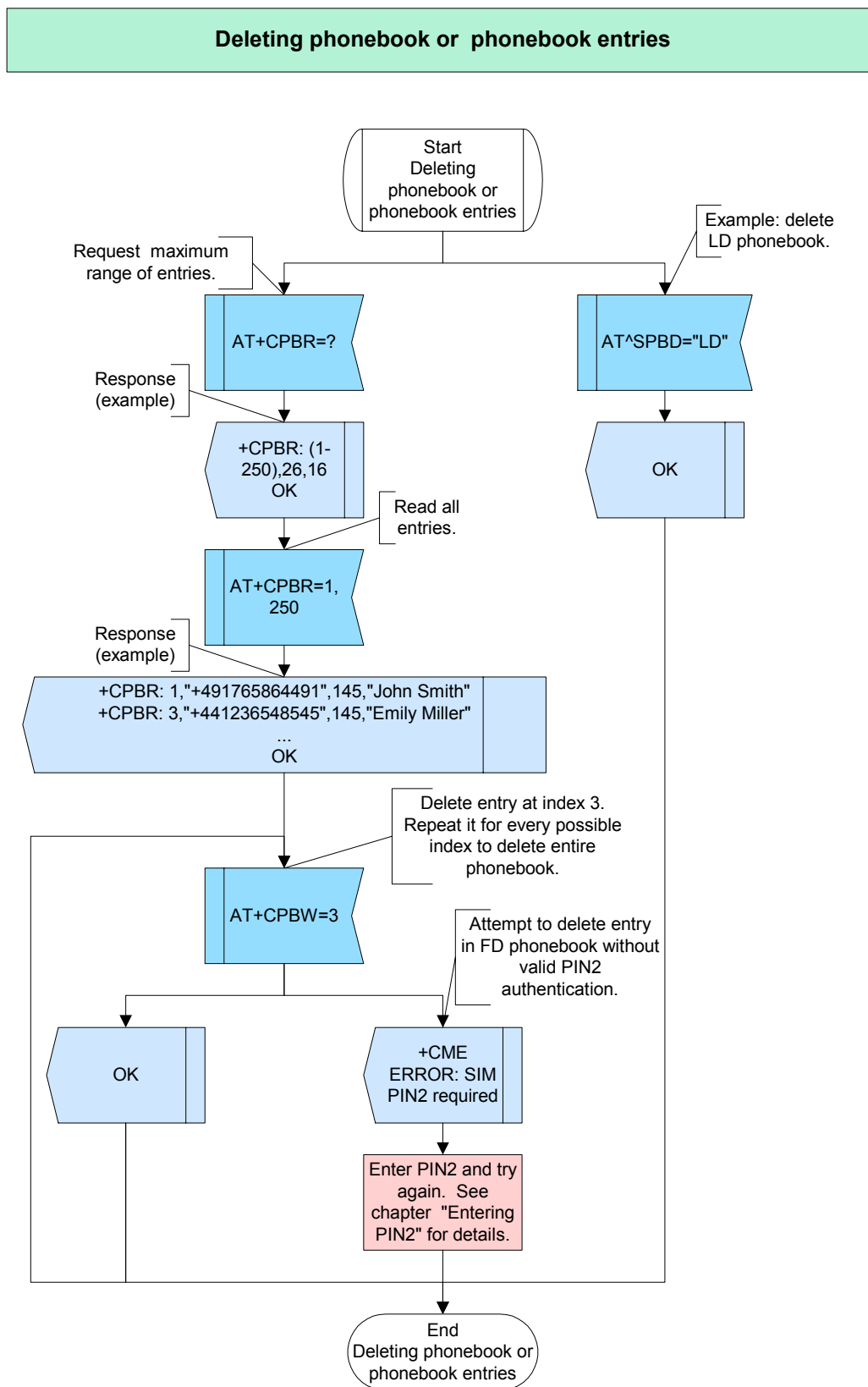


Figure 93: Deleting phonebook entries

## 2.12.5.4 Hints

- For PIN2 see phonebook initialization in chapter 2.12.1 and details on "FD" phonebook in chapter 2.12.7.

## 2.12.5.5 Example

\*\*\*\*\*

Comment: Deleting phonebook or phonebook entries

\*\*\*\*\*

\*\*\*\*\*

Comment: Request maximum range of entries and number of used memory locations.

\*\*\*\*\*

```
Subscr 1   Send: AT+CPBR=?
Subscr 1   Receive: AT+CPBR=?
Subscr 1   Receive: +CPBR: (1-20),20,14
Subscr 1   Receive:
Subscr 1   Receive: OK
```

\*\*\*\*\*

Comment: Read all entries.

\*\*\*\*\*

```
Subscr 1   Send: AT+CPBR=1,20
Subscr 1   Receive: AT+CPBR=1,20
Subscr 1   Receive: +CPBR: 1,"+491765864491",145,"John Smith"
Subscr 1   Receive: +CPBR: 2,"+44545896638",145,"Paul Williams"
Subscr 1   Receive: +CPBR: 3,"+44556565657",145,"Joe Anderson"
Subscr 1   Receive: +CPBR: 4,"+445636934485",145,"Oscar Thomson"
Subscr 1   Receive: +CPBR: 5,"+445565656899",145,"Hannah Adams"
Subscr 1   Receive: +CPBR: 6,"+447982865563",145,"Samantha Young"
Subscr 1   Receive: +CPBR: 7,"+449585315798",145,"Alexis Wright"
Subscr 1   Receive: +CPBR: 8,"+445415454646",145,"Abigail Cox"
Subscr 1   Receive: +CPBR: 12,"+446565689115",145,"Kyla Clark"
Subscr 1   Receive:
Subscr 1   Receive: OK
```

\*\*\*\*\*

Comment: Delete entry at index 3.

\*\*\*\*\*

```
Subscr 1   Send: AT+CPBW=3
Subscr 1   Receive: AT+CPBW=3
Subscr 1   Receive: OK
```

\*\*\*\*\*

Comment: Read all entries.

\*\*\*\*\*

```
Subscr 1   Send: AT+CPBR=1,20
Subscr 1   Receive: AT+CPBR=1,20
Subscr 1   Receive: +CPBR: 1,"+491765864491",145,"John Smith"
Subscr 1   Receive: +CPBR: 2,"+44545896638",145,"Paul Williams"
Subscr 1   Receive: +CPBR: 4,"+445636934485",145,"Oscar Thomson"
Subscr 1   Receive: +CPBR: 5,"+445565656899",145,"Hannah Adams"
Subscr 1   Receive: +CPBR: 6,"+447982865563",145,"Samantha Young"
Subscr 1   Receive: +CPBR: 7,"+449585315798",145,"Alexis Wright"
Subscr 1   Receive: +CPBR: 8,"+445415454646",145,"Abigail Cox"
Subscr 1   Receive: +CPBR: 12,"+446565689115",145,"Kyla Clark"
```

---

Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Delete "LD" phonebook.  
\*\*\*\*\*

Subscr 1 Send: AT^SPBD="LD"  
Subscr 1 Receive: AT^SPBD="LD"  
Subscr 1 Receive: OK

---

## **2.12.6 Writing phonebook entries**

### **2.12.6.1 Description**

This chapter describes the steps used to write a phonebook entry.

There are two ways to edit an entry with AT+CPBW:

- You can write a new entry to a specific position. In this case first read the phonebook, for example by using AT+CPBR. Then you can specify the position to change an existing entry or to add a new one.
- The other way is to write a new entry to the next free position. In this case, simply type the entry without specifying the location number.

The command AT+CPBW can be used to edit the following phonebooks: "SM", "ME", "FD", "ON".

### **2.12.6.2 Used AT commands**

AT+CPBR	-	Read current phonebook entries
AT+CPBW	-	Write phonebook entry

For further details about the commands see [2].

### 2.12.6.3 Flow chart

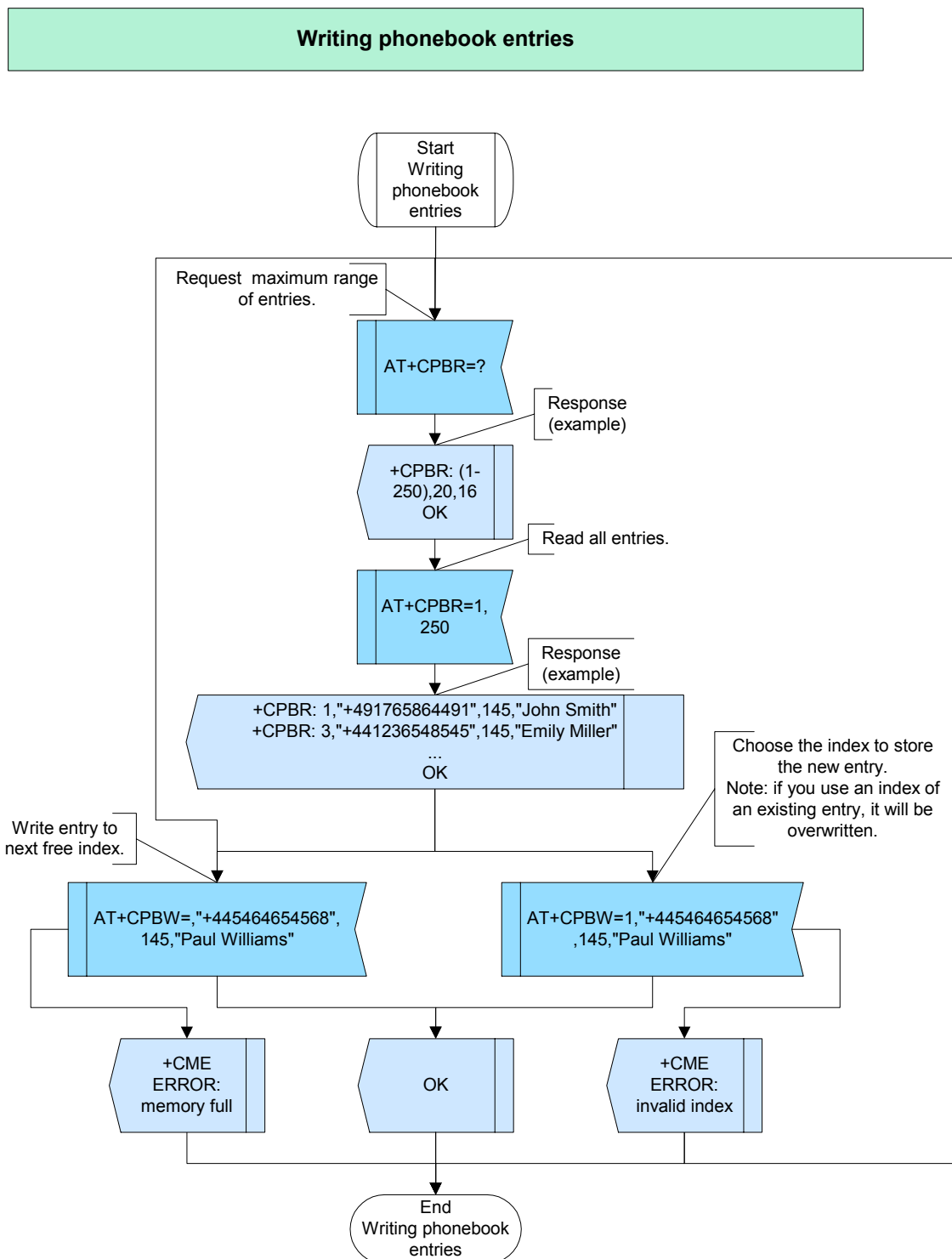


Figure 94: Writing phonebook entries

### 2.12.6.4 Hints

- For PIN2 see Phonebook initialization.



### 2.12.6.5 Example

\*\*\*\*\*

Comment: Writing phonebook entries

\*\*\*\*\*

\*\*\*\*\*

Comment: Request maximum range of entries.

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=?

Subscr 1 Receive: AT+CPBR=?

Subscr 1 Receive: +CPBR: (1-20),20,14

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read all entries.

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,20

Subscr 1 Receive: AT+CPBR=1,20

Subscr 1 Receive: +CPBR: 1,"+491765864491",145,"John Smith"

Subscr 1 Receive: +CPBR: 4,"+445636934485",145,"Tamara Jones"

Subscr 1 Receive: +CPBR: 5,"+445565656899",145,"Hannah Adams"

Subscr 1 Receive: +CPBR: 7,"+449585315798",145,"Alexis Wright"

Subscr 1 Receive: +CPBR: 8,"+445415454646",145,"Abigail Cox"

Subscr 1 Receive: +CPBR: 12,"+446565689115",145,"Kyla Clark"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Write a new entry to second index.

\*\*\*\*\*

Subscr 1 Send: AT+CPBW=2,+44545896638,145,"Paul Williams"

Subscr 1 Receive: AT+CPBW=2,+44545896638,145,"Paul Williams"

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read all entries.

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,20

Subscr 1 Receive: AT+CPBR=1,20

Subscr 1 Receive: +CPBR: 1,"+491765864491",145,"John Smith"

Subscr 1 Receive: +CPBR: 2,"+44545896638",145,"Paul Williams"

Subscr 1 Receive: +CPBR: 4,"+445636934485",145,"Tamara Jones"

Subscr 1 Receive: +CPBR: 5,"+445565656899",145,"Hannah Adams"

Subscr 1 Receive: +CPBR: 7,"+449585315798",145,"Alexis Wright"

Subscr 1 Receive: +CPBR: 8,"+445415454646",145,"Abigail Cox"

Subscr 1 Receive: +CPBR: 12,"+446565689115",145,"Kyla Clark"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Overwrite entry at fourth index.

\*\*\*\*\*

Subscr 1 Send: AT+CPBW=4,+445636934485,145,"Oscar Thomson"

Subscr 1 Receive: AT+CPBW=4,+445636934485,145,"Oscar Thomson"

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read all entries.

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,20  
Subscr 1 Receive: AT+CPBR=1,20  
Subscr 1 Receive: +CPBR: 1,"+491765864491",145,"John Smith"  
Subscr 1 Receive: +CPBR: 2,"+44545896638",145,"Paul Williams"  
Subscr 1 Receive: +CPBR: 4,"+445636934485",145,"Oscar Thomson"  
Subscr 1 Receive: +CPBR: 5,"+445565656899",145,"Hannah Adams"  
Subscr 1 Receive: +CPBR: 7,"+449585315798",145,"Alexis Wright"  
Subscr 1 Receive: +CPBR: 8,"+445415454646",145,"Abigail Cox"  
Subscr 1 Receive: +CPBR: 12,"+446565689115",145,"Kyla Clark"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Add new entry to the next free position.

\*\*\*\*\*

Subscr 1 Send: AT+CPBW=,+44321546546,145,"Tamara Jones"  
Subscr 1 Receive: AT+CPBW=,+44321546546,145,"Tamara Jones"  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read all entries.

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,20  
Subscr 1 Receive: AT+CPBR=1,20  
Subscr 1 Receive: +CPBR: 1,"+491765864491",145,"John Smith"  
Subscr 1 Receive: +CPBR: 2,"+44545896638",145,"Paul Williams"  
Subscr 1 Receive: +CPBR: 3,"+44321546546",145,"Tamara Jones"  
Subscr 1 Receive: +CPBR: 4,"+445636934485",145,"Oscar Thomson"  
Subscr 1 Receive: +CPBR: 5,"+445565656899",145,"Hannah Adams"  
Subscr 1 Receive: +CPBR: 7,"+449585315798",145,"Alexis Wright"  
Subscr 1 Receive: +CPBR: 8,"+445415454646",145,"Abigail Cox"  
Subscr 1 Receive: +CPBR: 12,"+446565689115",145,"Kyla Clark"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

---

## **2.12.7 Writing entries to SIM fixdialing phonebook**

### **2.12.7.1 Description**

This chapter describes how to write an entry to the fixdialing phonebook. Before editing the "FD" phonebook be sure that PIN2 authentication has been done. Then follow the steps listed in chapter 2.12.6.

After entering the correct PIN2, the PIN2 authentication code changes to READY and remains valid for 300s. Then a repetition of the authentication process is required, i.e. the PIN2 authentication code changes from READY to SIM PIN2. In this case any attempt to edit the "FD" phonebook will be denied with "+CME ERROR: SIM PIN2 required" until PIN2 is entered once again.

### **2.12.7.2 Used AT commands**

AT+CPBR	-	Read current phonebook entries
AT+CPBW	-	Write phonebook entry

For further details about the commands see [2].

### 2.12.7.3 Flow chart

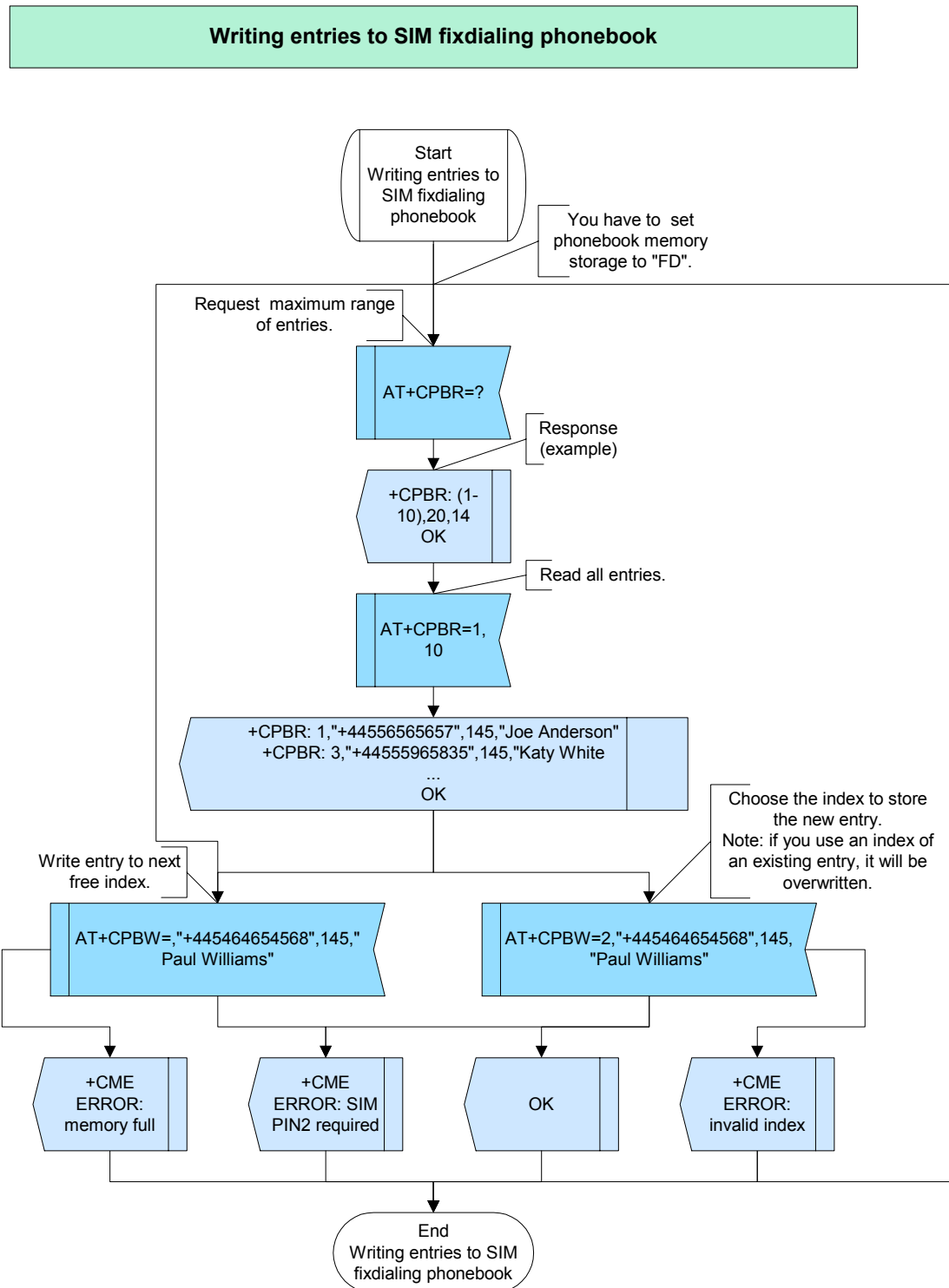


Figure 95: Writing entries to SIM fixdialing phonebook

### 2.12.7.4 Hints

Not applicable.

### 2.12.7.5 Example

\*\*\*\*\*

Comment: Writing entries to SIM fixdialing phonebook

\*\*\*\*\*

\*\*\*\*\*

Comment: Request maximum range of entries.

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=?

Subscr 1 Receive: AT+CPBR=?

Subscr 1 Receive: +CPBR: (1-10),20,14

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read all entries.

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,10

Subscr 1 Receive: AT+CPBR=1,10

Subscr 1 Receive: +CPBR: 1,"+445636934485",145,"Oscar Thomson"

Subscr 1 Receive: +CPBR: 2,"+44555965835",145,"Katy White"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Write a new entry to third index. PIN2 was not entered before.

\*\*\*\*\*

Subscr 1 Send: AT+CPBW=3,+44545896638,145,"Paul Williams"

Subscr 1 Receive: AT+CPBW=3,+44545896638,145,"Paul Williams"

Subscr 1 Receive: +CME ERROR: SIM PIN2 required

\*\*\*\*\*

Comment: Entering PIN2.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=1234

Subscr 1 Receive: AT+CPIN2=1234

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Write a new entry to fourth index.

\*\*\*\*\*

Subscr 1 Send: AT+CPBW=4,+44545896638,145,"Paul Williams"

Subscr 1 Receive: AT+CPBW=4,+44545896638,145,"Paul Williams"

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read all entries.

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,10

Subscr 1 Receive: AT+CPBR=1,10

Subscr 1 Receive: +CPBR: 1,"+445636934485",145,"Oscar Thomson"

Subscr 1 Receive: +CPBR: 2,"+44555965835",145,"Katy White"

Subscr 1 Receive: +CPBR: 4,"+44545896638",145,"Paul Williams"

Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Overwrite entry at first index.  
\*\*\*\*\*

Subscr 1 Send: AT+CPBW=1,+445636934485,145,"Oscar Thomson"  
Subscr 1 Receive: AT+CPBW=1,+445636934485,145,"Oscar Thomson"  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Read all entries.  
\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,10  
Subscr 1 Receive: AT+CPBR=1,10  
Subscr 1 Receive: +CPBR: 1,"+445636934485",145,"Oscar Thomson"  
Subscr 1 Receive: +CPBR: 2,"+44555965835",145,"Katy White"  
Subscr 1 Receive: +CPBR: 4,"+44545896638",145,"Paul Williams"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Add new entry to the next free position.  
\*\*\*\*\*

Subscr 1 Send: AT+CPBW=,+44321546546,145,"Tamara Jones"  
Subscr 1 Receive: AT+CPBW=,+44321546546,145,"Tamara Jones"  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Read all entries.  
\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,10  
Subscr 1 Receive: AT+CPBR=1,10  
Subscr 1 Receive: +CPBR: 1,"+445636934485",145,"Oscar Thomson"  
Subscr 1 Receive: +CPBR: 2,"+44555965835",145,"Katy White"  
Subscr 1 Receive: +CPBR: 3,"+44321546546",145,"Tamara Jones"  
Subscr 1 Receive: +CPBR: 4,"+44545896638",145,"Paul Williams"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## 2.13 Security

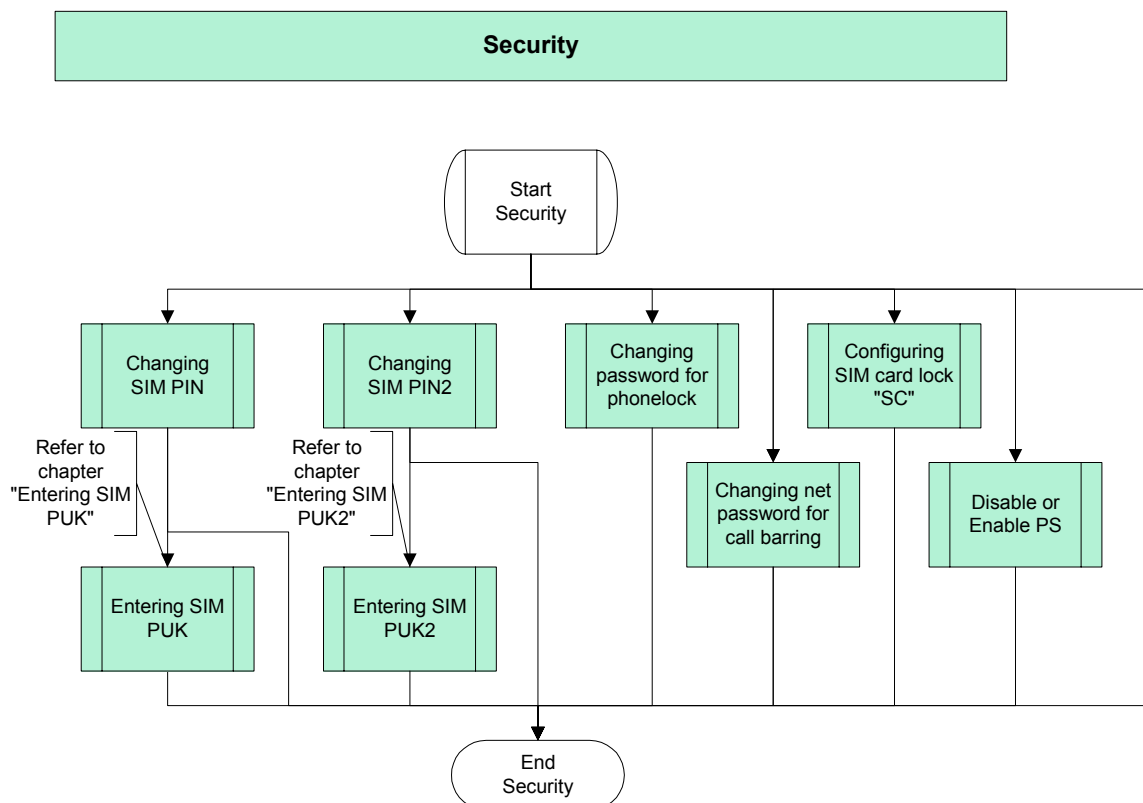


Figure 96: Security

### General remark

For all procedures described in this chapter it is advisory to check the number of attempts left for entering a PIN or password. This can be done using the command AT^SPIC. Please note that the handling of this command varies with the type of Siemens module:

The execute command AT^SPIC that is common to all module types delivers the counter related to the pending PIN or password request. In addition, some module types provide the read command AT^SPIC? and the write command AT^SPIC=<facility> to allow retrieving the PIN counter of a specific lock type. For details see the specifications provided in [2]. In the following chapters different flowcharts and examples are shown, each for products with execute command AT^SPIC only and for products with the additional write command AT^SPIC=<facility>.

## 2.13.1 Changing SIM PIN

### 2.13.1.1 Description

This chapter lists the steps required to change the SIM PIN and describes what happens, if a wrong PIN was entered too many times. The command AT+CPWD can be used to change the SIM PIN. The SIM PIN must be entered, if the lock command is issued before configuring the password. After entering a wrong SIM PIN three times in succession, the SIM PUK is required. When using AT^SPIC please consider that its functionality is product dependent (see "General remark" in section 2.13).

### 2.13.1.2 Used AT commands

AT^SPIC	-	Display PIN counter
AT+CPIN	-	Enter PIN
AT+CPWD	-	Change password

For further details about the commands see [2].

### 2.13.1.3 Flow chart

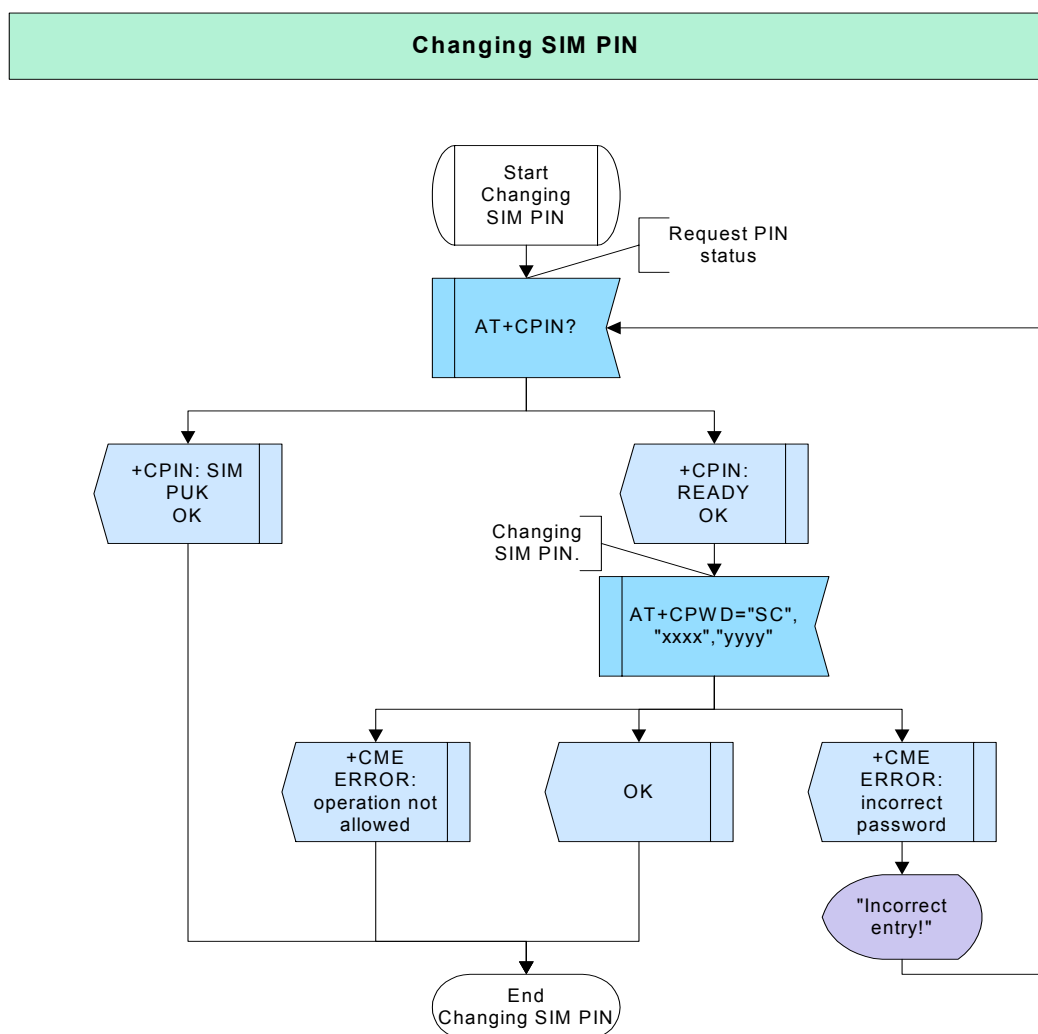


Figure 97: Changing SIM PIN



**Changing SIM PIN and retrieving PIN counter with AT^SPIC=<facility>**

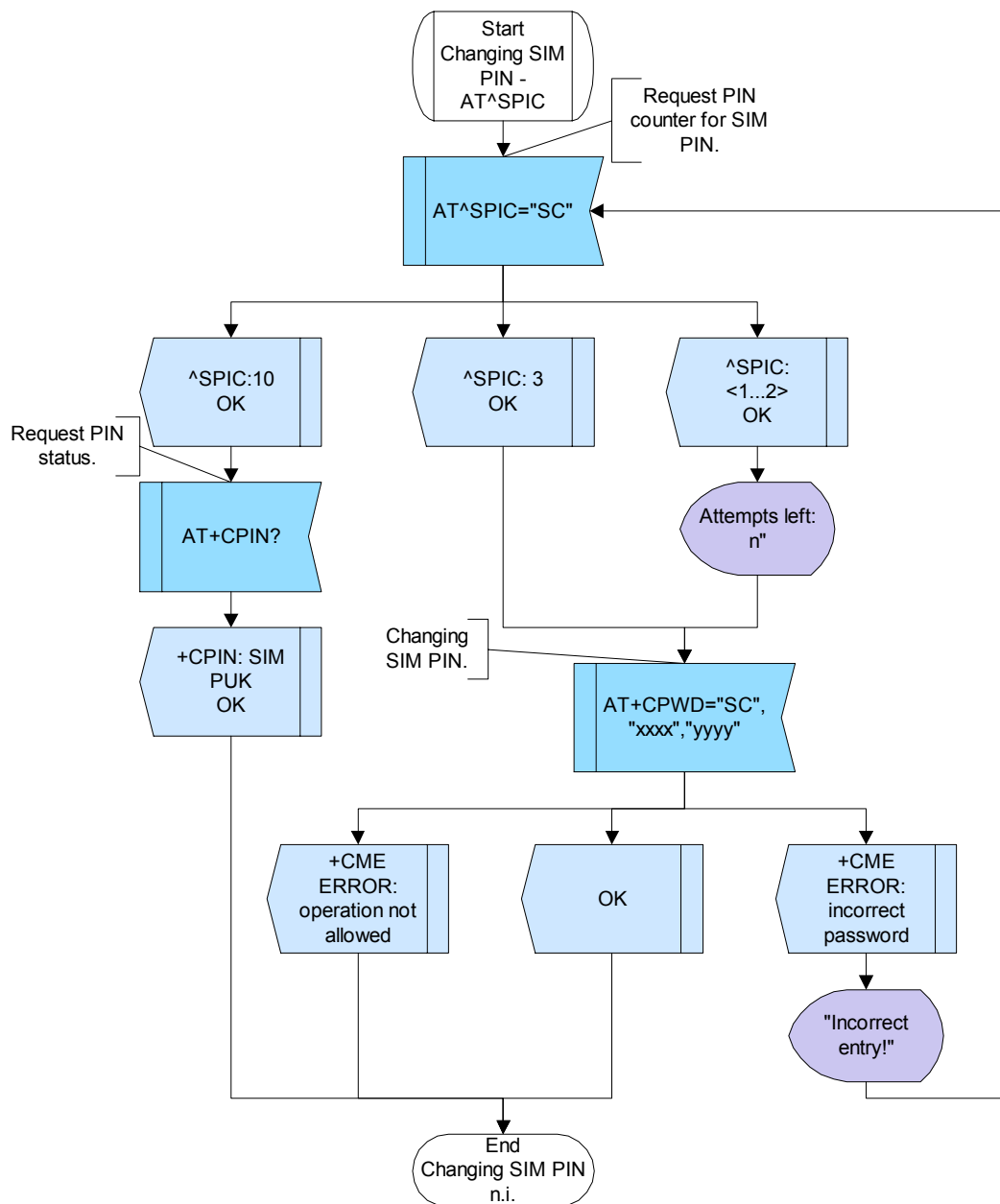


Figure 98: Changing SIM PIN and retrieving PIN counter with write command AT^SPIC=<facility>

### 2.13.1.4 Hints

- If the response to AT+CPWD="SC",xxx,yyy is "+CME ERROR: operation not allowed", SIM PIN authentication must be done first.
- As an alternative to the AT+CPWD you can use the command AT^SPWD="SC","old password","new password" or the command AT+CPIN=<password>,<new password>.
- For unlocking a blocked SIM PIN see chapter 2.5.2.

### 2.13.1.5 Example

#### Example 1:

\*\*\*\*\*

Comment: Changing SIM PIN

To request the PIN counter example 1 uses the AT^SPIC execute command supported by all products.

\*\*\*\*\*

\*\*\*\*\*

Comment: Request counter for SIM PIN ("SC" lock)

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="SC"

Subscr 1 Receive: AT^SPIC="SC"

Subscr 1 Receive: ^SPIC: 3

Subscr 1 Receive:

Subscr 1 Receive: OK(password for "SC" lock).

\*\*\*\*\*

Comment: Changing SIM PIN

Comment: old password=9999, new password =1111

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="SC","9999","1111"

Subscr 1 Receive: AT+CPWD="SC","9999","1111"

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter with AT^SPIC execute command

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 3

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong SIM PIN (first attempt)

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="SC","0001","1111"

Subscr 1 Receive: AT+CPWD="SC","0001","1111"

Subscr 1 Receive: +CME ERROR: incorrect password

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 2

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong SIM PIN (second attempt)

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="SC","0001","1111"

Subscr 1 Receive: AT+CPWD="SC","0001","1111"

Subscr 1 Receive: +CME ERROR: incorrect password

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong SIM PIN (third attempt)

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="SC","0001","1111"  
Subscr 1 Receive: AT+CPWD="SC","0001","1111"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request required PIN

\*\*\*\*\*

Subscr 1 Send: AT+CPIN?  
Subscr 1 Receive: AT+CPIN?  
Subscr 1 Receive: +CPIN: SIM PUK  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering SIM PUK

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=12345678,9999  
Subscr 1 Receive: AT+CPIN=12345678,9999  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## Example 2:

\*\*\*\*\*

Comment: Changing SIM PIN (password for "SC" lock)

To request the PIN counter example 2 uses the read command AT^SPIC? and the write command AT^SPIC=<facility>. Keep in mind that both command types are not supported by all products.

\*\*\*\*\*

\*\*\*\*\*

Comment: Changing SIM PIN

Comment: old password=0000, new password =1234

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="SC","0000","1234"  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong SIM PIN (first attempt)

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="SC","1113","1233"  
Subscr 1 Receive: AT+CPWD="SC","1113","1233"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request counter for SIM PIN ("SC" lock)

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="SC"

Subscr 1 Receive: AT^SPIC="SC"  
Subscr 1 Receive: ^SPIC: 2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong SIM PIN (second attempt)

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="SC","3333","1255"  
Subscr 1 Receive: AT+CPWD="SC","3333","1255"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request counter for SIM PIN ("SC" lock)

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="SC"  
Subscr 1 Receive: AT^SPIC="SC"  
Subscr 1 Receive: ^SPIC: 1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong SIM PIN (third attempt)

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="SC","4711","1331"  
Subscr 1 Receive: AT+CPWD="SC","4711","1331"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request counter for SIM PIN ("SC" lock)

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="SC"  
Subscr 1 Receive: AT^SPIC="SC"  
Subscr 1 Receive: ^SPIC: 10  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Ask which PIN is required (via AT^SPIC read command)

\*\*\*\*\*

Subscr 1 Send: AT^SPIC?  
Subscr 1 Receive: AT^SPIC?  
Subscr 1 Receive: ^SPIC: SIM PUK  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enter SIM PUK and specify new SIM PIN (activates new "SC lock).

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=12345678,0000  
Subscr 1 Receive: AT+CPIN=12345678,0000  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request counter for SIM PIN ("SC" lock)

\*\*\*\*\*

Subscr 1    Send: AT^SPIC="SC"  
Subscr 1    Receive: AT^SPIC="SC"  
Subscr 1    Receive: ^SPIC: 3  
Subscr 1    Receive:  
Subscr 1    Receive: OK

---

## **2.13.2 Changing SIM PIN2**

### **2.13.2.1 Description**

This chapter describes the steps required to change the SIM PIN2 with AT+CPWD. The SIM PUK2 is needed after entering a wrong SIM PIN2 three times. When using AT^SPIC, please consider that its functionality is product dependent (see "General remark" in section 2.13).

### **2.13.2.2 Used AT commands**

AT+CPIN2	-	Enter PIN2
AT^SPIC	-	Display PIN counter
AT+CPWD	-	Change password

For further details about the commands see [2].

### 2.13.2.3 Flow chart

#### Changing SIM PIN2 and retrieving PIN counter with AT^SPIC exec command

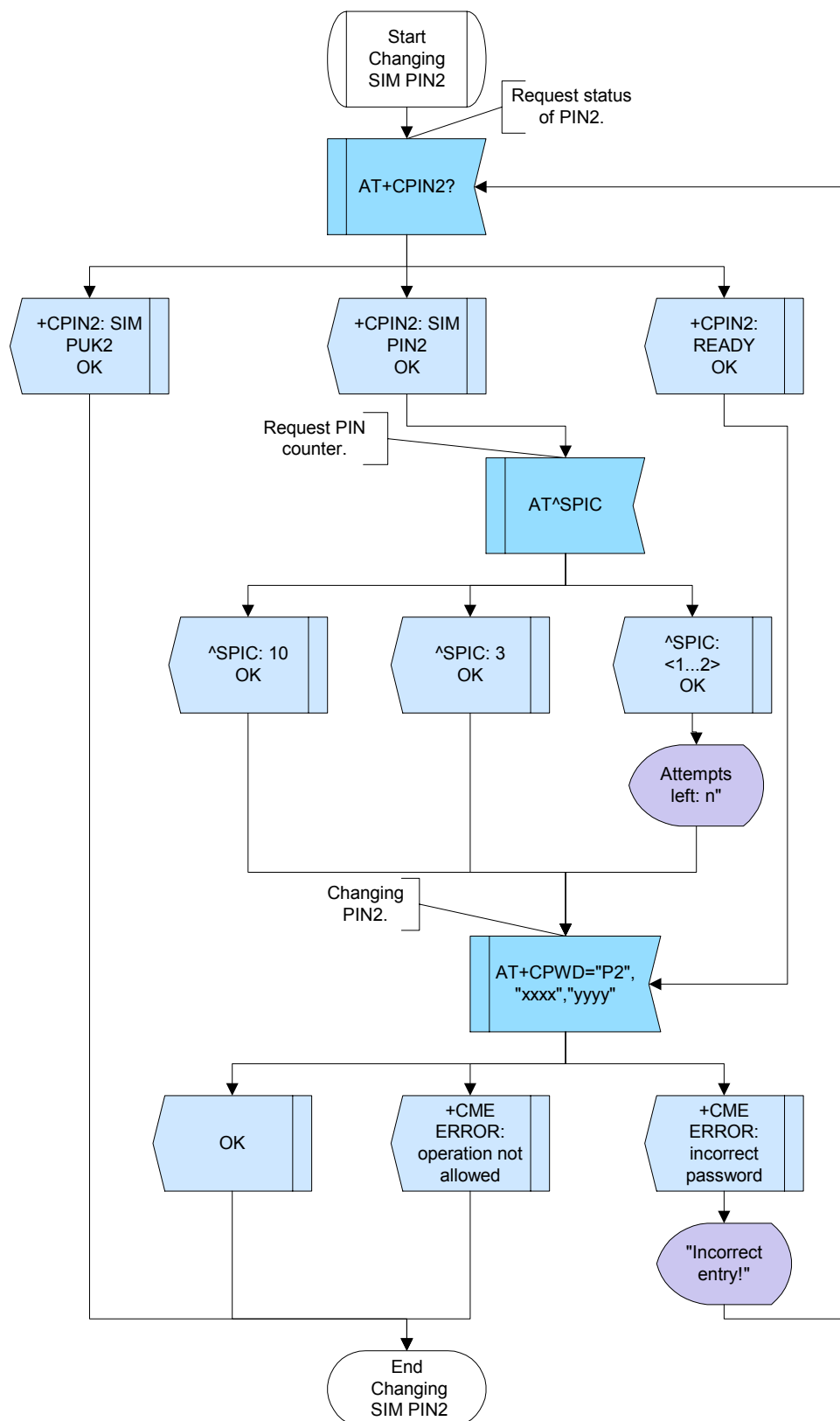


Figure 99: Changing SIM PIN2 and retrieving PIN counter with AT^SPIC exec command

Changing SIM PIN2 and retrieving PIN counter with AT^SPIC=<facility>

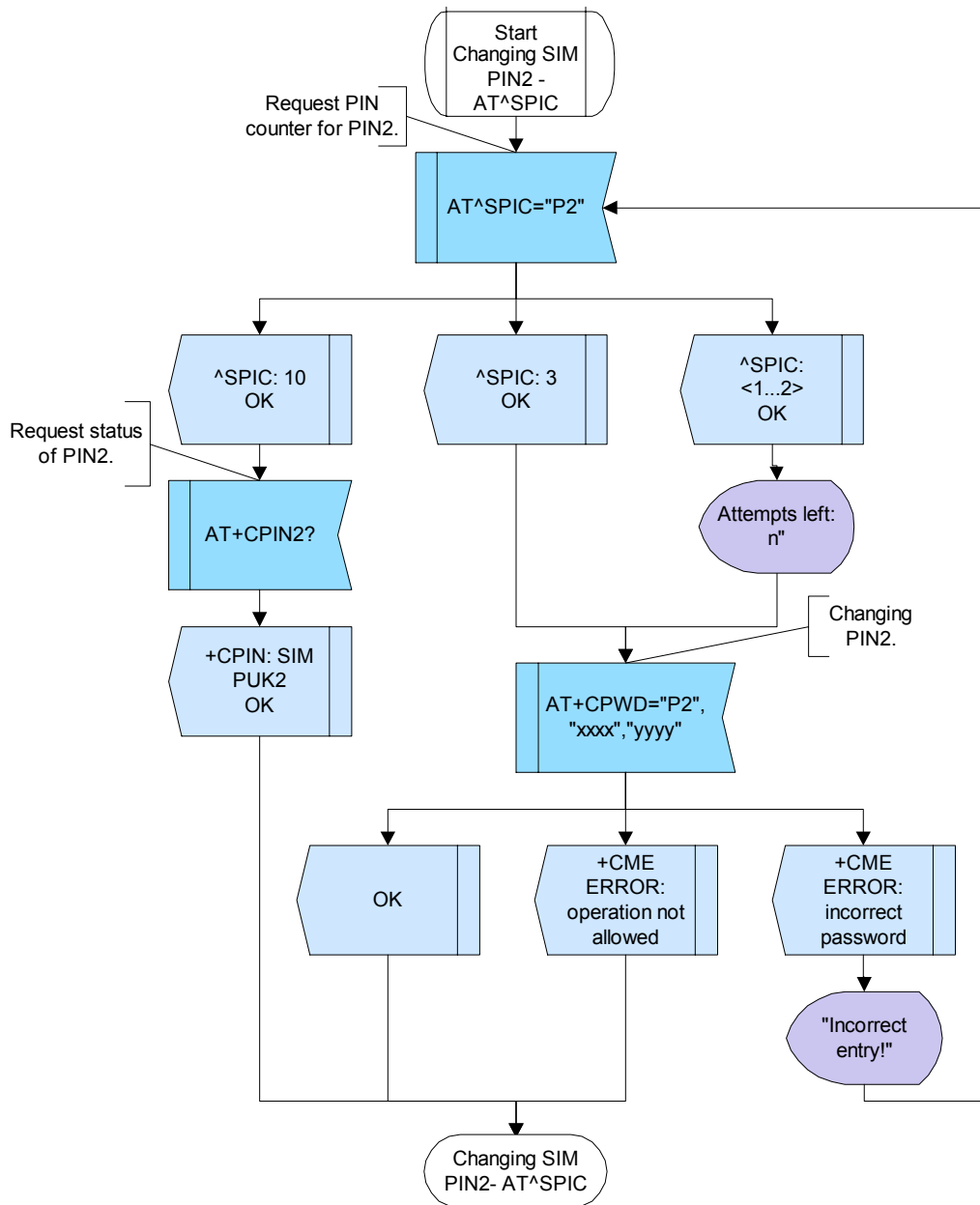


Figure 100: Changing SIM PIN2 and retrieving PIN counter with write command AT^SPIC=<facility>

#### 2.13.2.4 Hints

- As an alternative to the AT+CPWD you can use AT^SPWD="P2","old password","new password" or AT+CPIN2=<password>,<new password>
- For unlocking a blocked SIM PIN2 see chapter 2.5.6.



### 2.13.2.5 Example

#### Example 1:

\*\*\*\*\*

Comment: Changing SIM PIN2 (password for "P2" lock)

To request the PIN counter example 1 uses the AT^SPIC execute command supported by all products.

\*\*\*\*\*

\*\*\*\*\*

Comment: Request status of PIN2

\*\*\*\*\*

Subscr 3 Send: AT+CPIN2?

Subscr 3 Receive: AT+CPIN2?

Subscr 3 Receive: +CPIN2: SIM PIN2

Subscr 3 Receive:

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter with AT^SPIC execute command

\*\*\*\*\*

Subscr 3 Send: AT^SPIC

Subscr 3 Receive: AT^SPIC

Subscr 3 Receive: ^SPIC: 3

Subscr 3 Receive:

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Changing SIM PIN2

Comment: old password=4321, new password =1234

\*\*\*\*\*

Subscr 3 Send: AT+CPWD="P2","4321","1234"

Subscr 3 Receive: AT+CPWD="P2","4321","1234"

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Entering PIN2 (first attempt)

\*\*\*\*\*

Subscr 3 Send: AT+CPWD="P2","1111","4231"

Subscr 3 Receive: AT+CPWD="P2","1111","4231"

Subscr 3 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 3 Send: AT^SPIC

Subscr 3 Receive: AT^SPIC

Subscr 3 Receive: ^SPIC: 2

Subscr 3 Receive:

Subscr 3 Receive: OK

\*\*\*\*\*

---

Comment: Entering PIN2 (second attempt)

\*\*\*\*\*

Subscr 3    Send: AT+CPWD="P2","1111","4231"  
Subscr 3    Receive: AT+CPWD="P2","1111","4231"  
Subscr 3    Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter

\*\*\*\*\*

Subscr 3    Send: AT^SPIC  
Subscr 3    Receive: AT^SPIC  
Subscr 3    Receive: ^SPIC: 1  
Subscr 3    Receive:  
Subscr 3    Receive: OK

\*\*\*\*\*

Comment: Entering PIN2 (third attempt)

\*\*\*\*\*

Subscr 3    Send: AT+CPWD="P2","1111","4231"  
Subscr 3    Receive: AT+CPWD="P2","1111","4231"  
Subscr 3    Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request required PIN2

\*\*\*\*\*

Subscr 3    Send: AT+CPIN2?  
Subscr 3    Receive: AT+CPIN2?  
Subscr 3    Receive: +CPIN2: SIM PUK2  
Subscr 3    Receive:  
Subscr 3    Receive: OK

\*\*\*\*\*

Comment: Enter PUK2

\*\*\*\*\*

Subscr 3    Send: AT+CPIN2=87654321,4321  
Subscr 3    Receive: AT+CPIN2=87654321,4321  
Subscr 3    Receive:  
Subscr 3    Receive: OK

**Example 2:**

\*\*\*\*\*

Comment: Changing password for P2 (password for "P2" lock)  
To request the PIN counter example 2 uses the read command AT^SPIC? and the write command AT^SPIC=<facility>. Keep in mind that both command types are not supported by all products.

\*\*\*\*\*

\*\*\*\*\*

Comment: Changing Password for P2.  
Comment: old password=1234, new password =0000.

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="P2","1234","0000"  
Subscr 1 Receive: AT+CPWD="P2","1234","0000"  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Which PIN is required (read command is not supported by all products).

\*\*\*\*\*

Subscr 1 Send: AT^SPIC?  
Subscr 1 Receive: AT^SPIC?  
Subscr 1 Receive: ^SPIC: SIM PIN2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter for P2.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="P2"  
Subscr 1 Receive: AT^SPIC="P2"  
Subscr 1 Receive: ^SPIC: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong password for P2 (first attempt).

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="P2","11113","12334"  
Subscr 1 Receive: AT+CPWD="P2","11113","12334"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter for P2-

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="P2"  
Subscr 1 Receive: AT^SPIC="P2"  
Subscr 1 Receive: ^SPIC: 2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong password for P2 (second attempt).

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="P2","3333","1255"  
Subscr 1 Receive: AT+CPWD="P2","3333","1255"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter for P2.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="P2"  
Subscr 1 Receive: AT^SPIC="P2"  
Subscr 1 Receive: ^SPIC: 1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong password for P2 (third attempt).

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="P2","4711","1331"  
Subscr 1 Receive: AT+CPWD="P2","4711","1331"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter for P2.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="P2"  
Subscr 1 Receive: AT^SPIC="P2"  
Subscr 1 Receive: ^SPIC: 10  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enter SIM PUK2 and set new P2.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN2=87654321,1234  
Subscr 1 Receive: AT+CPIN2=87654321,1234  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter for P2.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="P2"  
Subscr 1 Receive: AT^SPIC="P2"  
Subscr 1 Receive: ^SPIC: 1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## **2.13.3 Changing password for phonelock ("PS")**

### **2.13.3.1 Description**

This chapter describes the steps required to change the phonelock password and to unlock a disabled password. The command "AT+CPWD" can be used to change the phonelock password. After entering a wrong phonelock password three times in succession the master phonecode will be required. "AT^SPIC" has various options, further information see above "General remark" 2.13.

### **2.13.3.2 Used AT commands**

AT+CPWD	-	Change password
AT^SPIC	-	Display PIN counter

For further details about the commands see [2].

### 2.13.3.3 Flow chart

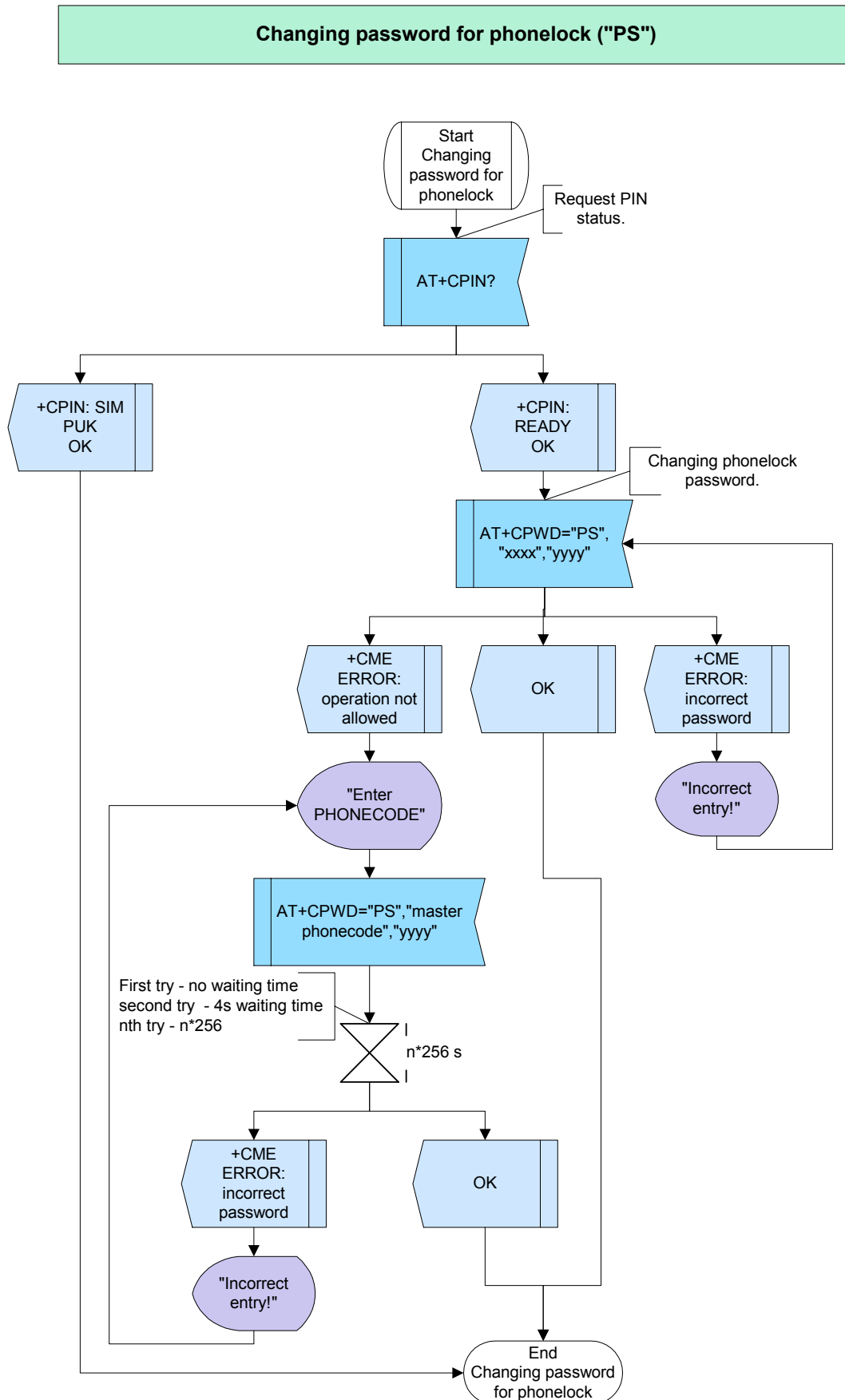


Figure 101: Changing password for phonelock

Changing password for phonelock and retrieving PIN counter with  
AT^SPIC=<facility>

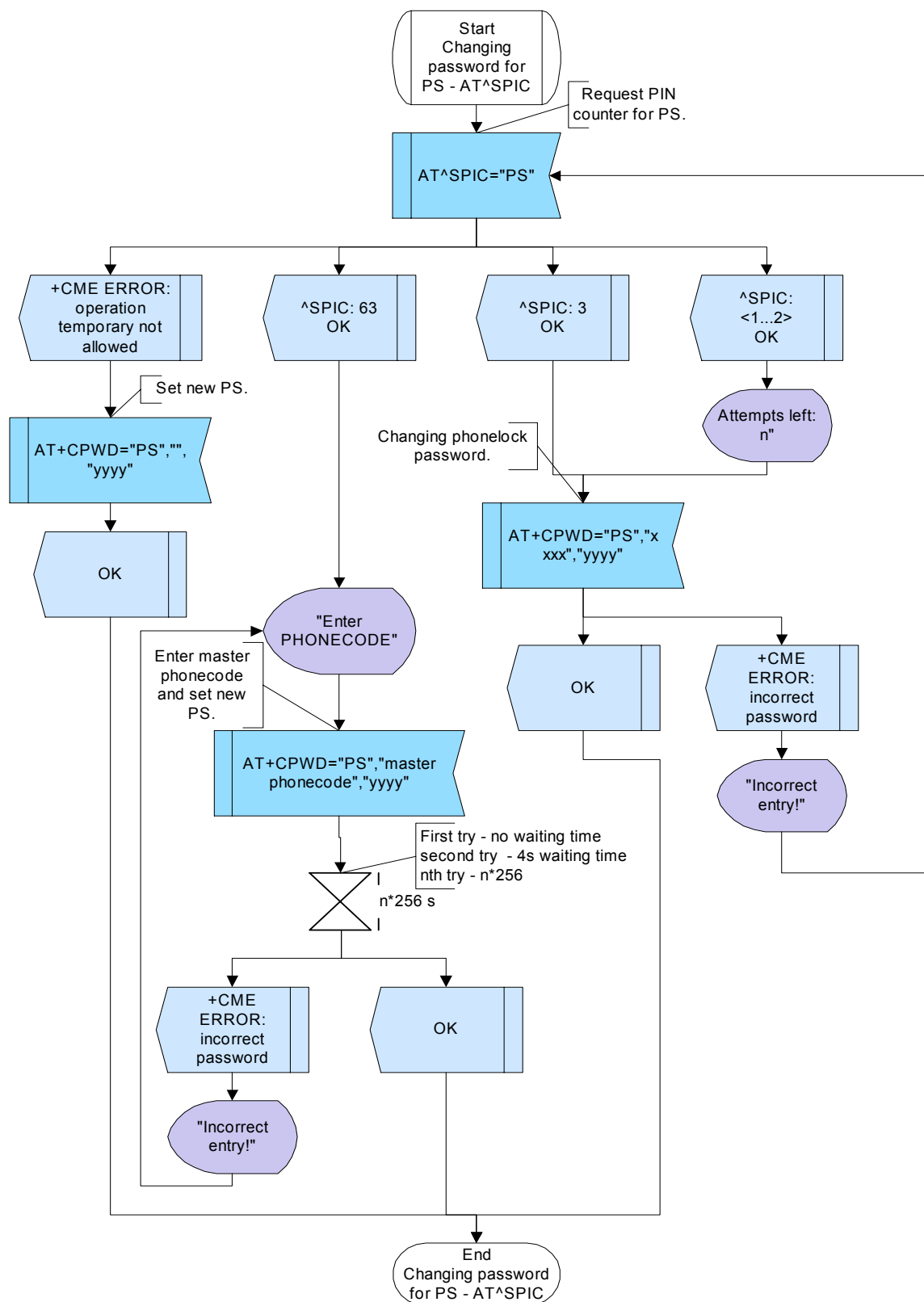


Figure 102: Changing password for phonelock and retrieving PIN counter with AT^SPIC=<facility>

#### 2.13.3.4 Hints

- As an alternative to the AT+CPWD command you can use AT+CPIN="Master Phonecode", "new PIN" or the ATD command with GSM code (\*#).

#### 2.13.3.5 Example

##### Example 1:

```
*****
Comment: Changing password for phonelock
*****
*****
Comment: If "PS" has not been set before
Comment: new password =1234
*****

Subscr 1   Send: AT+CPWD="PS", "1234"
Subscr 1   Receive: AT+CPWD="PS", "1234"
Subscr 1   Receive: OK

*****
Comment: Replace existing "PS" password
Comment: old password=1234, new password =0000
*****

Subscr 1   Send: AT+CPWD="PS", "1234", "0000"
Subscr 1   Receive: AT+CPWD="PS", "1234", "0000"
Subscr 1   Receive: OK

*****
Comment: Attempt to replace existing "PS" password
*****

Subscr 1   Send: AT+CPWD="PS", "1111", "5555"
Subscr 1   Receive: AT+CPWD="PS", "1111", "5555"
Subscr 1   Receive: +CME ERROR: incorrect password

*****
Comment: Attempt to replace existing "PS" password
*****

Subscr 1   Send: AT+CPWD="PS", "1111", "5555"
Subscr 1   Receive: AT+CPWD="PS", "1111", "5555"
Subscr 1   Receive:
Subscr 1   Receive: +CME ERROR: incorrect password

*****
Comment: Attempt to replace existing "PS" password
*****

Subscr 1   Send: AT+CPWD="PS", "1111", "5555"
Subscr 1   Receive: AT+CPWD="PS", "1111", "5555"
Subscr 1   Receive: +CME ERROR: incorrect password
```



\*\*\*\*\*

Comment: Enter Master Phone Code to unlock. Result: ME is operational and PS lock is totally removed

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="PS","70033255","0000"  
Subscr 1 Receive: AT+CPWD="PS","70033255","0000"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Erase the password

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="PS","0000"  
Subscr 1 Receive: AT+CPWD="PS","0000"  
Subscr 1 Receive: OK

### Example 2:

\*\*\*\*\*

Comment: Changing password for PS (password for "PS" lock)  
To request the PIN counter example 2 uses the read command AT^SPIC? and the write command AT^SPIC=<facility>. Keep in mind that both command types are not supported by all products.

\*\*\*\*\*

\*\*\*\*\*

Comment: Changing Password for PS.

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="PS","0000","1234"  
Subscr 1 Receive: AT+CPWD="PS","0000","1234"  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Which PIN is required.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC?  
Subscr 1 Receive: AT^SPIC?  
Subscr 1 Receive: ^SPIC: SIM PIN2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter (SIM PIN2).

\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter for PS .

\*\*\*\*\*

Subscr 1 Send: AT^SPIC="PS"  
Subscr 1 Receive: AT^SPIC="PS"  
Subscr 1 Receive: ^SPIC: 3

Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Entering wrong password for PS (first attempt).  
\*\*\*\*\*

Subscr 1 Send: AT+CPWD="PS","1111","1334"  
Subscr 1 Receive: AT+CPWD="PS","1111","1334"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*  
Comment: Request PIN counter for PS.  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC="PS"  
Subscr 1 Receive: AT^SPIC="PS"  
Subscr 1 Receive: ^SPIC: 2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Request PIN counter(SIM PIN2).  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Entering wrong password for PS (second attempt)  
\*\*\*\*\*

Subscr 1 Send: AT+CPWD="PS","3333","1255"  
Subscr 1 Receive: AT+CPWD="PS","3333","1255"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*  
Comment: Request PIN counter for PS.  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC="PS"  
Subscr 1 Receive: AT^SPIC="PS"  
Subscr 1 Receive: ^SPIC: 1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Request PIN counter (SIM PIN2).  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Entering wrong password for PS (third attempt).

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="PS","4711","1331"  
Subscr 1 Receive: AT+CPWD="PS","4711","1331"  
Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Request PIN counter for PS.  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC="PS"  
Subscr 1 Receive: AT^SPIC="PS"  
Subscr 1 Receive: ^SPIC: 63  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter(SIM PIN2).  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Enter master phonecode and set new PS.  
\*\*\*\*\*

Subscr 1 Send: AT+CPWD="PS","39969009","0000"  
Subscr 1 Receive: AT+CPWD="PS","39969009","0000"  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter for PS.  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC="PS"  
Subscr 1 Receive: AT^SPIC="PS"  
Subscr 1 Receive: ^SPIC: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## 2.13.4 Changing net password for call barring

### 2.13.4.1 Description

This chapter describes the steps required to change the net password.

### 2.13.4.2 Used AT commands

AT+CPWD - Change password

For further details about the commands see [2].

### 2.13.4.3 Flow chart

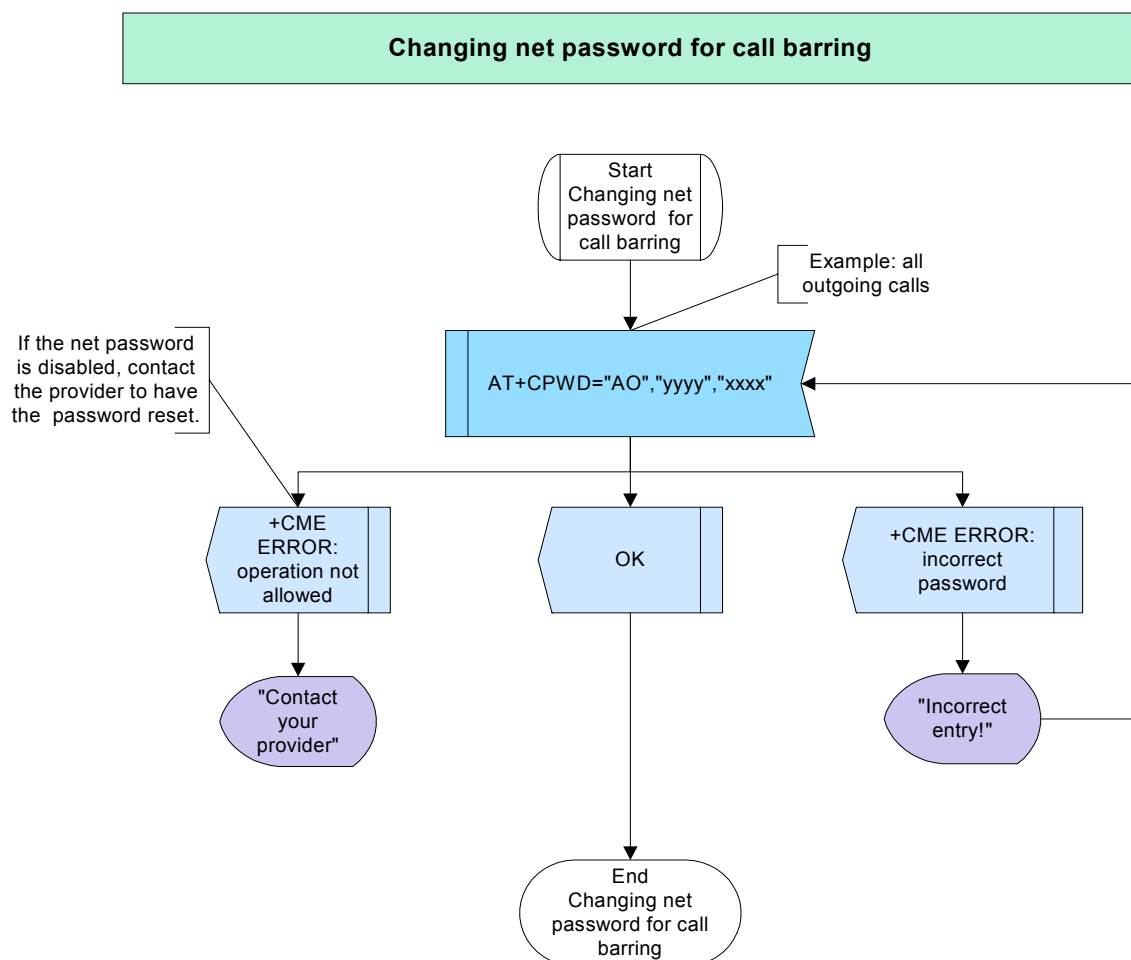


Figure 103: Changing net password for call barring

### 2.13.4.4 Hints

- As an alternative to the AT+CPWD you can use: AT^SPWD="AO","old password","new password" or the GSM code (\*#).
- If a wrong Call barring password is entered three times, the client needs to contact the provider and ask for unlocking the service.

### 2.13.4.5 Example

\*\*\*\*\*

Comment: Changing net password for Call barring

\*\*\*\*\*

\*\*\*\*\*

Comment: Changing net password

Comment: old password=1234, new password =0000

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="AO","1234","0000"

Subscr 1 Receive: AT+CPWD="AO","1234","0000"

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Entering wrong net password

\*\*\*\*\*

Subscr 1 Send: AT+CPWD="AO","0001","1224"

Subscr 1 Receive: AT+CPWD="AO","0001","1224"

Subscr 1 Receive:

Subscr 1 Receive: +CME ERROR: incorrect password

## **2.13.5 Configuring SIM card lock ("SC")**

### **2.13.5.1 Description**

This chapter describes how to set or remove a SIM card lock. If the SIM card is locked, the user will be required to enter SIM PIN1 every time the mobile is started.

To configure the SIM card lock, the SIM PIN1 must be at hand. Only three attempts are allowed. The command AT^SPIC can be used to view the number of left attempts. Use AT+CLCK="SC",2 or AT^SLCK="SC",2 to request the current state. To lock or unlock the SIM card use the commands AT+CLCK="SC",<mode>,<PIN> or AT^SLCK="SC",<mode>,<PIN>, where <mode>=1 sets the lock and <mode>=0 deactivates it.

It is recommended to check the status of the SIM PIN authentication at first. If the read command AT+CPIN? returns the response "+CPIN: SIM PUK", no changes can be made until the PUK was entered.

### **2.13.5.2 Used AT commands**

AT+CPIN	-	Enter PIN
AT^SPIC	-	Display PIN counter
AT+CLCK	-	Facility lock
AT^SLCK	-	Facility lock

For further details about the commands see [2].

2.13.5.3 Flow chart

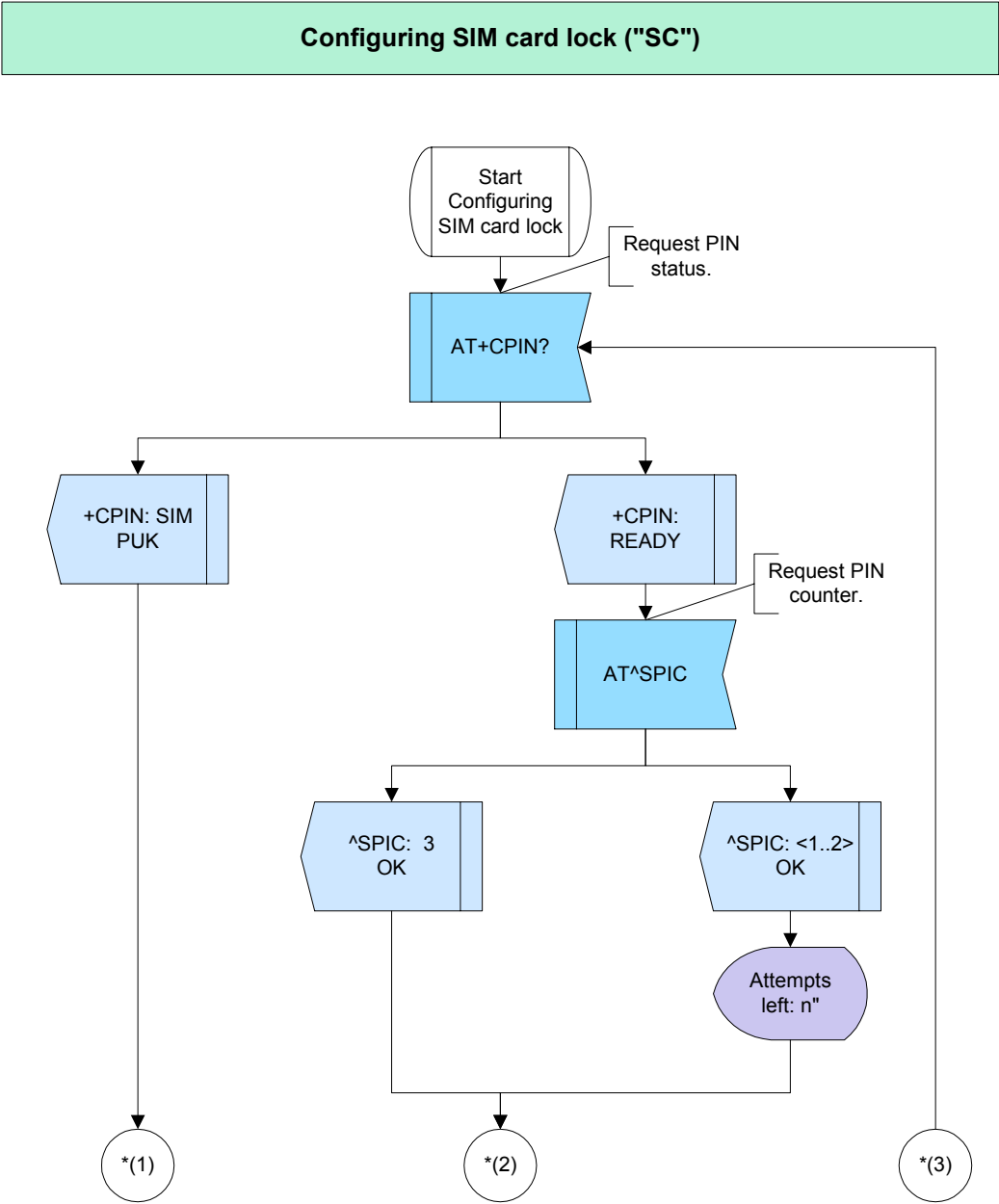


Figure 104: Configuring SIM card lock ("SC") – part 1

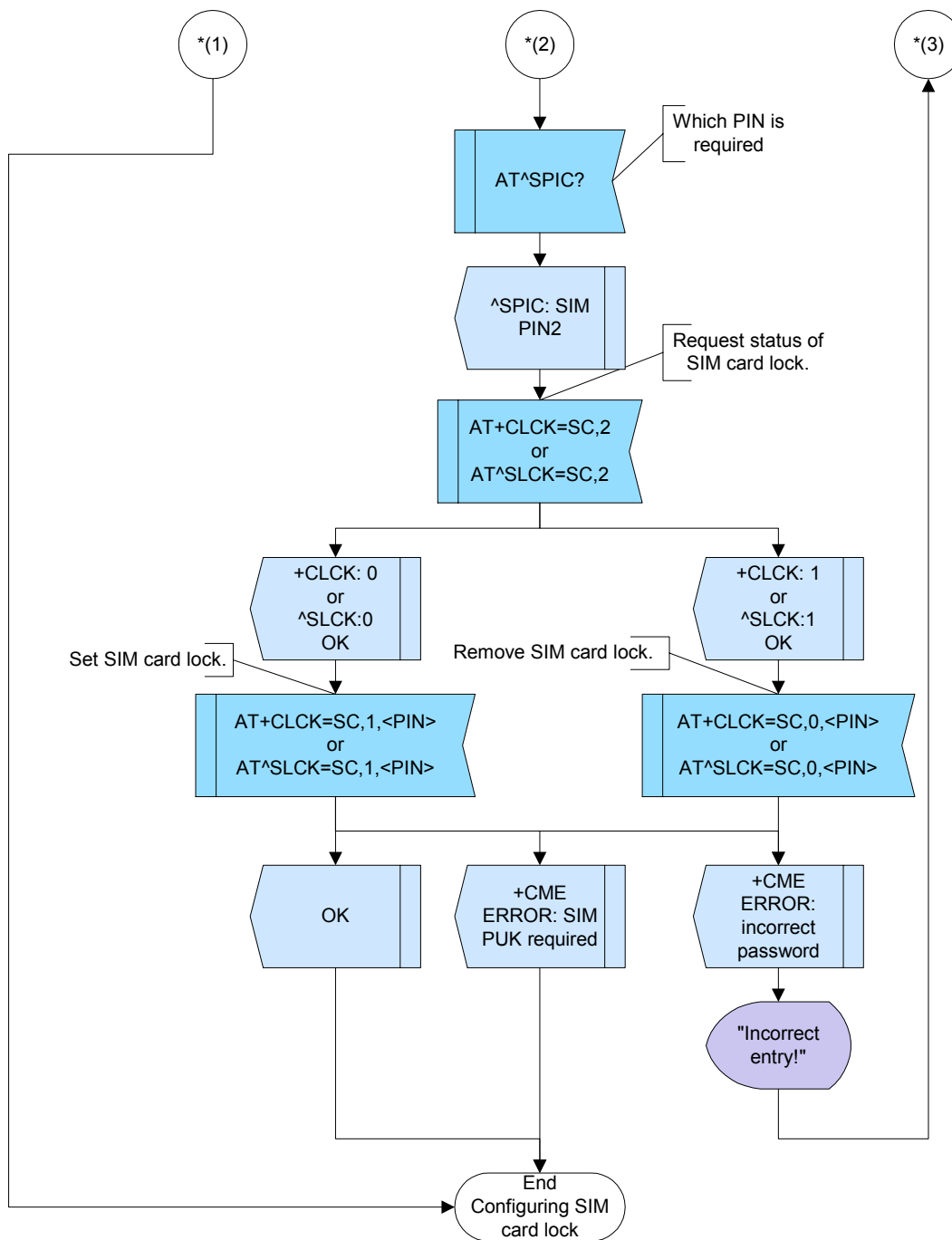


Figure 105: Configuring SIM card lock ("SC") – part 2

#### 2.13.5.4 Hints

- As an alternative to the AT+CPWD you can use AT^SPWD="SC","old password","new password".



### 2.13.5.5 Example

\*\*\*\*\*

Comment: Configuring SIM card lock ("SC")

\*\*\*\*\*

\*\*\*\*\*

Comment: Request PIN status.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN?

Subscr 1 Receive: AT+CPIN?

Subscr 1 Receive: +CPIN: READY

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request PIN counter.

\*\*\*\*\*

Subscr 1 Send: AT^SPIC

Subscr 1 Receive: AT^SPIC

Subscr 1 Receive: ^SPIC: 3

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Which PIN is required (read command is not supported by all products).

\*\*\*\*\*

Subscr 1 Send: AT^SPIC?

Subscr 1 Receive: AT^SPIC?

Subscr 1 Receive: ^SPIC: SIM PIN2

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Request status of SIM card lock (+CLCK: 0= lock is inactive).

\*\*\*\*\*

Subscr 1 Send: AT+CLCK=SC,2

Subscr 1 Receive: AT+CLCK=SC,2

Subscr 1 Receive: +CLCK: 0

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Try to set SIM card lock with wrong PIN.

\*\*\*\*\*

Subscr 1 Send: AT+CLCK=SC,1,5555

Subscr 1 Receive: AT+CLCK=SC,1,5555

Subscr 1 Receive: +CME ERROR: incorrect password

\*\*\*\*\*

Comment: Which PIN is required (read command is not supported by all products).

\*\*\*\*\*

Subscr 1 Send: AT^SPIC?

Subscr 1 Receive: AT^SPIC?  
Subscr 1 Receive: ^SPIC: SIM PIN2  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Request PIN counter.  
\*\*\*\*\*

Subscr 1 Send: AT^SPIC  
Subscr 1 Receive: AT^SPIC  
Subscr 1 Receive: ^SPIC: 3  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Set SIM card lock.  
\*\*\*\*\*

Subscr 1 Send: AT+CLCK=SC,1,0000  
Subscr 1 Receive: AT+CLCK=SC,1,0000  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Request status of SIM card lock (+CLCK: 1= lock is active).  
\*\*\*\*\*

Subscr 1 Send: AT+CLCK=SC,2  
Subscr 1 Receive: AT+CLCK=SC,2  
Subscr 1 Receive: +CLCK: 1  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Remove SIM card lock.  
\*\*\*\*\*

Subscr 1 Send: AT^SLCK=SC,0,0000  
Subscr 1 Receive: AT^SLCK=SC,0,0000  
Subscr 1 Receive: OK

\*\*\*\*\*  
Comment: Request status of SIM card lock (+CLCK: 0= lock is inactive).  
\*\*\*\*\*

Subscr 1 Send: AT+CLCK=SC,2  
Subscr 1 Receive: AT+CLCK=SC,2  
Subscr 1 Receive: +CLCK: 0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## 2.14 SIM

### 2.14.1 SIM access

#### 2.14.1.1 Description

This chapter describes how to access the Elementary Files (referred to as EF) on the SIM using the command `AT+CRSM=<command>[,<fileID>[,<P1>,<P2>,<P3>[,<data>]]]`.

Access to the SIM database is restricted to the following operations specified with the parameter `<command>`:

SIM command number	Command	Function
176	READ BINARY	Reads a string of bytes, which gives information about the current transparent elementary datafield.
178	READ RECORD	Reads a complete record in a current linear or fixed elementary datafield. Four modes (CURRENT, ABSOLUTE, NEXT, PREVIOUS) are defined to read a record.
192	GET RESPONSE	Return data, which gives information about the current elementary datafield. This information includes the type of file and its size.
214	UPDATE BINARY	UPDATE BINARY updates the current transparent elementary data field with a string of bytes.
220	UPDATE RECORD	UPDATE RECORD updates one complete record in the current linear fixed or cyclic elementary data fields. For update operations there are four modes (CURRENT, ABSOLUTE, NEXT, PREVIOUS) defined, but only PREVIOUS is allowed for cyclic files.
242	STATUS	Return data which gives information about the current elementary data field.

The `<fileID>` is the identifier of the EF on the SIM and mandatory for every command except for STATUS. `<P1>`, `<P2>`, `<P3>` are parameters for the instruction.

Every command sends the ME a response with the current SIM information and response data. The response parameters `<sw1>` and `<sw2>` are delivered on successful or failed execution of the command. If the command cannot be passed to the SIM, the ME will return "+CME ERROR: `<err>`".

A response consists of following parts (example "READ RECORD" EF<sub>LND</sub>):

Bytes	Description	Length
1 to X	Alpha Identifier	X bytes
X+1	Length of BCD number/SSC contents	1 byte
X+2	TON and NPI	1 byte
X+3 to X+12	Dialing Number/SSC String	10 byte
X+13	Capability/Configuration Identifier	1 byte
X+14	Extension1 Record Identifier	1 byte

For further details see section "Coding of commands" in [12].

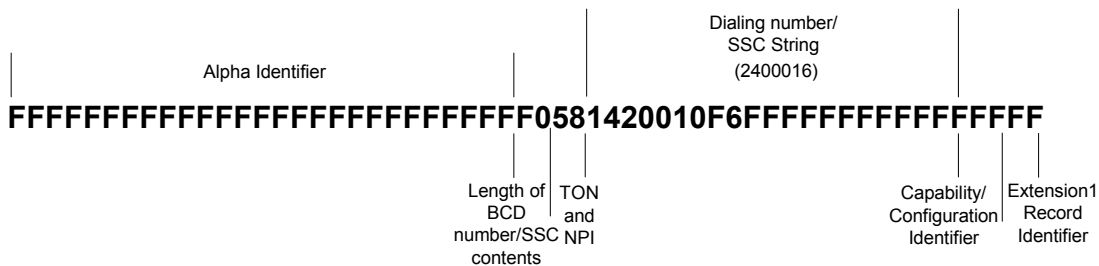


Figure 106: READ RECORD example response

**Description (Example 3):**

This example shows how to read a record (“last number dailed”) from the SIM. First, the response “+CRSM:103,28” will be returned. The first parameter <sw1> = ‘103’ is a decimal value, the appropriate hexadecimal value is ‘67’ which means “incorrect parameter <P3>”. The second parameter <sw2>=‘xx’ gives the correct length (in example ‘28’) or states that no additional information is given.

**2.14.1.2 Used AT commands**

AT+CRSM - Restricted SIM access

For further details about the commands see [2].

**2.14.1.3 Flow chart**

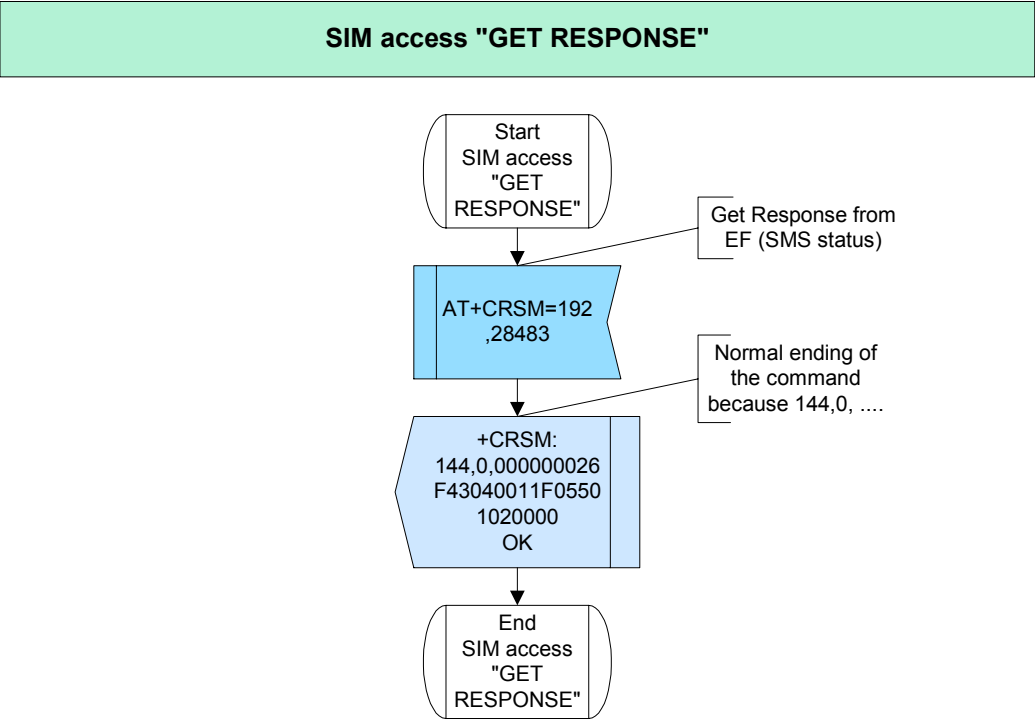


Figure 107: SIM access "GET RESPONSE"

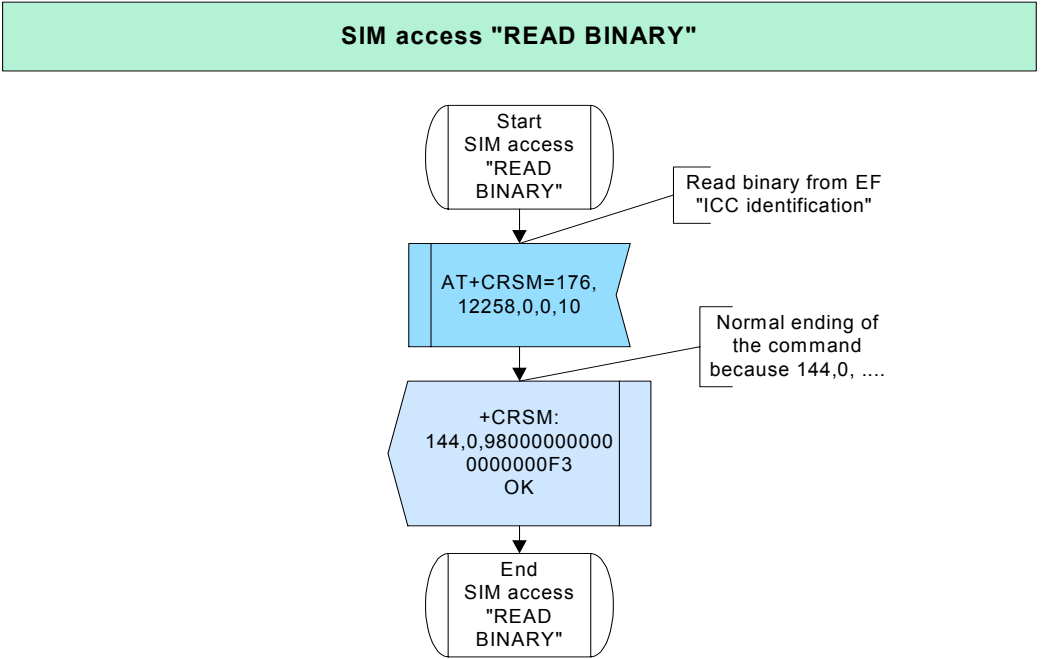


Figure 108: SIM access "READ BINARY"

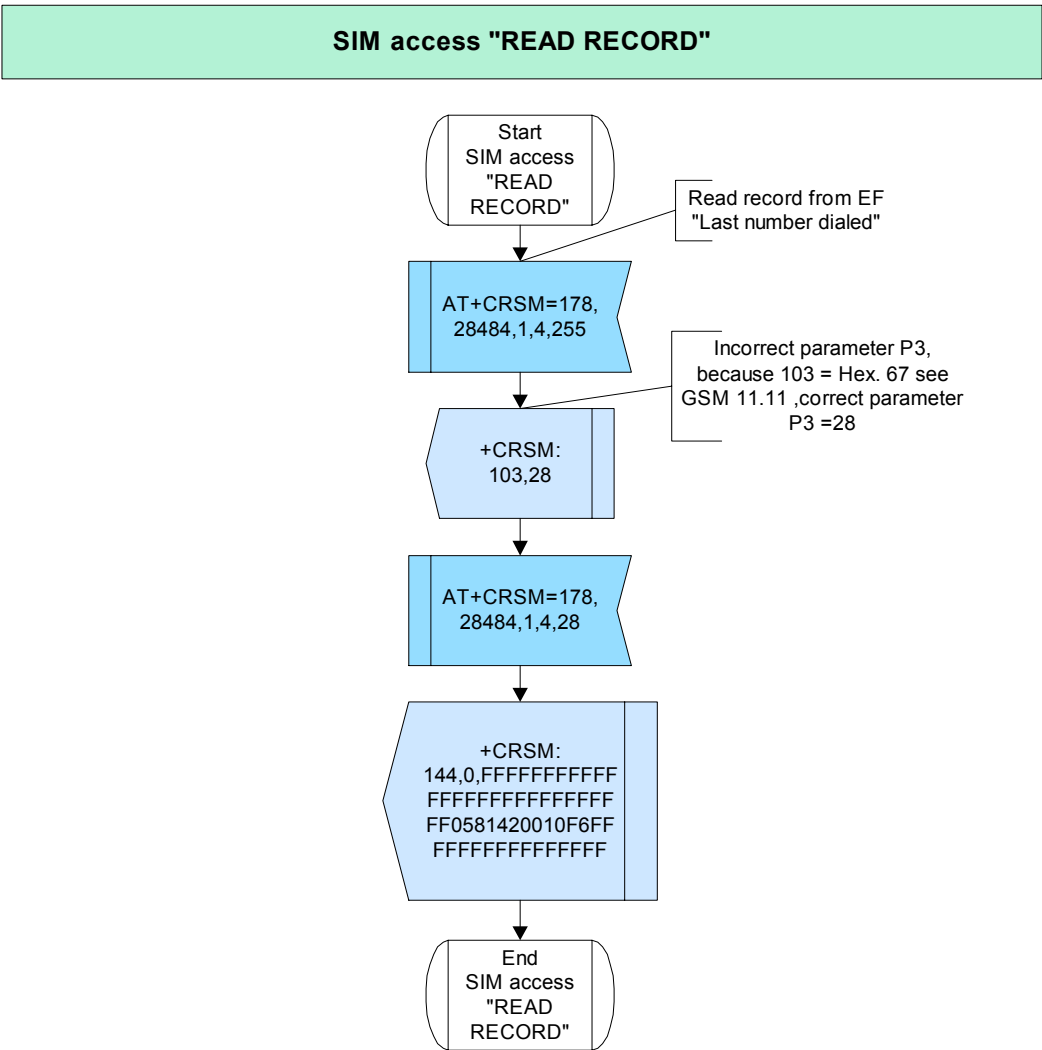


Figure 109: SIM access "READ RECORD"

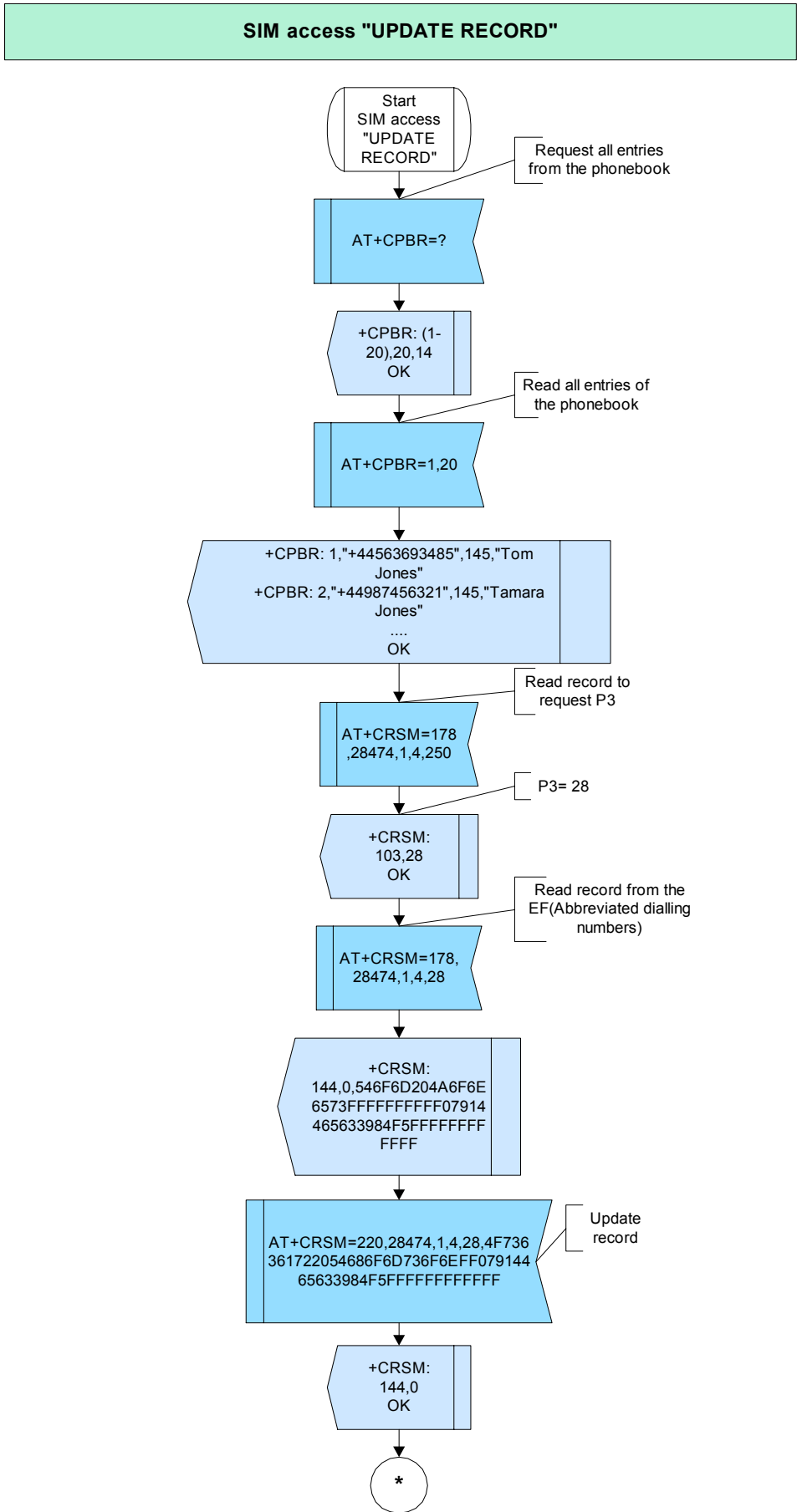


Figure 110: SIM access "UPDATE RECORD"- part 1

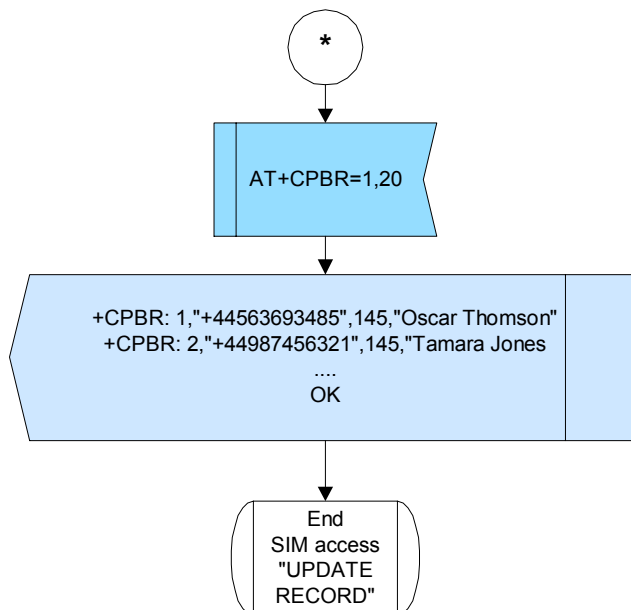


Figure 111: SIM access "UPDATE RECORD"- part 2

#### 2.14.1.4 Hints

Not applicable.

#### 2.14.1.5 Example

##### Example 1:

\*\*\*\*\*

Comment: SIM access "GET RESPONSE"

\*\*\*\*\*

\*\*\*\*\*

Comment: Get response from the EF(SMS status).

\*\*\*\*\*

Subscr 1 Send: AT+CRSM=192,28483

Subscr 1 Receive: AT+CRSM=192,28483

Subscr 1 Receive: +CRSM: 144,0,000000026F43040011F05501020000

Subscr 1 Receive:

Subscr 1 Receive: OK

##### Example 2:

\*\*\*\*\*

Comment: SIM access "READ BINARY"

\*\*\*\*\*

\*\*\*\*\*

Comment: Read binary from the EF (ICC identification).

\*\*\*\*\*

Subscr 1 Send: AT+CRSM=176,12258,0,0,10

Subscr 1 Receive: AT+CRSM=176,12258,0,0,10

Subscr 1 Receive: +CRSM: 144,0,98000000000000000000F3

Subscr 1 Receive:

Subscr 1 Receive: OK

**Example 3:**

\*\*\*\*\*

Comment: SIM access "READ RECORD"

\*\*\*\*\*

\*\*\*\*\*

Comment: Wrong entry to read record from the EF (Last number dialed). See above 2.14.1.1.

\*\*\*\*\*

Subscr 1 Send: AT+CRSM=178,28484,1,4,255  
Subscr 1 Receive: AT+CRSM=178,28484,1,4,255  
Subscr 1 Receive: +CRSM: 103,28  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read record from the EF (Last number dialed).

\*\*\*\*\*

Subscr 1 Send: AT+CRSM=178,28484,1,4,28  
Subscr 1 Receive: AT+CRSM=178,28484,1,4,28  
Subscr 1 Receive: +CRSM: 144,0,  
FFFFFFFFFFFFFFFFFFFFFFFF0581420010F6FFFFFFFFFFFFFFFF  
Subscr 1 Receive:  
Subscr 1 Receive: OK

**Example 4:**

\*\*\*\*\*

Comment: SIM access "UPDATE RECORD"

\*\*\*\*\*

\*\*\*\*\*

Comment: Request max. range of entries .

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=?  
Subscr 1 Receive: AT+CPBR=?  
Subscr 1 Receive: +CPBR: (1-254),20,14  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read all entries of the phonebook .

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,254  
Subscr 1 Receive: AT+CPBR=1,254  
Subscr 1 Receive: +CPBR: 1,"+44563693485",145,"Tom Jones"  
Subscr 1 Receive: +CPBR: 2,"+44987456321",145,"Tamara Jones"  
Subscr 1 Receive: +CPBR: 3,"+44545896638",145,"Paul Williams"  
Subscr 1 Receive: +CPBR: 4,"+44545896897",145,"John Smith"  
Subscr 1 Receive: +CPBR: 5,"+44321546546",145,"Alexis Wright"  
Subscr 1 Receive: +CPBR: 6,"+44496857927",145,"Hannah Adams"  
Subscr 1 Receive: +CPBR: 7,"+44321546547",145,"Abigail Cox"



\*\*\*\*\*

Comment: Read record from the EF (Abbreviated dialing numbers) further details see 2.14.1.1.

\*\*\*\*\*

Subscr 1 Send: AT+CRSM=178,28474,1,4,250  
Subscr 1 Receive: AT+CRSM=178,28474,1,4,250  
Subscr 1 Receive: +CRSM: 103,28  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read record from the EF (Abbreviated dialing numbers).

\*\*\*\*\*

Subscr 1 Send: AT+CRSM=178,28474,1,4,28  
Subscr 1 Receive: AT+CRSM=178,28474,1,4,28  
Subscr 1 Receive: +CRSM:  
144,0,546F6D204A6F6E6573FFFFFFFFF07914465633984F5FFFFFFFFFFFF  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Update record from the EF (Abbreviated dialing numbers).

Comment: Replacing Tom Jones with Oscar Thomson.

\*\*\*\*\*

Subscr 1 Send:  
AT+CRSM=220,28474,1,4,28,4F736361722054686F6D736F6EFF07914465633984F5FFFFFFFFFFFF  
FF  
Subscr 1 Receive:  
AT+CRSM=220,28474,1,4,28,4F736361722054686F6D736F6EFF07914465633984F5FFFFFFFFFFFF  
FF  
Subscr 1 Receive:  
Subscr 1 Receive: +CRSM: 144,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment: Read all entries of the phonebook.

Comment: Oscar Thomson has now replaced Tom Jones.

\*\*\*\*\*

Subscr 1 Send: AT+CPBR=1,254  
Subscr 1 Receive: AT+CPBR=1,254  
Subscr 1 Receive: +CPBR: 1,"+44563693485",145,"Oscar Thomson"  
Subscr 1 Receive: +CPBR: 2,"+44987456321",145,"Tamara Jones"  
Subscr 1 Receive: +CPBR: 3,"+44545896638",145,"Paul Williams"  
Subscr 1 Receive: +CPBR: 4,"+44545896897",145,"John Smith"  
Subscr 1 Receive: +CPBR: 5,"+44321546546",145,"Alexis Wright"  
Subscr 1 Receive: +CPBR: 6,"+44496857927",145,"Hannah Adams"  
Subscr 1 Receive: +CPBR: 7,"+44321546547",145,"Abigail Cox"  
Subscr 1 Receive:  
Subscr 1 Receive:  
Subscr 1 Receive: OK

## 2.15 Internet Services

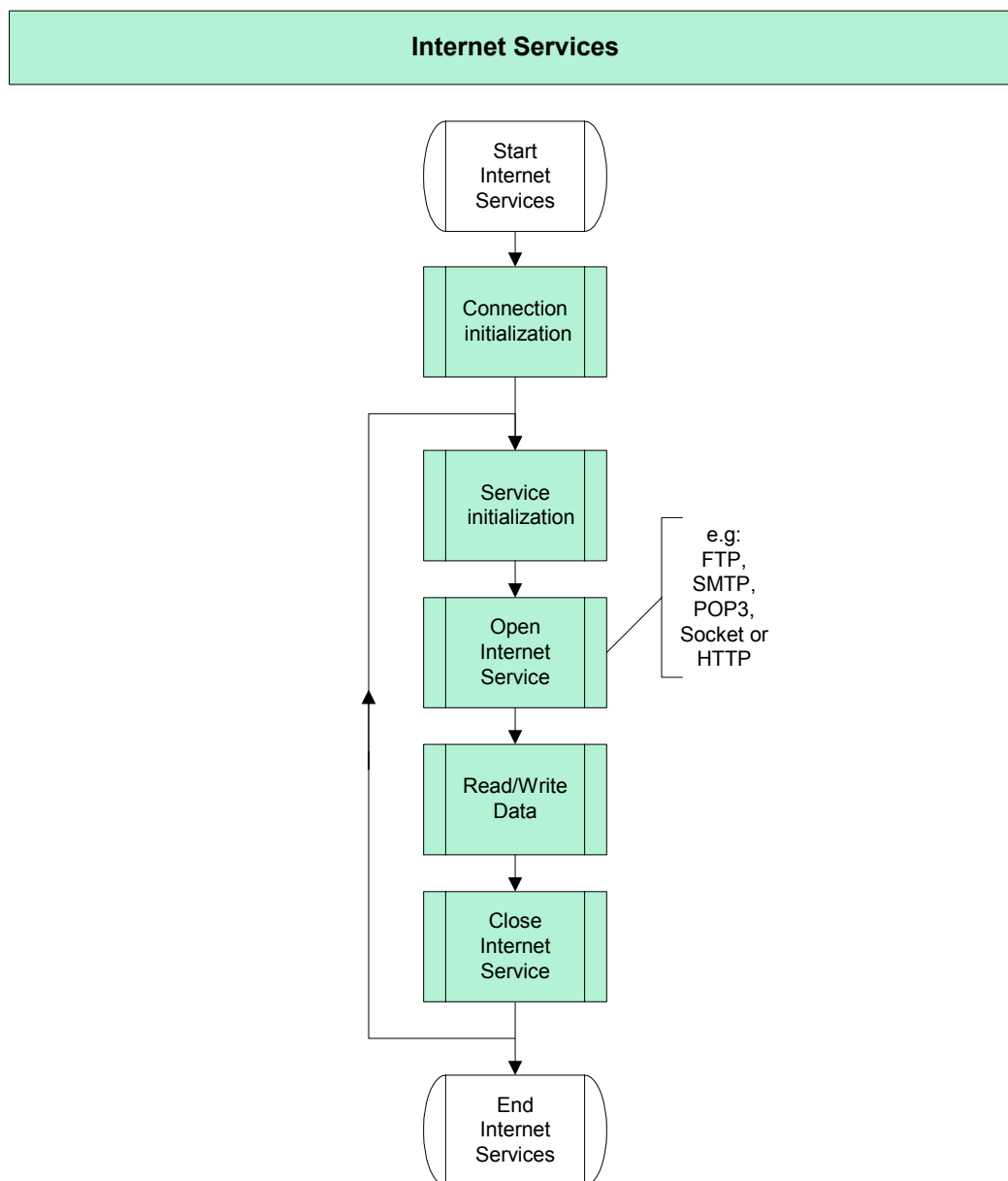


Figure 112: Internet Services

### 2.15.1.1 Description

- Note, that the embedded TCP/IP stack is not available for all modules.
- The embedded TCP/IP stack allows the usage of the following Internet Services:
  - a) Socket for TCP: Client and Server
  - b) Socket for UDP: Client
  - c) FTP: Client
  - d) HTTP Client
  - e) SMTP Client
  - f) POP3 Client

over a GPRS or CSD connection. There are some differences between different modules, which will be mentioned in the following examples.

- Very important aspect in the Siemens implementation is non-blocking interface concept, which will be mentioned in the Read/Write Data chapter.
- Several examples for the usage of Internet Services are provided in the following subsections.

## 2.15.2 Connection Initialization

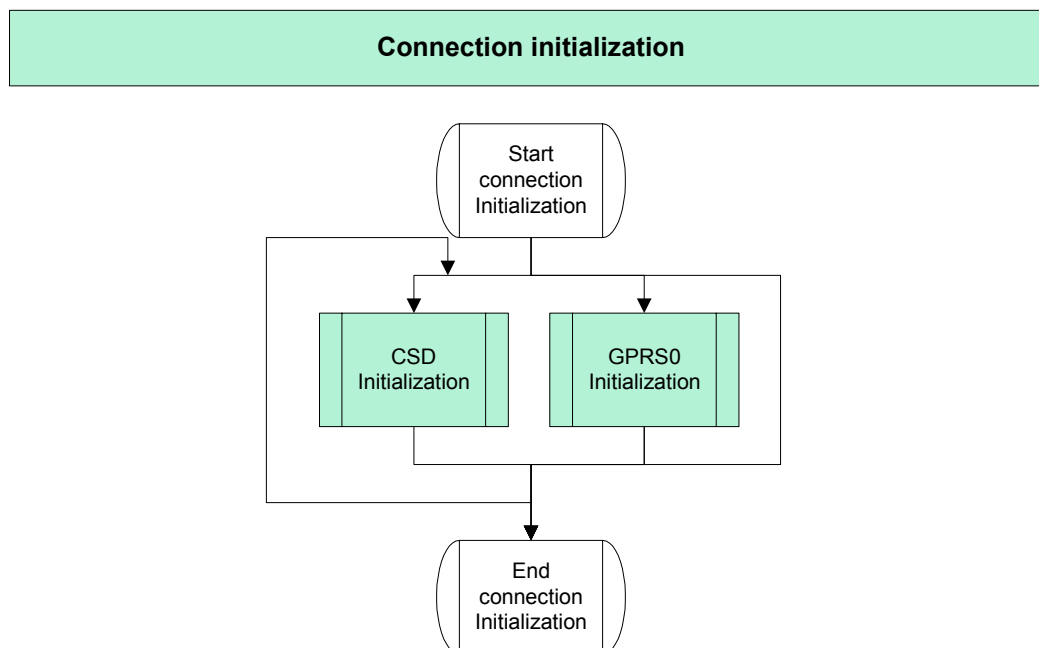


Figure 113: Connection initialization

### 2.15.2.1 Description

This chapter describes the two connection types: CSD and GPRS which are also referred to as bearers.

To configure the connection profiles the AT<sup>SICS</sup> command is used. It is possible to create a maximum of 6 connection profiles. The connections are identified by the <conProfileId>.

There are differences in setting of the connection parameters relating to CSD and GPRS.

- CSD parameter description:
  - a) Parameters like: <authMode>, <calledNum>, <dataRate>, <dataType> are mandatory and depend on the network providers and can be found on their websites.
  - b) The <conType> parameter should be set at first.
  - c) It's advisable to set the <alphabet> parameter after setting the <conType> parameter, because it selects the set of input and output of string parameters.
  - d) The <authMode> parameter should be set before setting the <passwd>, because changing this parameter will restore the <passwd> parameter to its default.
  - e) The other parameters can be set in any order.
- GPRS parameter description:
  - a) Parameters like: <authMode> and <apn> are mandatory and depend on the network providers and can be found on their websites.
  - b) The <conType> parameter should be set at first.
  - c) It's advisable to set the <alphabet> parameter after setting the <conType> parameter, because it selects the set of input and output of string parameters.
  - d) The <authMode> parameter should be set before setting the <passwd>, because changing this parameter will restore the <passwd> parameter to its default.
  - e) The other parameters can be set in any order.
- The parameters used in this example, e.g. <user> or <apn> reflect settings for the german network provider: T-mobile.

### 2.15.2.2 Used AT commands

AT<sup>SICS</sup> - Internet Connection Setup Profile

For further details about the commands see [2].

2.15.2.3 Flow chart – CSD and GPRS0 Initialization

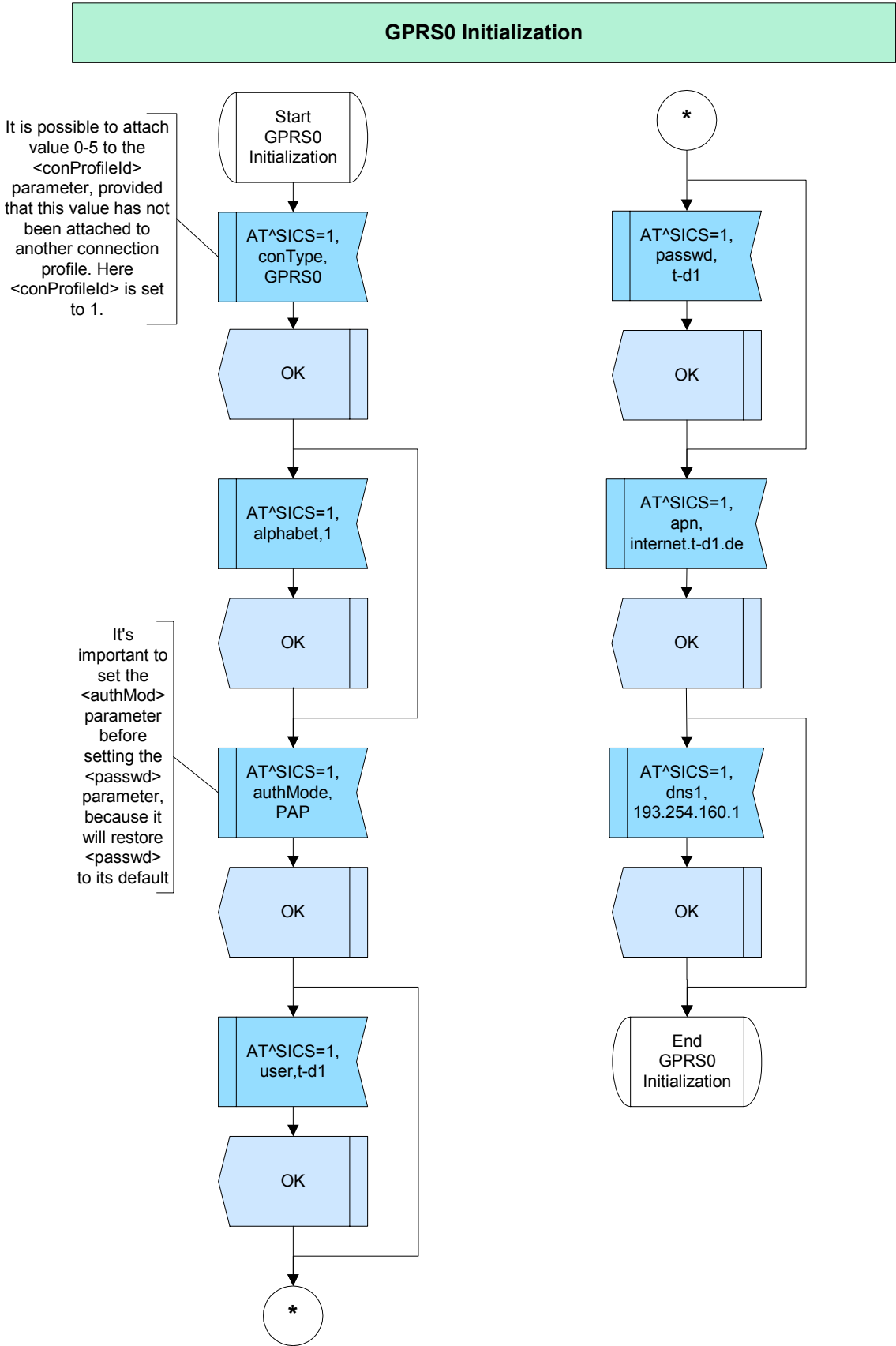


Figure 114: CSD initialization

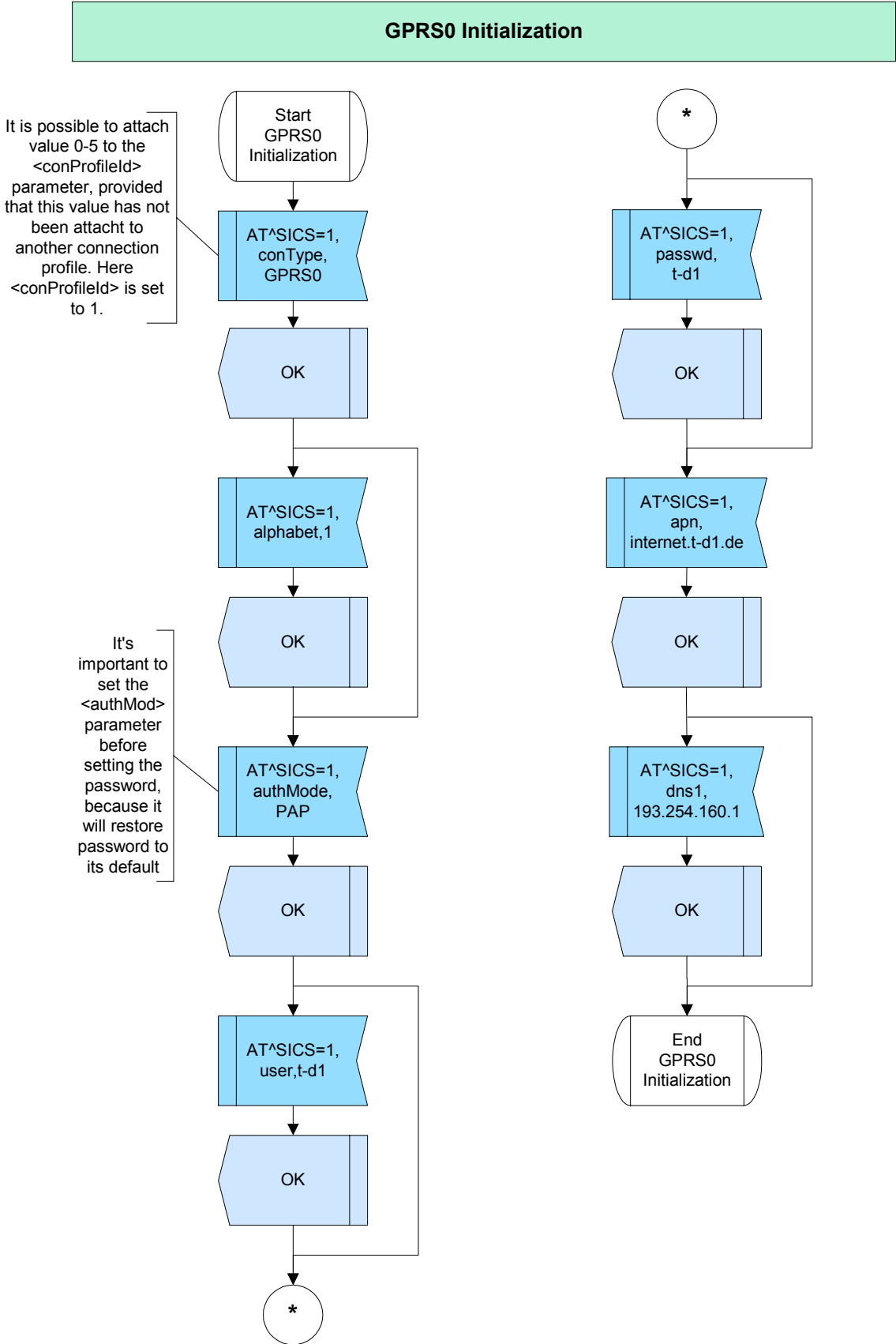


Figure 115: GPRS0 initialization

### 2.15.2.4 Hints

- MC55/56 (version 2.5) doesn't support the CSD connection.
- MC55/56 (version 2.5) doesn't support setting of the <authMode> parameter.

### 2.15.2.5 Example – CSD and GPRS0 Initialization

#### Example 1: CSD Initialization

\*\*\*\*\*

Comment Connection Setup Profile CSD

\*\*\*\*\*

```
Subscr 1 Send: AT^SICS=0,conType,CSD
Subscr 1 Receive: AT^SICS=0,conType,CSD
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=0,alphabet,1
Subscr 1 Receive: AT^SICS=0,alphabet,1
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=0,authMode,PAP
Subscr 1 Receive: AT^SICS=0,authMode,PAP
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=0,user,freenet
Subscr 1 Receive: AT^SICS=0,user,freenet
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=0,passwd,mobil
Subscr 1 Receive: AT^SICS=0,passwd,mobil
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=0,calledNum,22243
Subscr 1 Receive: AT^SICS=0,calledNum,22243
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=0,dataRate,0
Subscr 1 Receive: AT^SICS=0,dataRate,0
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=0,dataType,0
Subscr 1 Receive: AT^SICS=0,dataType,0
Subscr 1 Receive: OK
```

#### Example 2: GPRS0 Initialization

\*\*\*\*\*

Comment Connection Setup Profile GPRS0

\*\*\*\*\*

```
Subscr 1 Send: AT^SICS=1,conType,GPRS0
Subscr 1 Receive: AT^SICS=1,conType,GPRS0
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=1,alphabet,1
Subscr 1 Receive: AT^SICS=1,alphabet,1
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=1,authMode,PAP
Subscr 1 Receive: AT^SICS=1,authMode,PAP
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=1,user,t-d1
Subscr 1 Receive: AT^SICS=1,user,t-d1
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=1,passwd,t-d1
Subscr 1 Receive: AT^SICS=1,passwd,t-d1
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=1,apn,internet.t-d1.de
Subscr 1 Receive: AT^SICS=1,apn,internet.t-d1.de
Subscr 1 Receive: OK
Subscr 1 Send: AT^SICS=1,dns1,193.254.160.1
Subscr 1 Receive: AT^SICS=1,dns1,193.254.160.1
```

Subscr 1 Receive: OK

## 2.15.3 Service Initialization

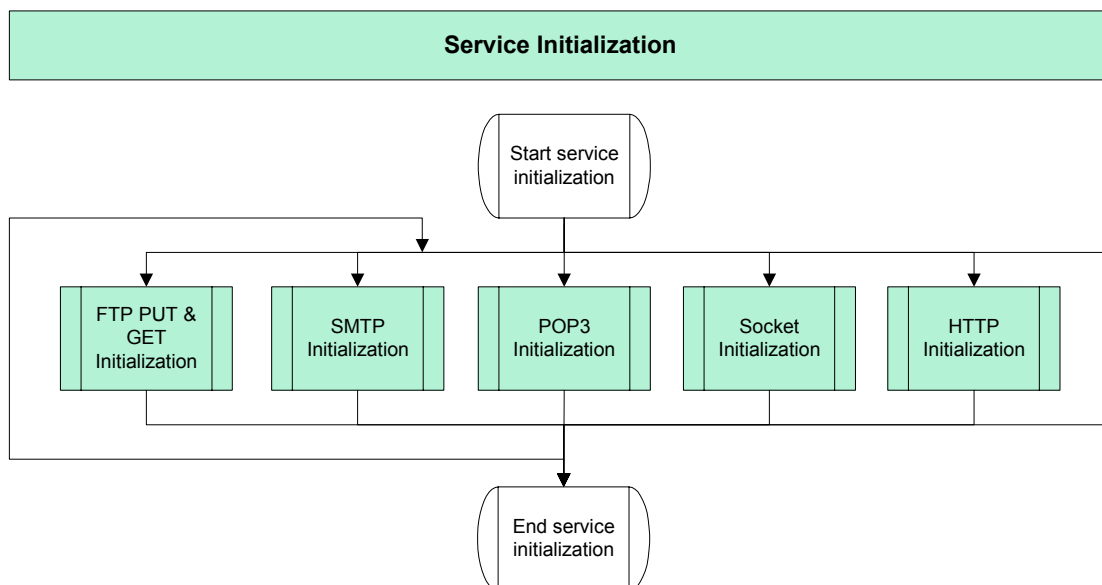


Figure 116: Service Initialization.

### 2.15.3.1 Description

This chapter describes basic settings recommended to configure the internet services: FTP, SMTP, POP3, Socket and HTTP.

- The command `AT^SISS` enables to set required parameters of a service.
- It is possible to create a maximum of 10 service profiles.
- It is allowed to configure maximum 3 HTTP, 6 Sockets (The sum of Listener Sockets and Client Sockets is 6 and the account of listener Sockets are limited by 2), 1 FTP, 1 POP3, 1 SMTP profiles within those 10 connection profiles.
- The services are identified by the `<srvProfileId>`.
- The services can be configured to use any of the connections which have been configured during the connection initialization by setting "conId" parameter accordingly.

### 2.15.3.2 Used AT commands

`AT^SISS` - Internet Service Setup Profile

For further details about the commands see [2].

2.15.3.3 Flow chart

2.15.3.3.1 FTP Initialization

- The following examples describe the configuration of the FTP GET and PUT service. FTP GET enables download of data and FTP PUT upload.

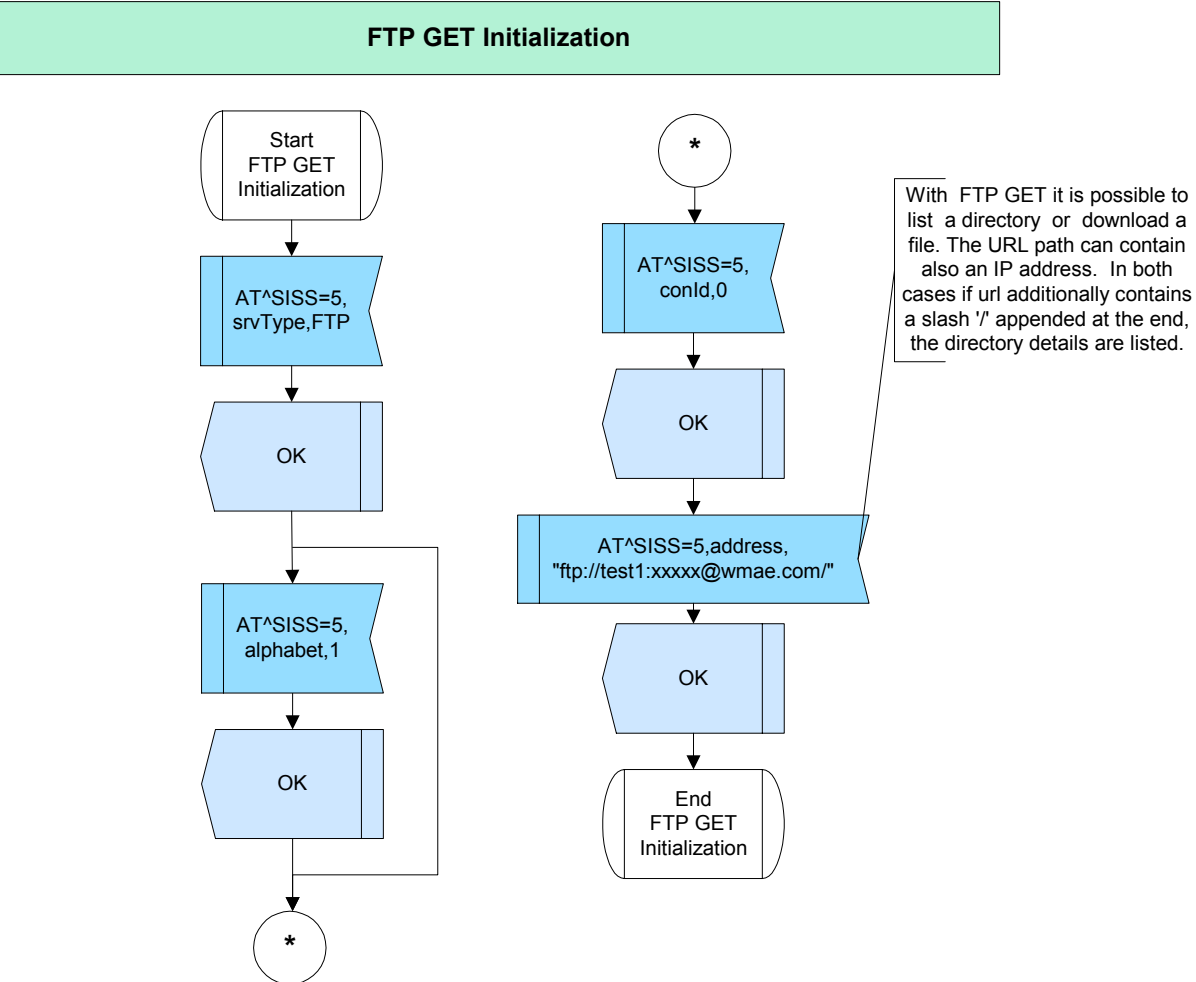


Figure 117 FTP GET Initialization



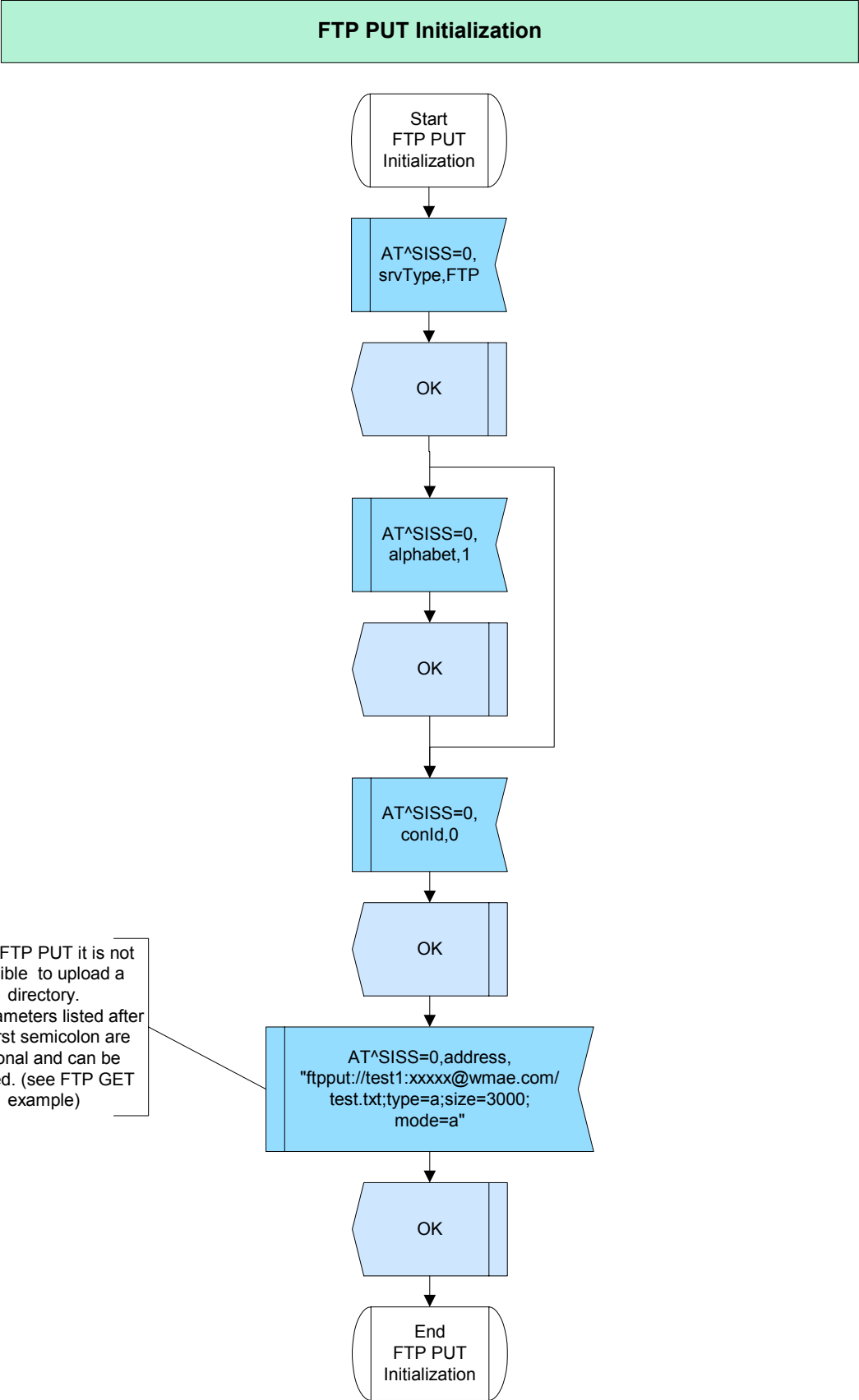


Figure 118: FTP PUT initialization

### 2.15.3.3.2 SMTP Initialization

- The following example describes settings, required to send an email.

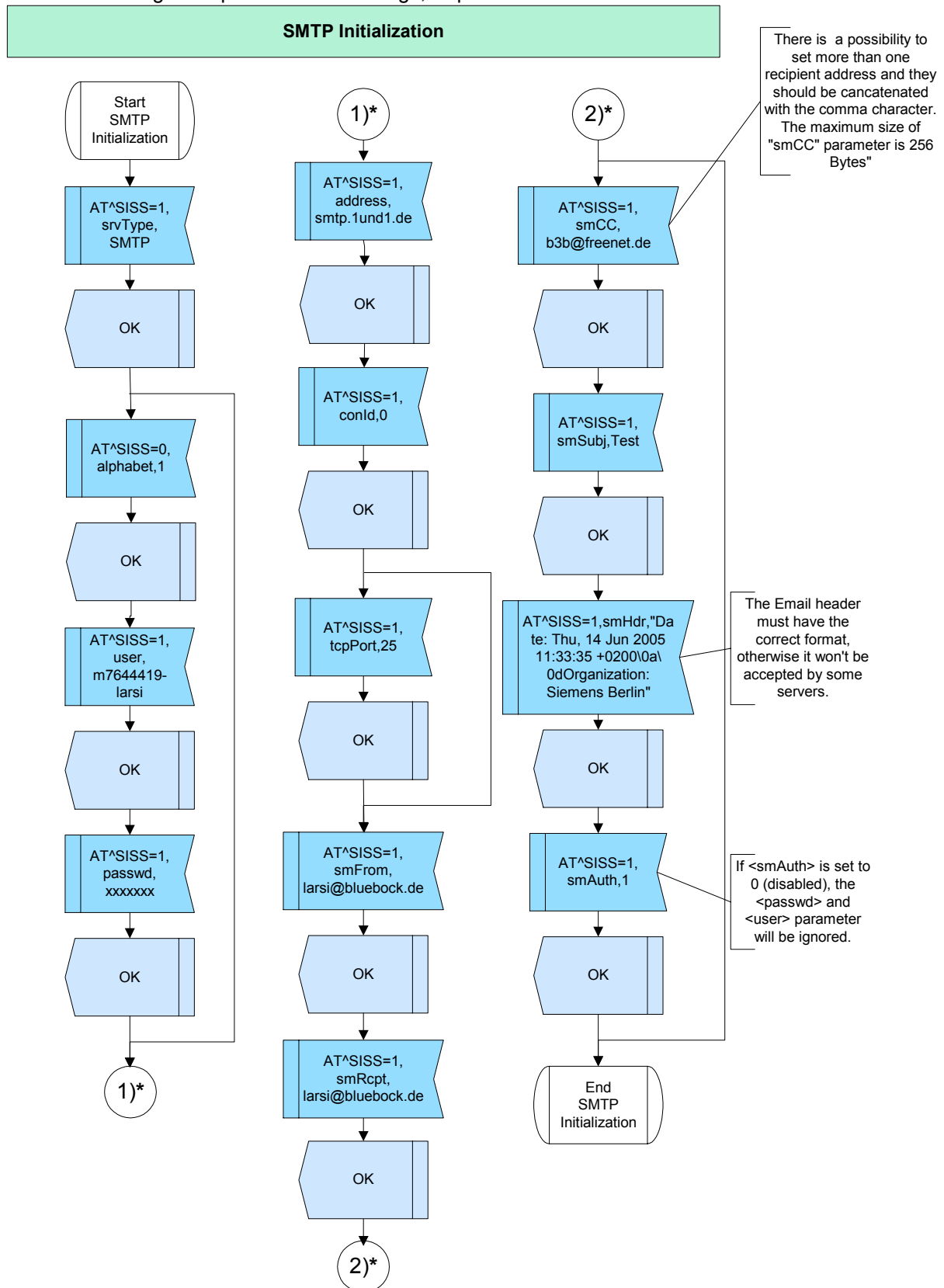


Figure 119: SMTP Initialization.

2.15.3.3.3 POP3 Initialization

- The following example describes the settings required to retrieve the chosen email specified by pNumber parameter.

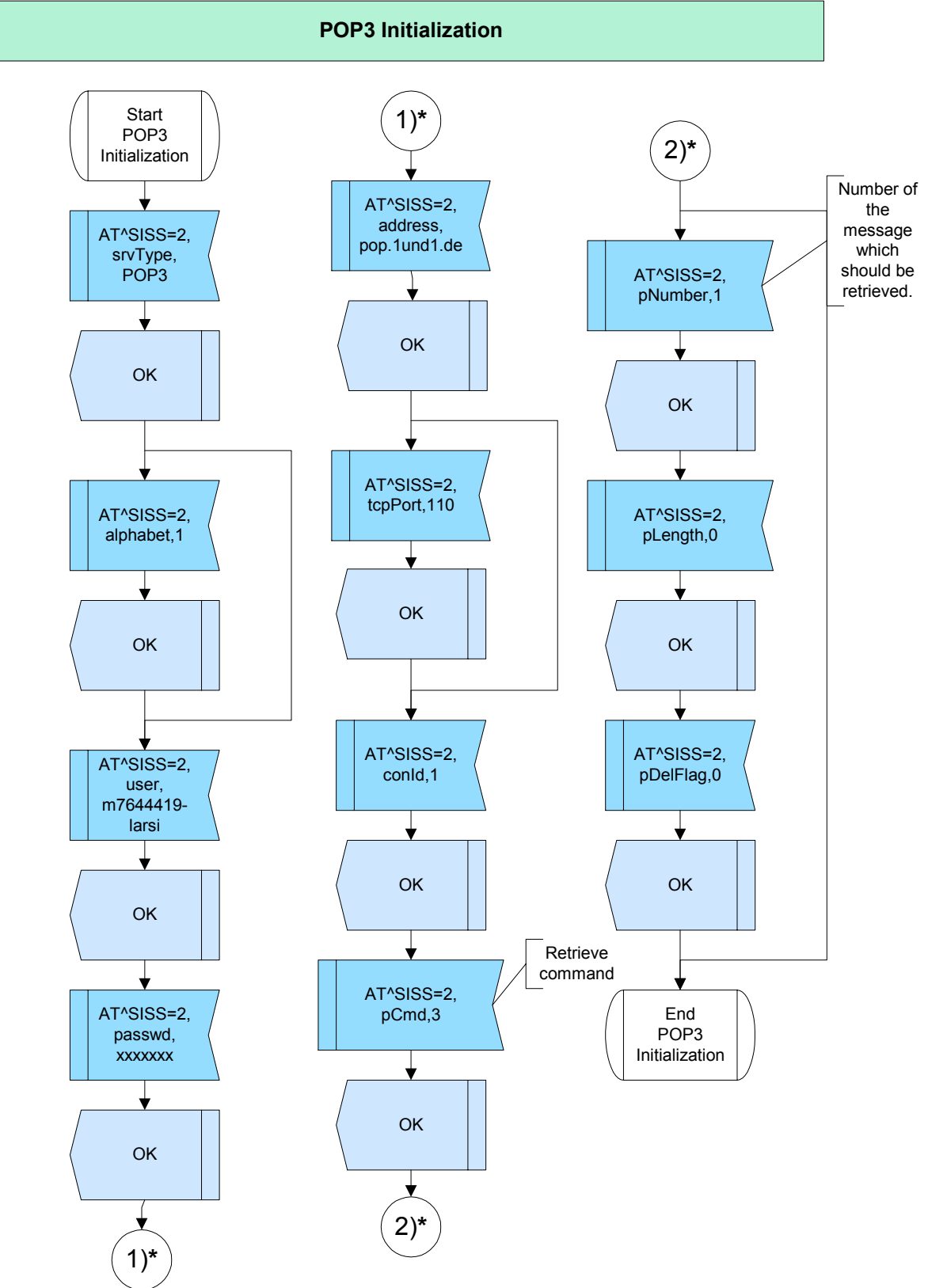


Figure 120: POP3 Initialization.

#### 2.15.3.3.4 Socket Initialization

- In this example the socket to the echo port (7) of the given server has been configured. Echo port belongs to the well known ports.

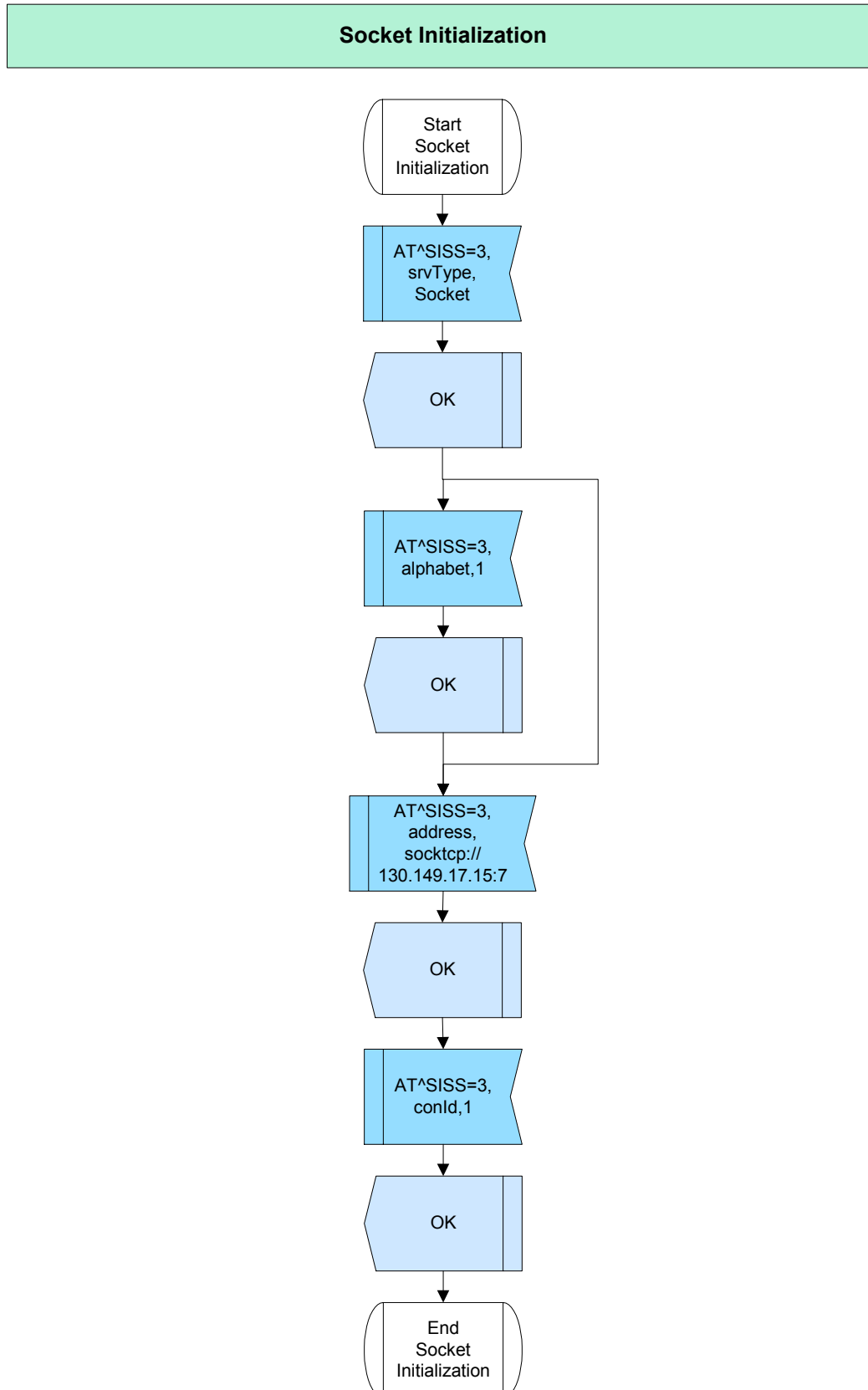


Figure 121: Socket Initialization.

### 2.15.3.3.5 HTTP Initialization

- In this example HTTP GET of the www.wmae.com website has been configured.

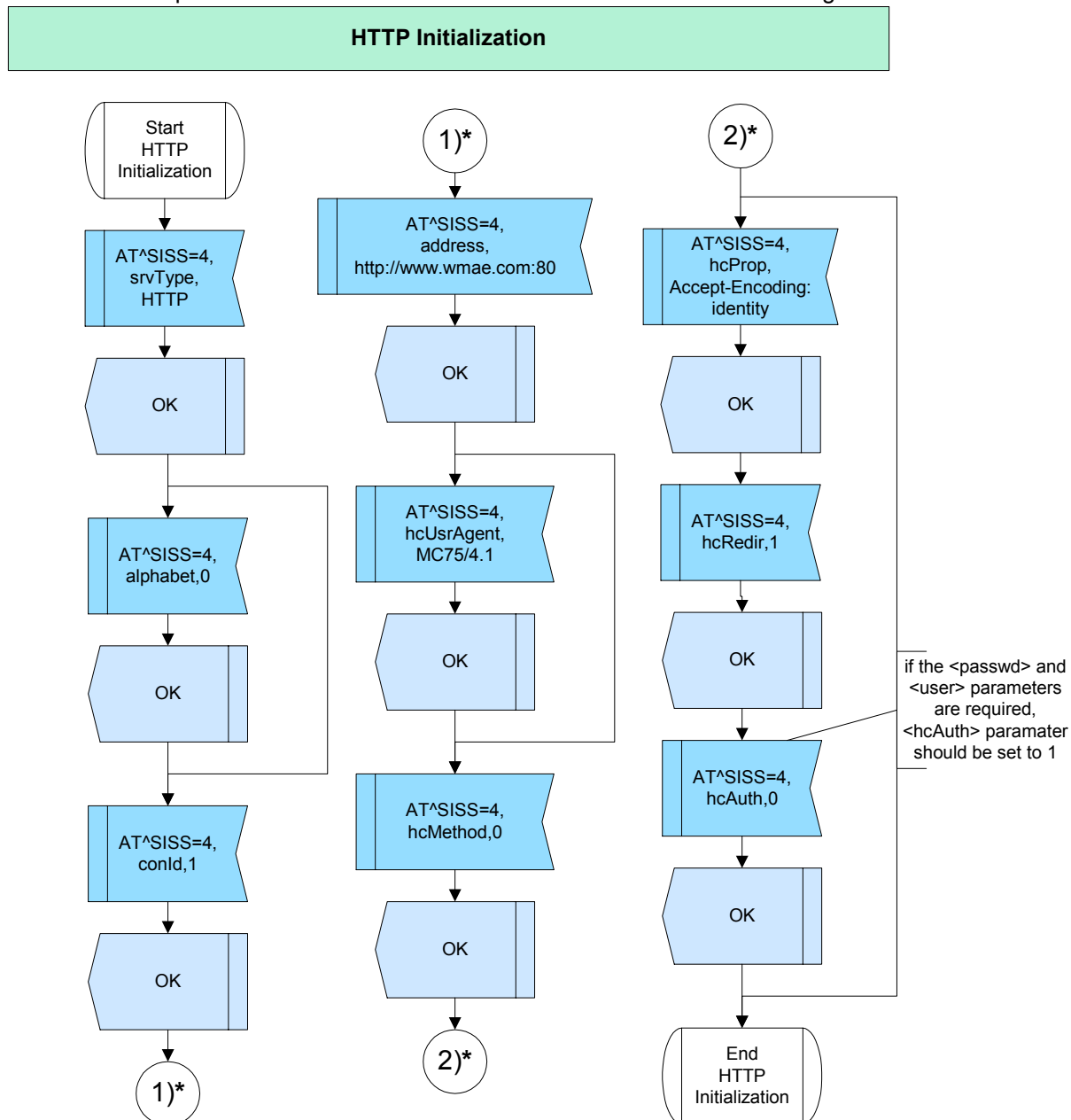


Figure 122: HTTP Initialization.

### 2.15.3.4 Hints

- Note that some terminals e.g. ZOC support the ASCII character set but some modules use the GSM character set per default. The problem is, that some special characters e.g. '@' are coded differently in those character sets. It is advisable to set the <alphabet> parameter to 1.
- The FTP example shows how to upload the text file. In order to upload a binary file, the type of the <address> parameter should be set to "i".
- If the <user> and <passwd> parameter shall be used for SMTP authentication, it is important to set <smAuth> to 1.
- If the website requires <passwd> and <user> in HTTP GET example, both parameters should be set and the <hcAuth> parameter should be set to 1.
- In the Socket example it is important to set the port number of the chosen server, which is really defined and not protected by e.g. firewall.

### 2.15.3.5 Examples

#### 2.15.3.5.1 FTP Initialization

##### FTP GET

\*\*\*\*\*

Comment Service Setup Profile FTP GET

\*\*\*\*\*

```
Subscr 1    Send: AT^SISS=5,svrType,ftp
Subscr 1    Receive: AT^SISS=5,svrType,ftp
Subscr 1    Receive: OK
Subscr 1    Send: AT^SISS=5,alphabet,1
Subscr 1    Receive: AT^SISS=5,alphabet,1
Subscr 1    Receive: OK
Subscr 1    Send: AT^SISS=5,conId,0
Subscr 1    Receive: AT^SISS=5,conId,0
Subscr 1    Receive: OK
Subscr 1    Send: AT^SISS=5,address,"ftp://test1:xxxxx@wmae.com/"
Subscr 1    Receive: AT^SISS=5,address,"ftp://test1:xxxxx@wmae.com/"
Subscr 1    Receive: OK
```

##### FTP PUT

\*\*\*\*\*

Comment Service Setup Profile FTP PUT

\*\*\*\*\*

```
Subscr 1    Send: AT^SISS=0,svrType,ftp
Subscr 1    Receive: AT^SISS=0,svrType,ftp
Subscr 1    Receive: OK
Subscr 1    Send: AT^SISS=0,alphabet,1
Subscr 1    Receive: AT^SISS=0,alphabet,1
Subscr 1    Receive: OK
Subscr 1    Send: AT^SISS=0,conId,0
Subscr 1    Receive: AT^SISS=0,conId,0
Subscr 1    Receive: OK
Subscr 1    Send:
AT^SISS=0,address,"ftpput://test1:xxxxx@wmae.com/test.txt?type=a;size=3000;mode=a"
Subscr 1    Receive:
AT^SISS=0,address,"ftpput://test1:xxxxx@wmae.com/test.txt?type=a;size=3000;mode=a"
Subscr 1    Receive: OK
```

#### 2.15.3.5.2 SMTP Initialization

\*\*\*\*\*

Comment Service Setup Profile SMTP

\*\*\*\*\*

```
Subscr 1    Send: AT^SISS=1,svrType,smtp
Subscr 1    Receive: AT^SISS=1,svrType,smtp
Subscr 1    Receive: OK
Subscr 1    Send: AT^SISS=1,alphabet,1
Subscr 1    Receive: AT^SISS=1,alphabet,1
Subscr 1    Receive: OK
Subscr 1    Send: AT^SISS=1,user,m7644419-larsi
Subscr 1    Receive: AT^SISS=1,user,m7644419-larsi
Subscr 1    Receive: OK
```

```
Subscr 1    Send: AT^SISS=1,passwd,xxxxxxx
Subscr 1 Receive: AT^SISS=1,passwd,xxxxxxx
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=1,address,smtp.1und1.de
Subscr 1 Receive: AT^SISS=1,address,smtp.1und1.de
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=1,conId,0
Subscr 1 Receive: AT^SISS=1,conId,0
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=1,tcpPort,25
Subscr 1 Receive: AT^SISS=1,tcpPort,25
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=1,smFrom,larsi@bluebock.de
Subscr 1 Receive: AT^SISS=1,smFrom,larsi@bluebock.de
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=1,smRcpt,larsi@bluebock.de
Subscr 1 Receive: AT^SISS=1,smRcpt,larsi@bluebock.de
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=1,smCC,b3b@freenet.de
Subscr 1 Receive: AT^SISS=1,smCC,b3b@freenet.de
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=1,smSubj,Test
Subscr 1 Receive: AT^SISS=1,smSubj,Test
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=1,smHdr,"Date: Thu, 14 Jun 2005 11:33:35 +0200\0a\0dOrganization:
Siemens Berlin"
Subscr 1 Receive: AT^SISS=1,smHdr,"Date: Thu, 14 Jun 2005 11:33:35 +0200\0a\0dOrganization:
Siemens Berlin"
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=1,smAuth,1
Subscr 1 Receive: AT^SISS=1,smAuth,1
Subscr 1 Receive: OK
```

### 2.15.3.5.3 POP3 Initialization

\*\*\*\*\*

Comment Service Setup Profile POP3

\*\*\*\*\*

```
Subscr 1    Send: AT^SISS=2,svrType,pop3
Subscr 1 Receive: AT^SISS=2,svrType,pop3
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=2,alphabet,1
Subscr 1 Receive: AT^SISS=2,alphabet,1
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=2,user,m7644419-larsi
Subscr 1 Receive: AT^SISS=2,user,m7644419-larsi
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=2,passwd,xxxxxxx
Subscr 1 Receive: AT^SISS=2,passwd,xxxxxxx
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=2,address,pop.1und1.de
Subscr 1 Receive: AT^SISS=2,address,pop.1und1.de
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=2,tcpPort,110
Subscr 1 Receive: AT^SISS=2,tcpPort,110
Subscr 1 Receive: OK
Subscr 1    Send: AT^SISS=2,conId,1
Subscr 1 Receive: AT^SISS=2,conId,1
```

```
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=2,pCmd,3
Subscr 1 Receive: AT^SISS=2,pCmd,3
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=2,pNumber,1
Subscr 1 Receive: AT^SISS=2,pNumber,1
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=2,pLength,0
Subscr 1 Receive: AT^SISS=2,pLength,0
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=2,pDelFlag,0
Subscr 1 Receive: AT^SISS=2,pDelFlag,0
Subscr 1 Receive: OK
```

#### **2.15.3.5.4 Socket Initialization**

\*\*\*\*\*

Comment Service Setup Profile Socket

\*\*\*\*\*

```
Subscr 1 Send: AT^SISS=3,svrType,socket
Subscr 1 Receive: AT^SISS=3,svrType,socket
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=3,alphabet,1
Subscr 1 Receive: AT^SISS=3,alphabet,1
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=3,address,socktcp://130.149.17.15:7
Subscr 1 Receive: AT^SISS=3,address,socktcp://130.149.17.15:7
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=3,conId,1
Subscr 1 Receive: AT^SISS=3,conId,1
Subscr 1 Receive: OK
```

#### **2.15.3.5.5 HTTP Initialization**

\*\*\*\*\*

Comment Service Setup Profile HTTP

\*\*\*\*\*

```
Subscr 1 Send: AT^SISS=4,svrType,http
Subscr 1 Receive: AT^SISS=4,svrType,http
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=4,alphabet,0
Subscr 1 Receive: AT^SISS=4,alphabet,0
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=4,conId,1
Subscr 1 Receive: AT^SISS=4,conId,1
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=4,address,http://www.wmae.com:80
Subscr 1 Receive: AT^SISS=4,address,http://www.wmae.com:80
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=4,hcUsrAgent,MC75/4.1
Subscr 1 Receive: AT^SISS=4,hcUsrAgent,MC75/4.1
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISS=4,hcMethod,0
Subscr 1 Receive: AT^SISS=4,hcMethod,0
Subscr 1 Receive: OK
```



---

Subscr 1    Send: AT^SISS=4,hcProp,Accept-Encoding: identity  
Subscr 1    Receive: AT^SISS=4,hcProp,Accept-Encoding: identity  
Subscr 1    Receive: OK  
Subscr 1    Send: AT^SISS=4,hcRedir,1  
Subscr 1    Receive: AT^SISS=4,hcRedir,1  
Subscr 1    Receive: OK  
Subscr 1    Send: AT^SISS=4,hcAuth,0  
Subscr 1    Receive: AT^SISS=4,hcAuth,0  
Subscr 1    Receive: OK

## 2.15.4 Open Internet Service

### 2.15.4.1 Description

This chapter describes how to open the service profiles configured before with the AT^SISO command. Executing of that command causes bearer (GPRS/CSD) establishment.

- The errors, which might occur after executing the AT^SISO command can be:
  - Setup profile errors. They appear instead of OK answer.
  - Bearer (GPRS/CSD) establishment errors.
  - Service and server errors, which can appear between OK answer and the AT^SISC command.

### 2.15.4.2 Used AT commands

AT^SISO - Internet Service Open

### 2.15.4.3 Flow chart

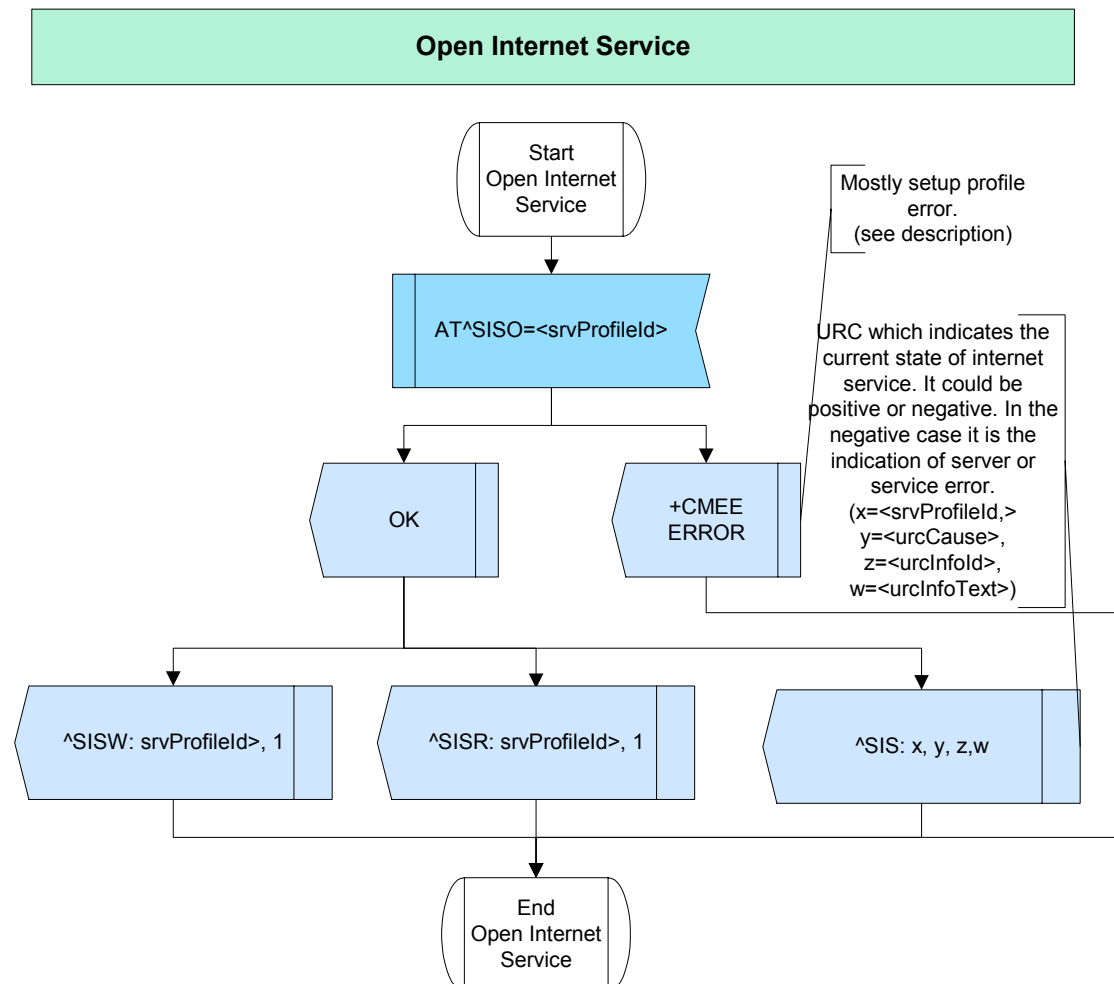


Figure 123: Open Internet Services

### 2.15.4.4 Examples

(see Write/Read chapter)

---

## **2.15.5 Read/Write Data**

### **2.15.5.1 Description**

This chapter describes how to use the services configured before.

- In this example the services are executed independently of each other, but some Siemens modules allow to use all of them in parallel, provided that they are running on the same connection profile. The other modules support only one service profile at the same time.
- After executing the AT^SISO command, "OK" and the response to the prior write or read command will appear (see Open Internet Service) After that the write or read command should be executed which contains <srvProfileId> and the number of bytes to read or write (<reqReadLength> / <reqWriteLength>).
- It is not possible to find out how many bytes there are to read, only if the <reqReadLength> is greater than the existing size of bytes to read, the <cnfReadLength> in the ^SISR: response will show this actual size.
- The Read/Write procedure is quite complex. Reading or writing x bytes can be done at once or in several steps.
- The concept of non-blocking interface, mentioned in chapter 2.15.1.1 allows to intercept AT commands related to different topics into Internet Services (see Figure 124). This example shows the interception of the AT+CMEE command during Internet Services data transfer.

### **2.15.5.2 Used AT commands**

AT^SISR	-	Internet Service Read Data
AT^SISW	-	Internet Service Write Data

For further details about the commands see [2].

### 2.15.5.3 Flow chart

- The first flow chart shows the read and write data sequence in general. The next flow charts describes the usage of every service in details.

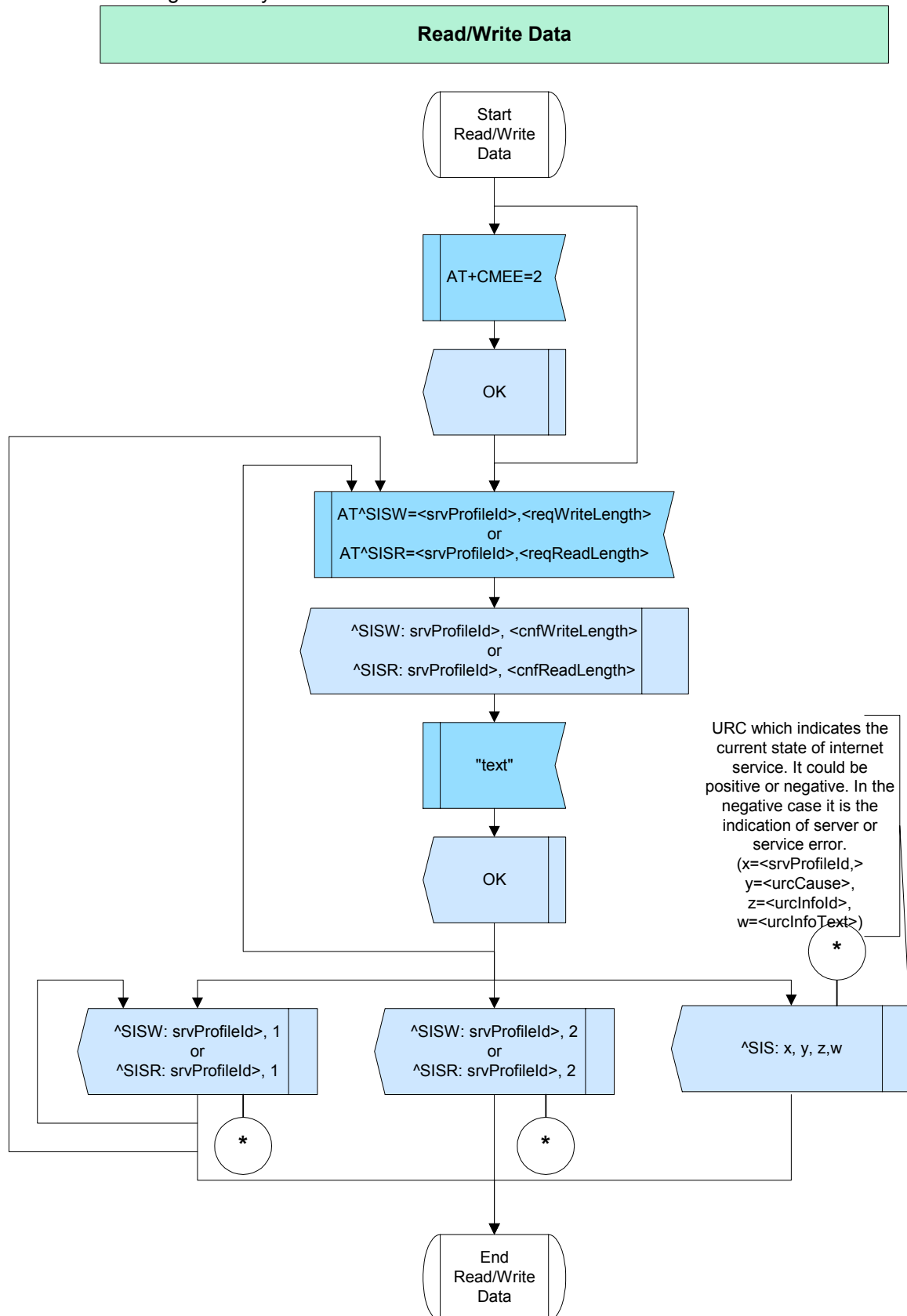


Figure 124: Read/Write Data

2.15.5.3.1 FTP

FTP GET

- The following example describes the download of the directory from the wmae.com server.

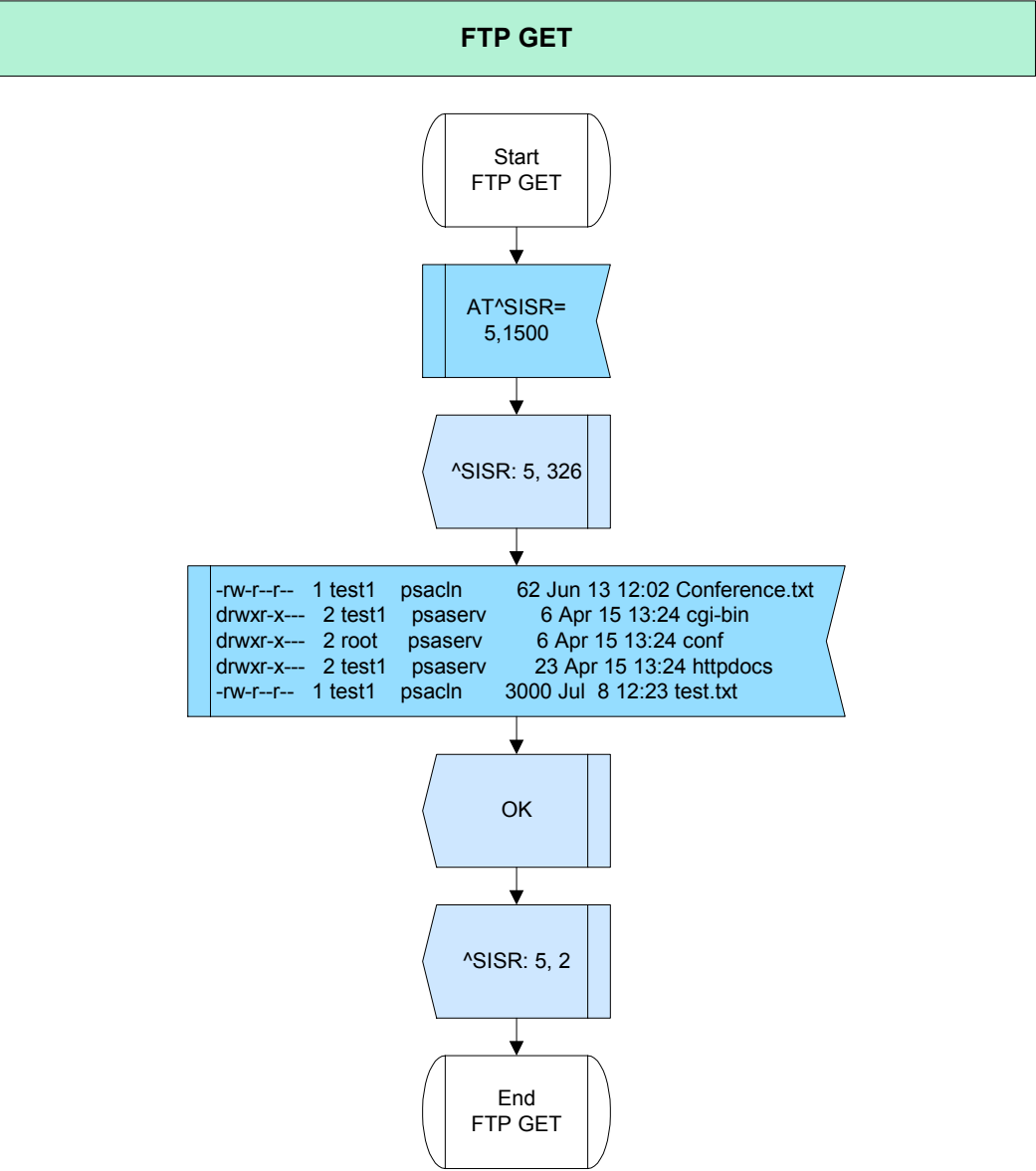


Figure 125: FTP GET

FTP PUT

- The following example describes the upload of the text file, with a size of 3000 bytes.

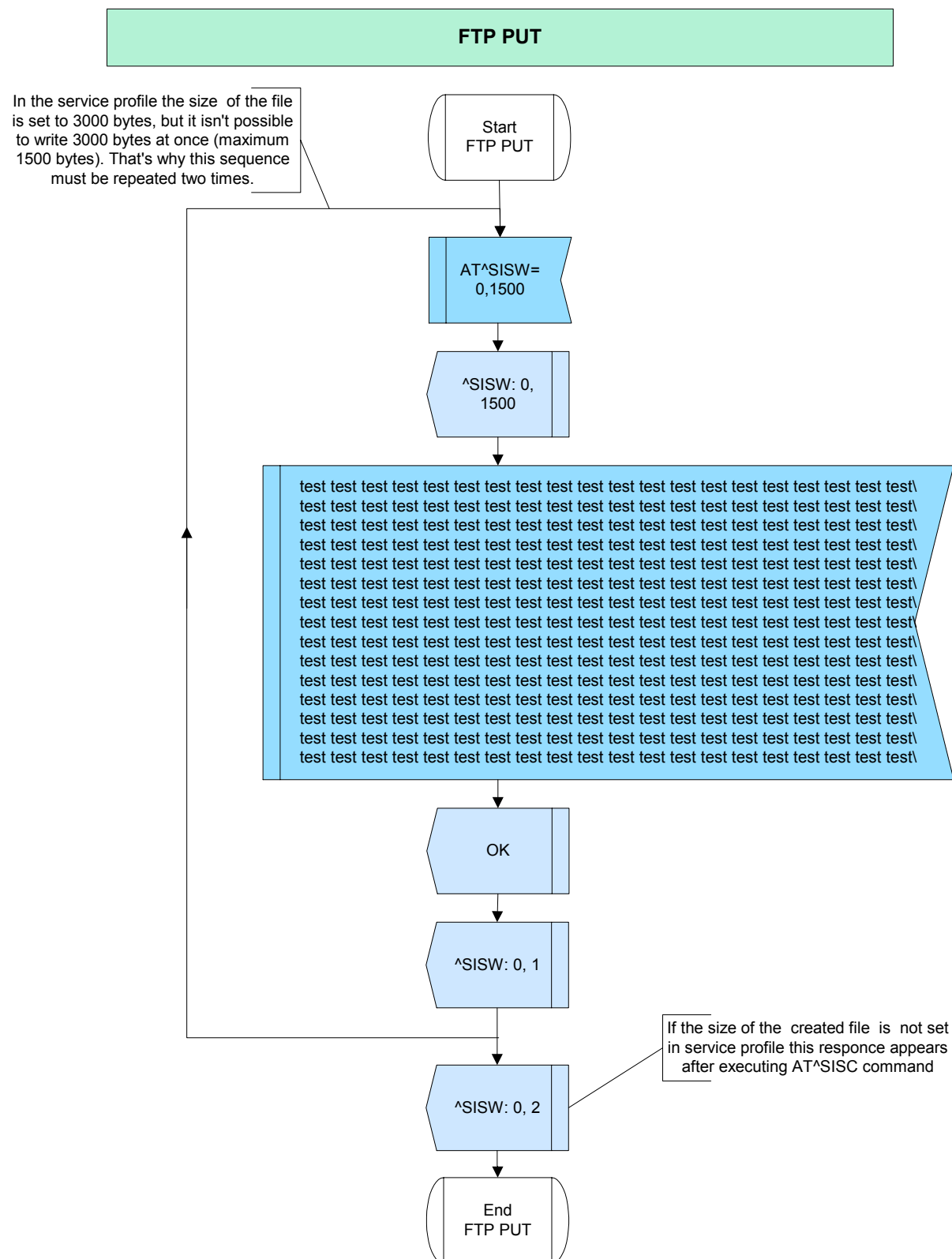


Figure 126 FTP PUT

### 2.15.5.3.2 SMTP

- The following example describes how to send a short email.

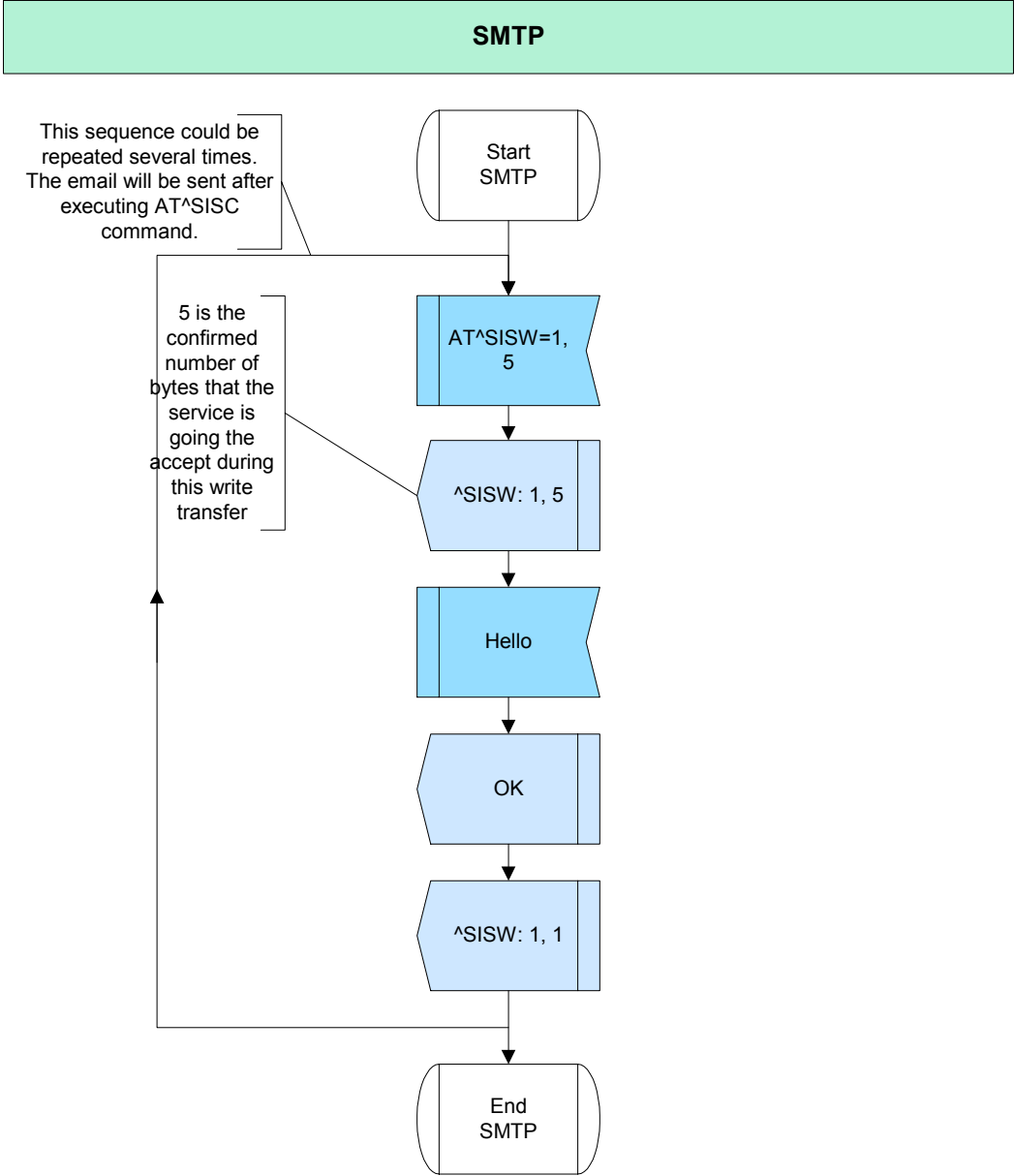


Figure 127: SMTP

2.15.5.3.3 POP3

- The following example describes retrieving the chosen email from the POP3 server.

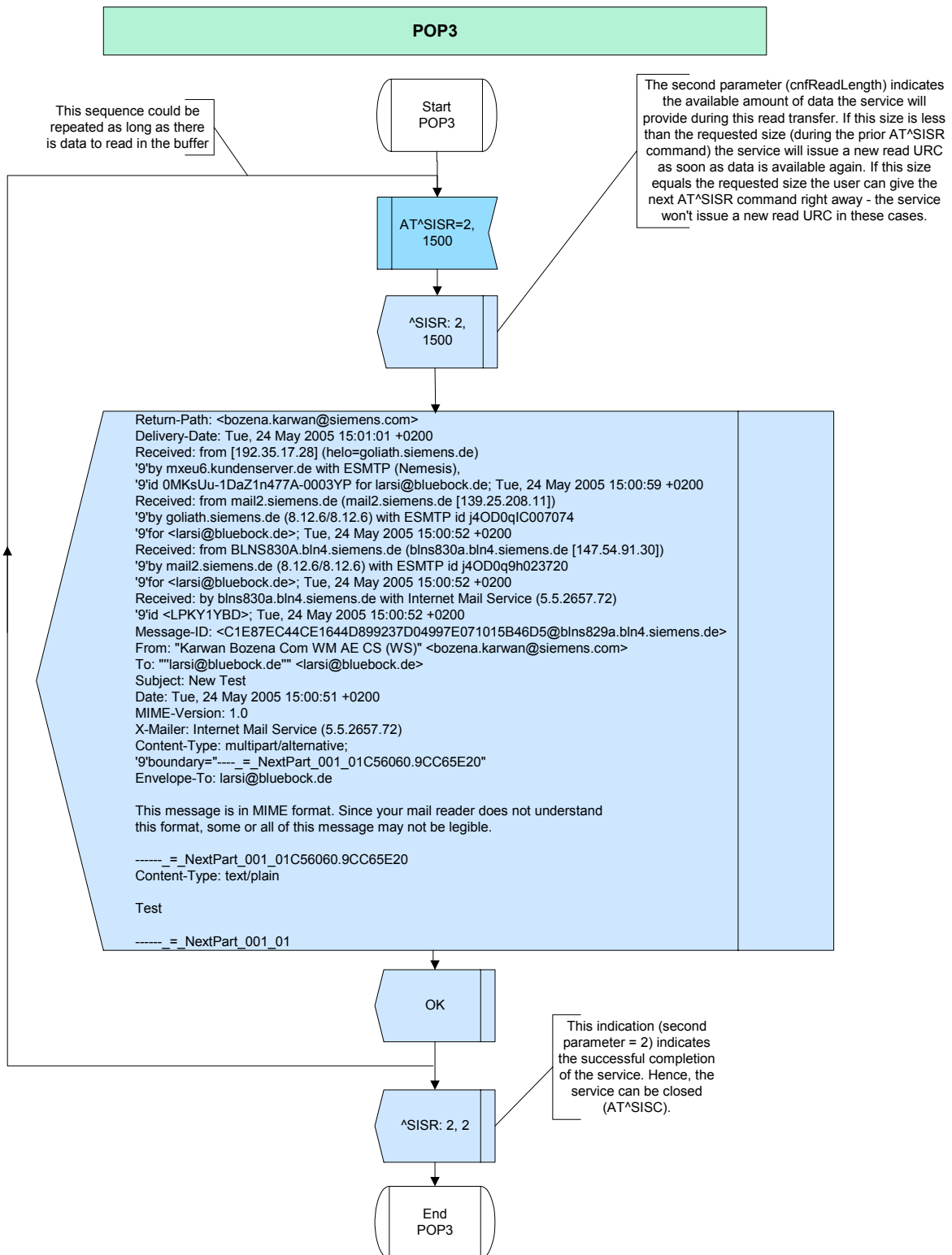


Figure 128: POP3

#### 2.15.5.3.4 Socket

- The following example describes the socket connection to the echo port.



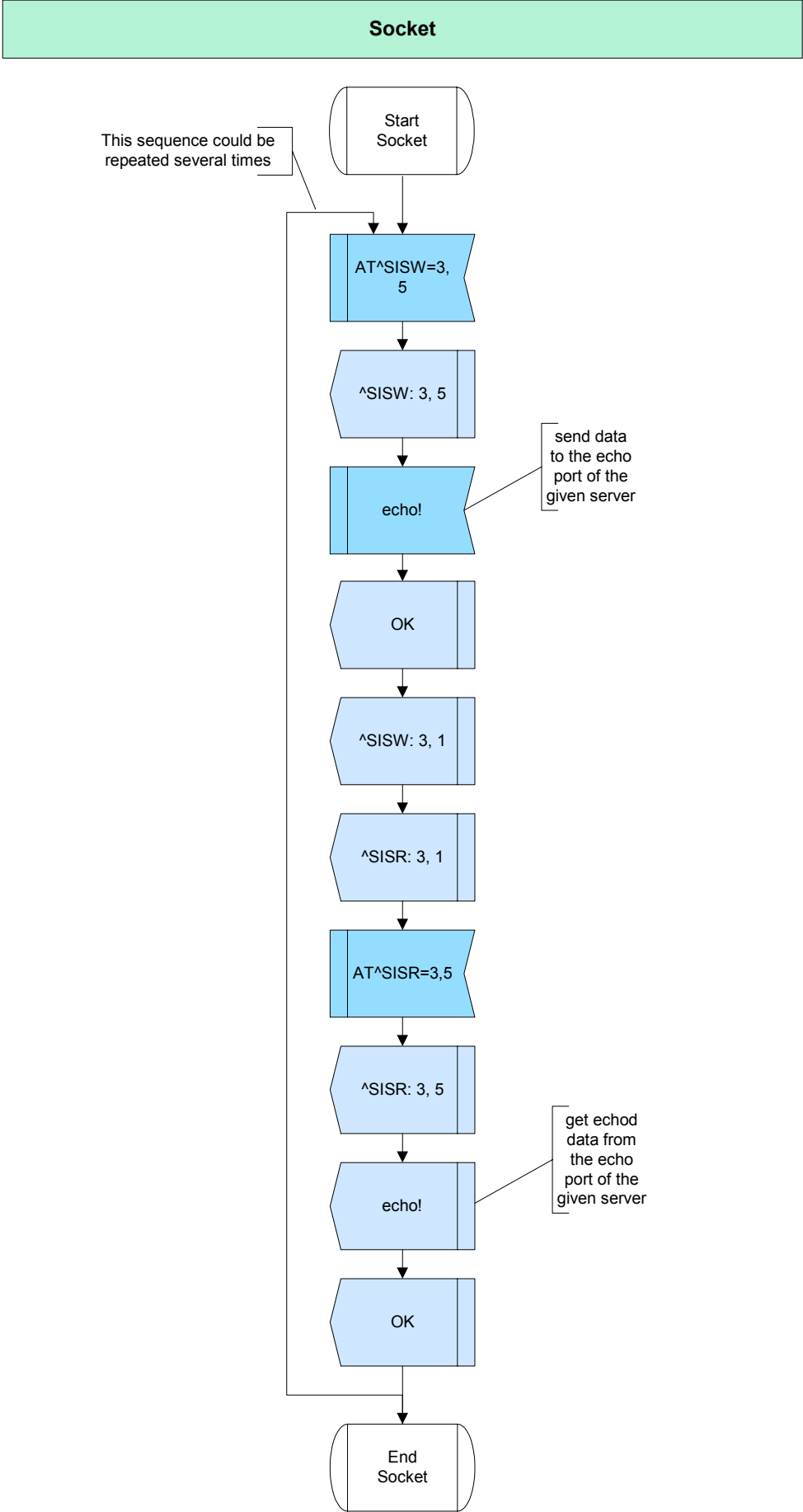


Figure 129: Socket

---

#### **2.15.5.3.5 HTTP**

- The following flow chart shows downloading the website with HTTP GET.

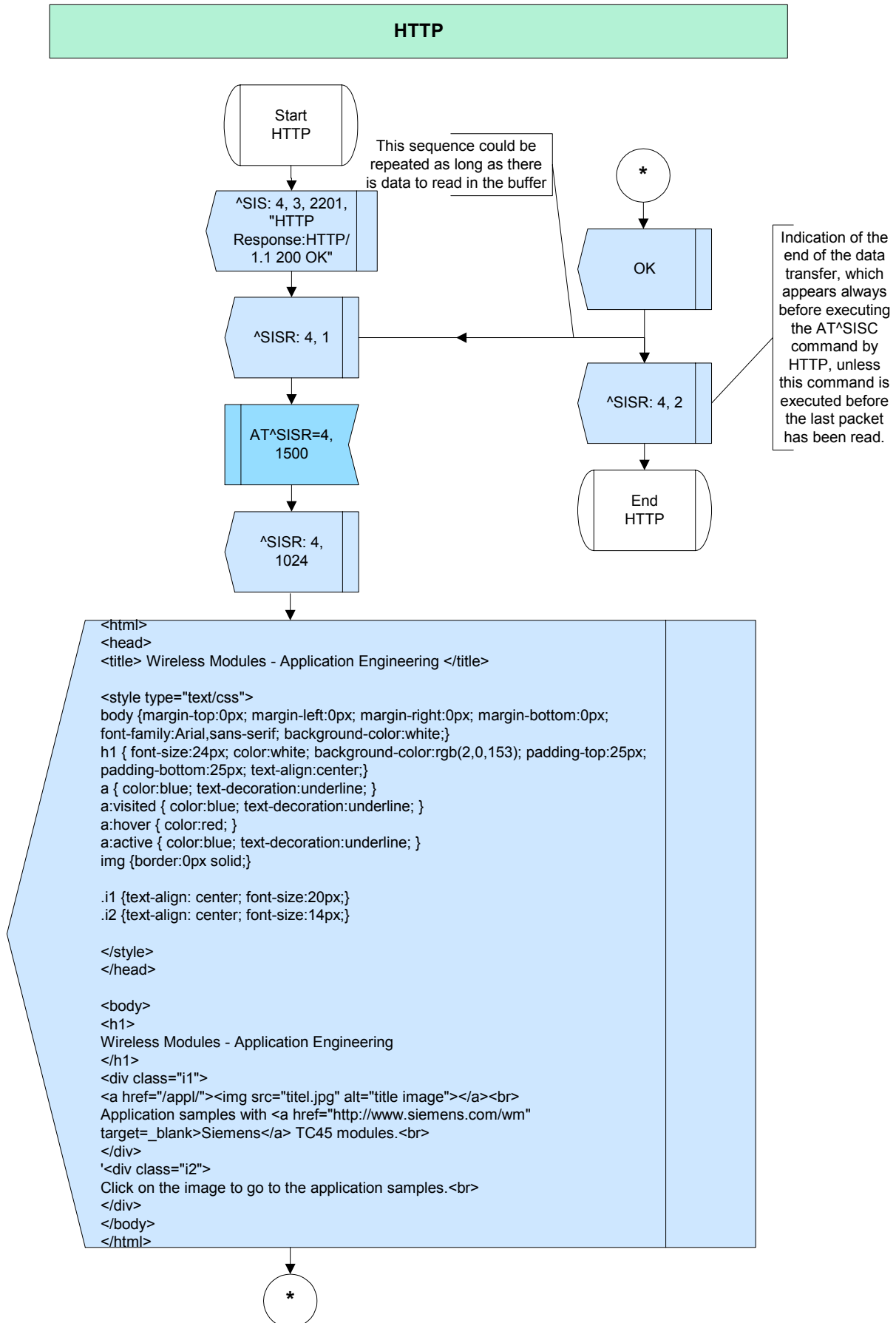


Figure 130: HTTP

## 2.15.5.4 Hints

### FTP

- FTP PUT uses only write commands (AT^SISW) (see the following example) and FTP GET uses only read commands (AT^SISR).
- It isn't possible to upload an already existing file. The file is created by executing the FTP service (see the following example).

### SMTP

- Note, that the email is sent after sending AT^SISC command by SMTP service. Before this happens, it is possible to execute the AT^SISW command several times and thereby send any number of bytes.
- Note, that AT^SISC=<srvProfileId>,1 cancels the email send command (i.e. the email won't be stored on the remote peer SMTP server).

### POP3

- Note, that indication of the end of data transfer, which appears always before executing AT^SISC command by POP3, unless this command is executed before last packet has been read.

### SOCKET

- Defining/activating and using the listener service depends on the network provider. Not all allow the usage of the service.

## 2.15.5.5 Examples

### 2.15.5.5.1 FTP

#### FTP GET

\*\*\*\*\*

Comment Download the directory from the FTP server

\*\*\*\*\*

```
Subscr 1 Send: AT^SISO=5
Subscr 1 Receive: AT^SISO=5
Subscr 1 Receive:
Subscr 1 Receive: OK
Subscr 1 Receive:
Subscr 1 Receive: ^SISR: 5, 1
Subscr 1 Send: AT^SISR=5,1500
Subscr 1 Receive: AT^SISR=5,1500
Subscr 1 Receive: ^SISR: 5, 326
Subscr 1 Receive: -rw-r--r-- 1 test1 psacIn 62 Jun 13 12:02 Conference.txt
Subscr 1 Receive: drwxr-x--- 2 test1 psaserv 6 Apr 15 13:24 cgi-bin
Subscr 1 Receive: drwxr-x--- 2 root psaserv 6 Apr 15 13:24 conf
Subscr 1 Receive: drwxr-x--- 2 test1 psaserv 23 Apr 15 13:24 httpdocs
Subscr 1 Receive: -rw-r--r-- 1 test1 psacIn 3000 Jul 8 12:23 test.txt
Subscr 1 Receive:
Subscr 1 Receive: OK
Subscr 1 Receive:
Subscr 1 Receive: ^SISR: 5, 2
Subscr 1 Receive:
Subscr 1 Send: AT^SISC=5
Subscr 1 Receive: AT^SISC=5
Subscr 1 Receive: OK
```

#### FTP PUT

\*\*\*\*\*

Comment Create and save file on the FTP server

\*\*\*\*\*

#### 2.15.5.5.2 SMTP

Subscr 1      Send: AT^SISO=1

Subscr 1 Receive: AT^SISO=1  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: ^SISW: 1, 1  
Subscr 1 Send: AT^SISW=1,5  
Subscr 1 Receive: AT^SISW=1,5  
Subscr 1 Receive: ^SISW: 1, 5  
Subscr 1 Send: Hello  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Send: AT^SISC=1  
Subscr 1 Receive: AT^SISC=1  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: ^SISW: 1, 2

### 2.15.5.5.3 POP3

\*\*\*\*\*

Comment Reading an email

\*\*\*\*\*

Subscr 1 Send: AT^SISO=2  
Subscr 1 Receive: AT^SISO=2  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: ^SISR: 2, 1  
Subscr 1 Send: AT^SISR=2,1500  
Subscr 1 Receive: AT^SISR=2,1500  
Subscr 1 Receive: ^SISR: 2, 1500  
Subscr 1 Receive: Return-Path: <bozena.karwan@siemens.com>  
Subscr 1 Receive: Delivery-Date: Tue, 24 May 2005 15:01:01 +0200  
Subscr 1 Receive: Received: from [192.35.17.28] (helo=goliath.siemens.de)  
Subscr 1 Receive: '9'by mxu6.kundenserver.de with ESMTP (Nemesis),  
Subscr 1 Receive: '9'id 0MKsUu-1DaZ1n477A-0003YP for larsi@bluebock.de; Tue, 24 May 2005 15:00:59 +0200  
Subscr 1 Receive: Received: from mail2.siemens.de (mail2.siemens.de [139.25.208.11])  
Subscr 1 Receive: '9'by goliath.siemens.de (8.12.6/8.12.6) with ESMTP id j4OD0qIC007074  
Subscr 1 Receive: '9'for <larsi@bluebock.de>; Tue, 24 May 2005 15:00:52 +0200  
Subscr 1 Receive: Received: from BLNS830A.blm4.siemens.de (blns830a.blm4.siemens.de [147.54.91.30])  
Subscr 1 Receive: '9'by mail2.siemens.de (8.12.6/8.12.6) with ESMTP id j4OD0q9h023720  
Subscr 1 Receive: '9'for <larsi@bluebock.de>; Tue, 24 May 2005 15:00:52 +0200  
Subscr 1 Receive: Received: by blns830a.blm4.siemens.de with Internet Mail Service (5.5.2657.72)  
Subscr 1 Receive: '9'id <LPKY1YBD>; Tue, 24 May 2005 15:00:52 +0200  
Subscr 1 Receive: Message-ID:  
<C1E87EC44CE1644D899237D04997E071015B46D5@blns829a.blm4.siemens.de>  
Subscr 1 Receive: From: "Karwan Bozena Com WM AE CS (WS)" <bozena.karwan@siemens.com>  
Subscr 1 Receive: To: ""larsi@bluebock.de"" <larsi@bluebock.de>  
Subscr 1 Receive: Subject: New Test  
Subscr 1 Receive: Date: Tue, 24 May 2005 15:00:51 +0200  
Subscr 1 Receive: MIME-Version: 1.0  
Subscr 1 Receive: X-Mailer: Internet Mail Service (5.5.2657.72)  
Subscr 1 Receive: Content-Type: multipart/alternative;  
Subscr 1 Receive: '9'boundary="----=\_NextPart\_001\_01C56060.9CC65E20"  
Subscr 1 Receive: Envelope-To: larsi@bluebock.de  
Subscr 1 Receive:

```
Subscr 1 Receive: This message is in MIME format. Since your mail reader does not understand
Subscr 1 Receive: this format, some or all of this message may not be legible.
Subscr 1 Receive:
Subscr 1 Receive: -----=_NextPart_001_01C56060.9CC65E20
Subscr 1 Receive: Content-Type: text/plain
Subscr 1 Receive:
Subscr 1 Receive: Test
Subscr 1 Receive:
Subscr 1 Receive: -----=_NextPart_001_01
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISR=2,1500
Subscr 1 Receive: AT^SISR=2,1500
Subscr 1 Receive: ^SISR: 2, 415
Subscr 1 Receive: C56060.9CC65E20
Subscr 1 Receive: Content-Type: text/html
Subscr 1 Receive:
Subscr 1 Receive: <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2//EN">
Subscr 1 Receive: <HTML>
Subscr 1 Receive: <HEAD>
Subscr 1 Receive: <META HTTP-EQUIV="Content-Type" CONTENT="text/html; charset=US-
ASCII">
Subscr 1 Receive: <META NAME="Generator" CONTENT="MS Exchange Server version
5.5.2654.45">
Subscr 1 Receive: <TITLE>New Test</TITLE>
Subscr 1 Receive: </HEAD>
Subscr 1 Receive: <BODY>
Subscr 1 Receive:
Subscr 1 Receive: <P><FONT SIZE=2 FACE="Arial">Test</FONT>
Subscr 1 Receive: </P>
Subscr 1 Receive:
Subscr 1 Receive: </BODY>
Subscr 1 Receive: </HTML>
Subscr 1 Receive: -----=_NextPart_001_01C56060.9CC65E20--
Subscr 1 Receive: .
Subscr 1 Receive:
Subscr 1 Receive: OK
Subscr 1 Receive:
Subscr 1 Receive: ^SISR: 2, 2
Subscr 1 Send: AT^SISC=2
Subscr 1 Receive: AT^SISC=2
Subscr 1 Receive: OK
```

#### **2.15.5.5.4 Socket**

\*\*\*\*\*

Comment Socket connection with the port 7 (echo port)

\*\*\*\*\*

```
Subscr 1 Send: AT^SISO=3
Subscr 1 Receive: AT^SISO=3
Subscr 1 Receive: OK
Subscr 1 Receive:
Subscr 1 Receive: ^SISW: 3, 1
Subscr 1 Send: AT^SISW=3,5
Subscr 1 Receive: AT^SISW=3,5
Subscr 1 Receive: ^SISW: 3, 5
Subscr 1 Send: echo!
Subscr 1 Receive:
Subscr 1 Receive: OK
```

```
Subscr 1 Receive:
Subscr 1 Receive: ^SISW: 3, 1
Subscr 1 Receive:
Subscr 1 Receive: ^SISR: 3, 1
Subscr 1 Send: AT^SISR=3,5
Subscr 1 Receive: AT^SISR=3,5
Subscr 1 Receive: ^SISR: 3, 5
Subscr 1 Receive: echo!
Subscr 1 Receive: OK
Subscr 1 Send: AT^SISC=3
Subscr 1 Receive: AT^SISC=3
Subscr 1 Receive: OK
```

#### 2.15.5.5.5 HTTP

```
*****
Comment HTTP Get
*****
```

```
Subscr 1 Send: AT^SISO=4
Subscr 1 Receive: AT^SISO=4
Subscr 1 Receive: OK
Subscr 1 Receive:
Subscr 1 Receive: ^SIS: 4, 3, 2201, "HTTP Response:HTTP/1.1 200 OK"
Subscr 1 Receive:
Subscr 1 Receive: ^SISR: 4, 1
Subscr 1 Send: AT^SISR=4,1500
Subscr 1 Receive: AT^SISR=4,1500
Subscr 1 Receive: ^SISR: 4, 1024
Subscr 1 Receive: <html>
Subscr 1 Receive: <head>
Subscr 1 Receive: <title> Wireless Modules - Application Engineering </title>
Subscr 1 Receive:
Subscr 1 Receive: <style type="text/css">
Subscr 1 Receive: body {margin-top:0px; margin-left:0px; margin-right:0px; margin-bottom:0px;
Subscr 1 Receive: font-family:Arial,sans-serif; background-color:white;}
Subscr 1 Receive: h1 { font-size:24px; color:white; background-color:rgb(2,0,153); padding-top:25px;
Subscr 1 Receive: padding-bottom:25px; text-align:center;}
Subscr 1 Receive: a { color:blue; text-decoration:underline; }
Subscr 1 Receive: a:visited { color:blue; text-decoration:underline; }
Subscr 1 Receive: a:hover { color:red; }
Subscr 1 Receive: a:active { color:blue; text-decoration:underline; }
Subscr 1 Receive: img {border:0px solid;}
Subscr 1 Receive:
Subscr 1 Receive: .i1 {text-align: center; font-size:20px;}
Subscr 1 Receive: .i2 {text-align: center; font-size:14px;}
Subscr 1 Receive:
Subscr 1 Receive: </style>
Subscr 1 Receive: </head>
Subscr 1 Receive:
Subscr 1 Receive: <body>
Subscr 1 Receive: <h1>
Subscr 1 Receive: Wireless Modules - Application Engineering
Subscr 1 Receive: </h1>
Subscr 1 Receive: <div class="i1">
Subscr 1 Receive: <a href="/appl/"></a><br>
Subscr 1 Receive: Application samples with <a href="http://www.siemens.com/wm"
Subscr 1 Receive: target=_blank>Siemens</a> TC45 modules.<br>
Subscr 1 Receive: </div>
```



```

Subscr 1 Receive: <div class="i2">
Subscr 1 Receive: Click on the image to go to the application samples.<br>
Subscr 1 Receive: </div>
Subscr 1 Receive: </body>
Subscr 1 Receive: </html>
Subscr 1 Receive:
Subscr 1 Receive: OK
Subscr 1 Receive:
Subscr 1 Receive: ^SISR: 4, 2
Subscr 1 Send: AT^SISC=4
Subscr 1 Receive: AT^SISC=4
Subscr 1 Receive: OK
    
```

## 2.15.6 Close Internet Service

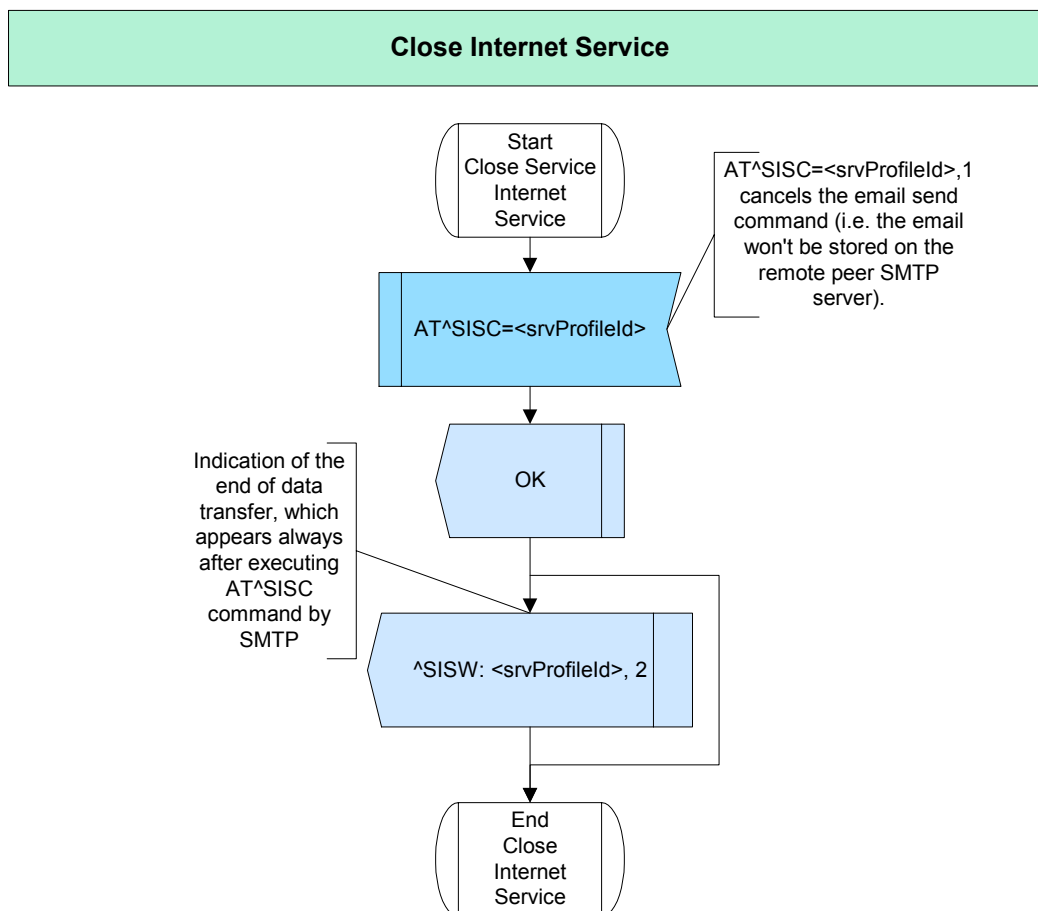


Figure 131: Close Internet Service

### 2.15.6.1 Description

This chapter describes how to close the service with the AT^SISC command.

- It's important always to close the service if it isn't used any more.
- The profiles cost resources, therefore they need to be closed before new profiles can be defined.

### 2.15.6.2 Used AT commands

AT^SISC - Internet Service Close

---

### **2.15.6.3 Examples**

(see Write/Read chapter)

## 2.16 Remote SIM Access

The feature Remote SIM Access (RSA) allows the ME to access a remote SIM card via the serial interface of the ME in addition to the SIM card locally attached via the dedicated lines on the local SIM interface connector. The SIM Access Profile (SAP) offers the possibility to share SIM card information between different mobile devices. For further information see [13].

A SAP setup consists of a remote SIM card connected to an SAP server, a SAP client with an optional local SIM card and the application, which connects the client and server. Either the client or the server or both can be SAP-capable ME.

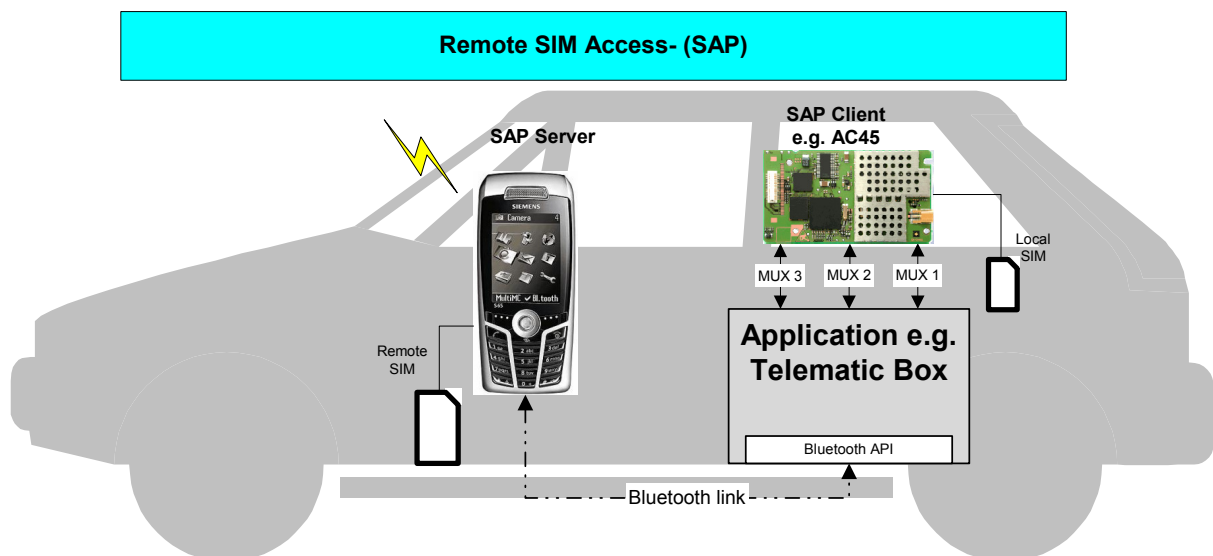


Figure 132: Remote SIM Access (SAP)

The typical example of an SAP server is a cellular phone; it has direct access to a SIM card. The SAP server assists the client in accessing and controlling the SIM card via the serial link. In the example above the SAP Client is connected via a serial link to the application. The application establishes and controls the Bluetooth connection with the SAP Server. The SAP Client accesses and controls the SIM card inside the SAP Server via the application.

In addition to Bluetooth, SAP can be executed with other protocols or interfaces (e.g. RS232) on the underlying layer. There is the possibility to use one ME as client and another as a server connected via serial interface.

Two data formats are available to exchange SIM data and to set up a RSA connection:

- XSAP ASCII coded string format
- SAP binary format

It depends on the application whether the data will be transmitted in XSAP (connection between two SAP-capable ME) or in SAP (connection between one SAP-capable ME and another SAP-capable device) format. For further details see [13].

Please note that for the Remote SIM Access the Mux driver is absolutely necessary. For further information on the recommended installation see [13].

## **2.16.1 Initialization of RSA**

### **2.16.1.1 Description**

This chapter describes the initialization of Remote SIM Access (RSA). The following AT commands might be of interest when using the RSA feature:

- The AT+CMEE command chooses the format of result codes for mobile equipment errors. By factory default (AT+CMEE=0), simply "ERROR" will be returned. For better error detection, we recommend to select either the numeric format (AT+CMEE=1) or the extended text format (AT+CMEE=2). For further details see 2.2.2 or [2].
- The AT^SCKS command is used to check the current status of the SIM (local or remote).
- The AT^SM20 command specifies two call setup response modes, i.e. two different modes of responses returned when dialing voice call numbers with ATD.  
AT^SM20=1 (factory default) causes the ME to respond once the call setup is completed either successfully ("OK") or unsuccessfully ("NO CARRIER", "NO DIAL TONE", "BUSY").  
AT^SM20=0 causes the ME to return "OK" immediately after dialing was completed (i.e. before call setup terminates successfully or unsuccessfully).
- The AT^SSET command controls the "^SSIM READY" URC indicating that the SIM data reading process (e.g. reading the SIM phonebook) has been completed. You may watch the reading of the SIM phonebook by sending the "AT^SIND=adnread,1" command. After sending this command every read SIM phonebook entry will be reported as an URC.

### **2.16.1.2 Used AT commands**

AT+CMEE	-	Report Mobile Equipment Error
AT^SCKS	-	Set SIM connection presentation mode
AT^SM20	-	Set M20 Compatibility
AT^SSET	-	Indicate SIM data ready

For further details about the commands see [2].

2.16.1.3 Flow chart

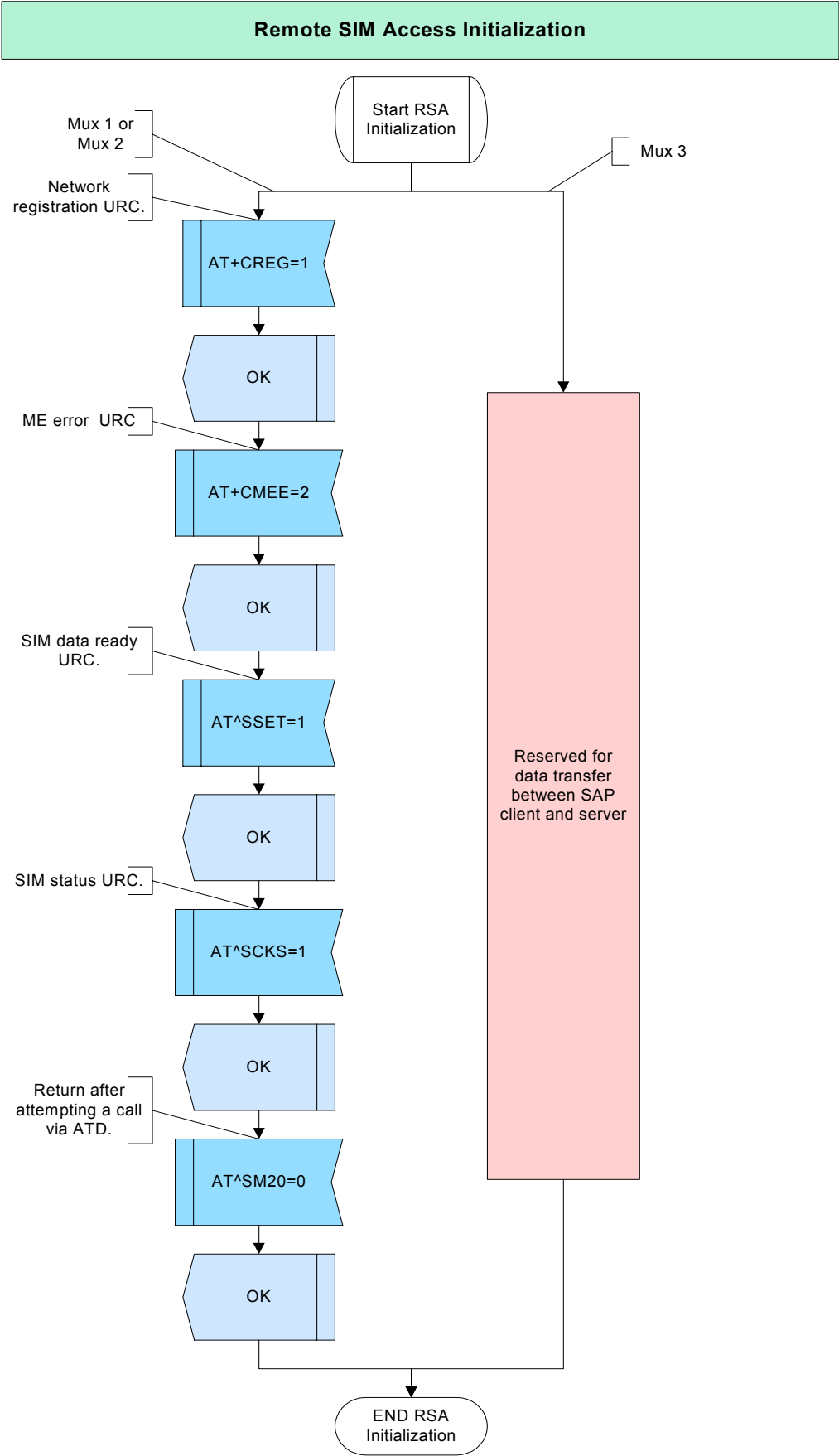


Figure 133: RSA initialization

#### 2.16.1.4 Hints

- Note, that all RSA URCs will be displayed on all active serial channels.

#### 2.16.1.5 Example

\*\*\*\*\*

Comment: Remote SIM Access Initialization

\*\*\*\*\*

\*\*\*\*\*

Comment: Query SIM PIN status (valid Mux 1 and Mux 2).

\*\*\*\*\*

Subscr 3 Send: AT+CPIN?

Subscr 3 Receive: AT+CPIN?

Subscr 3 Receive: +CPIN: READY

Subscr 3 Receive:

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Initialization of Mux 1.

Comment: Switch on network registration URC.

\*\*\*\*\*

Subscr 3 Send: AT+CREG=1

Subscr 3 Receive: AT+CREG=1

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Mobile equipment errors in text format URC.

\*\*\*\*\*

Subscr 3 Send: AT+CMEE=2

Subscr 3 Receive: AT+CMEE=2

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Switch on SIM data ready URC.

\*\*\*\*\*

Subscr 3 Send: AT^SSET=1

Subscr 3 Receive: AT^SSET=1

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Switch on SIM status URC.

\*\*\*\*\*

Subscr 3 Send: AT^SCKS=1

Subscr 3 Receive: AT^SCKS=1

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Return after attempting a call via ATD.

\*\*\*\*\*

Subscr 3 Send: AT^SM20=0

Subscr 3 Receive: AT^SM20=0

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Initialization of Mux 2.  
Comment: Switch on network registration URC.

\*\*\*\*\*

Subscr 4 Send: AT+CREG=1  
Subscr 4 Receive: AT+CREG=1  
Subscr 4 Receive: OK

\*\*\*\*\*

Comment: Mobile equipment errors in text format URC.

\*\*\*\*\*

Subscr 4 Send: AT+CMEE=2  
Subscr 4 Receive: AT+CMEE=2  
Subscr 4 Receive: OK

\*\*\*\*\*

Comment: Switch on SIM data ready URC.

\*\*\*\*\*

Subscr 4 Send: AT^SSET=1  
Subscr 4 Receive: AT^SSET=1  
Subscr 4 Receive: OK

\*\*\*\*\*

Comment: Switch on SIM status URC.

\*\*\*\*\*

Subscr 4 Send: AT^SCKS=1  
Subscr 4 Receive: AT^SCKS=1  
Subscr 4 Receive: OK

\*\*\*\*\*

Comment: Return after attempting a call via ATD.

\*\*\*\*\*

Subscr 4 Send: AT^SM20=0  
Subscr 4 Receive: AT^SM20=0  
Subscr 4 Receive: OK

## **2.16.2 RSA Connection via Bluetooth**

### **2.16.2.1 Description**

This chapter describes how to activate and terminate the RSA connection between a ME which acts as SAP client and an SAP server which communicates with the application via Bluetooth.

The example below describes the steps, which are required to enable and disable the RSA connection (SAP client):

- The AT+COPS command is used to query or select the network operator.
- An RSA session can be activated or terminated with the AT^SRSA command. Please note that since the ME can act as SAP Server or SAP Client, different parameters are required for this command:
  - SAP Client activation: AT^SRSA=2,2,3,1
  - SAP Server activation: AT^SRSA=2,1,3,1

If the connection is started successfully the URC ^SRSA: 2,2,0 is issued. After connecting to an SAP peer the URC will be ^SRSA: 2,2,1.

There are different ways to terminate the SAP connection:

- The first option is to disable the SAP connection but the ME remains in SAP mode and is ready to re-establish a connection (AT^SRSA=2,0,,,0).
- The second option is to disable the SAP connection and make the ME return to the local SIM mode (AT^SRSA=2,0,,,1). In this case all calls or active GRPS contexts via a remote SIM will be terminated.
- After activation of RSA connection you must enter the SAP Server SIM PIN (See chapter 2.5 for details).

### **2.16.2.2 Used AT commands**

AT+COPS	-	Operator selection
AT+CPIN	-	Enter PIN
AT^SRSA	-	Remote SIM Access Activation

For further details about the commands see [2].



### 2.16.2.3 Flow chart

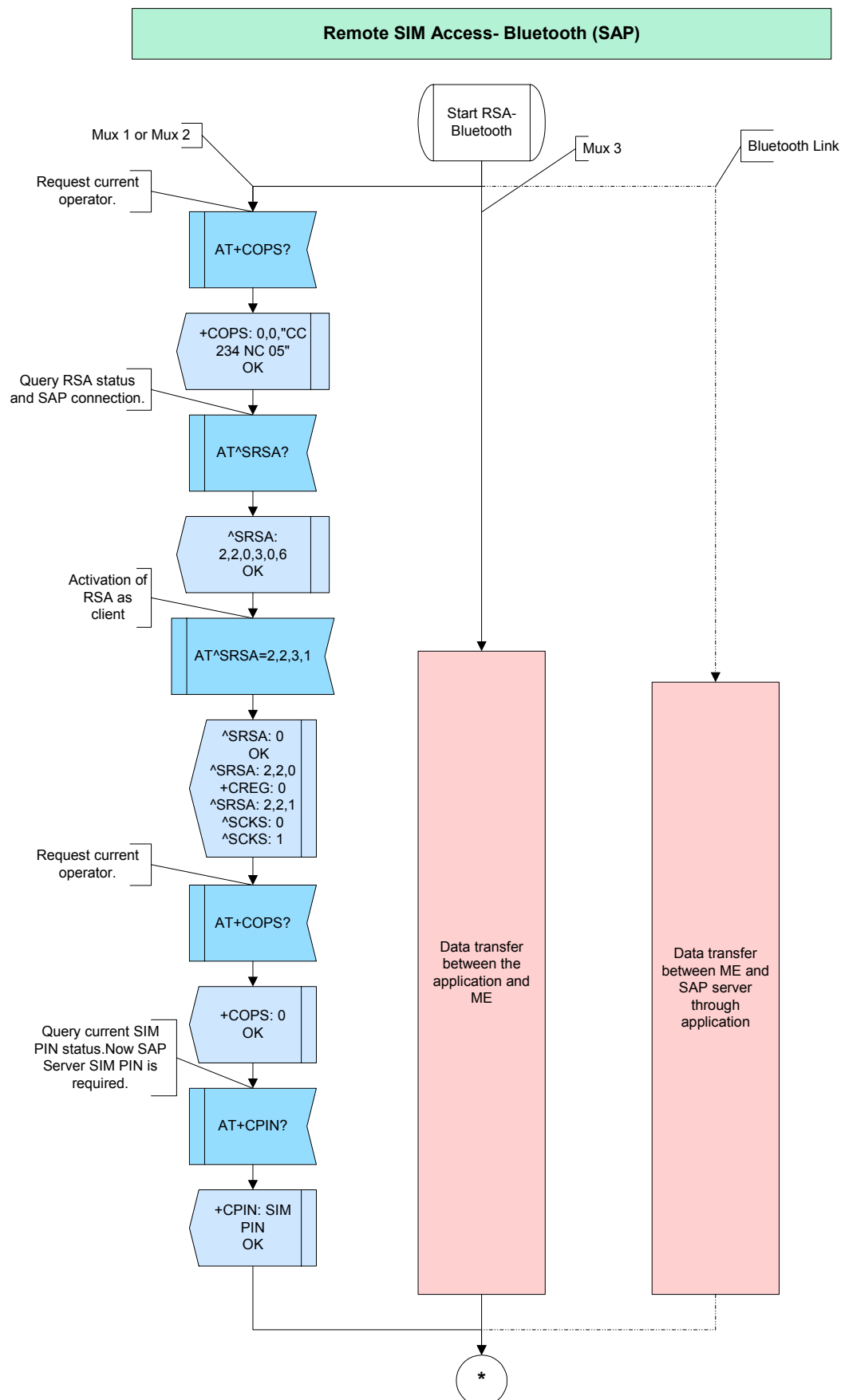


Figure 134: RSA Connection via Bluetooth part 1

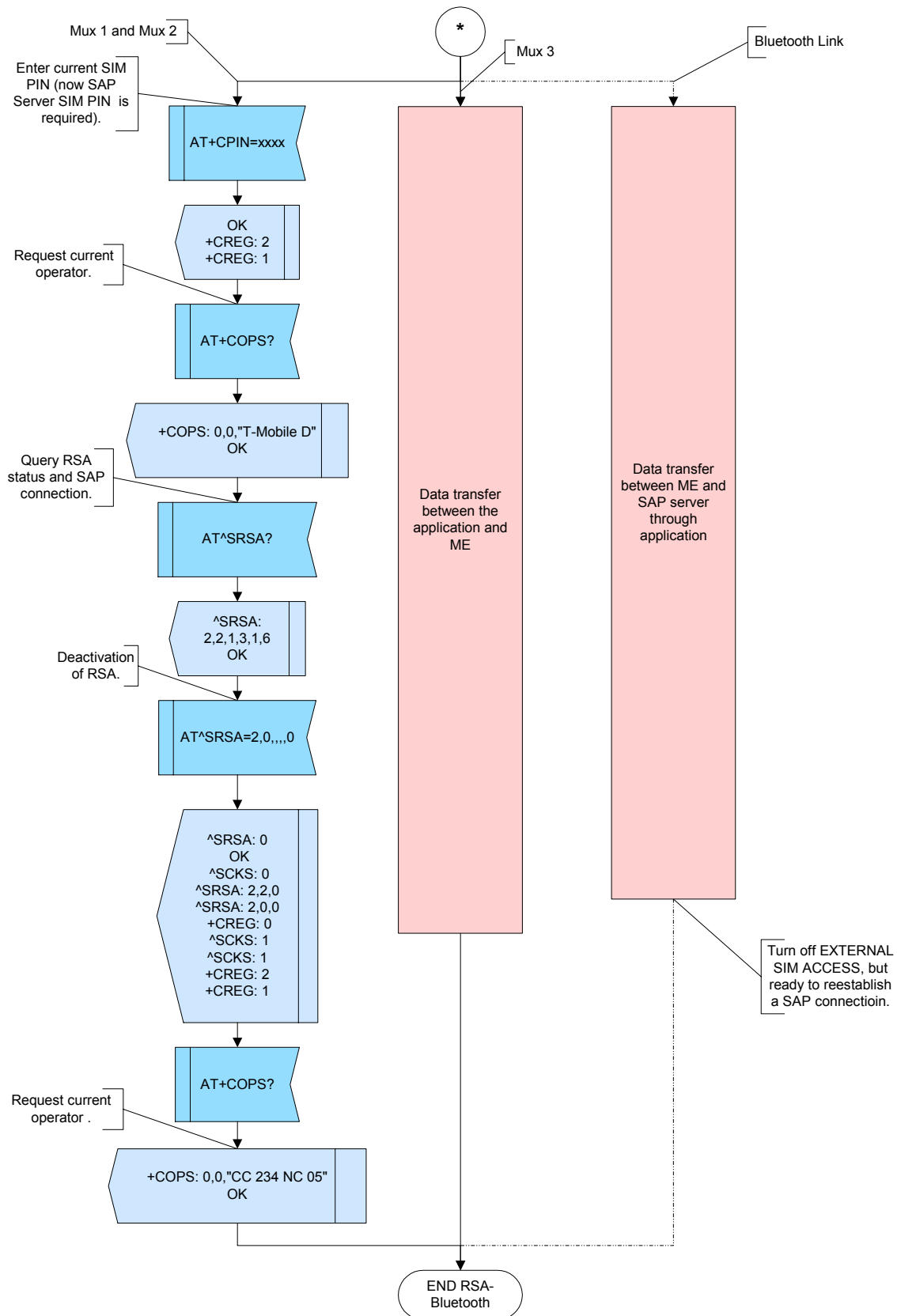


Figure 135: RSA Connection via Bluetooth part 2

#### 2.16.2.4 Hints

- Note, that all RSA URCs will be displayed on all active serial channels.

### 2.16.2.5 Example

\*\*\*\*\*

Comment: Remote SIM Access (Bluetooth)

\*\*\*\*\*

\*\*\*\*\*

Comment: Request current operator.

\*\*\*\*\*

Subscr 3 Send: AT+COPS?

Subscr 3 Receive: AT+COPS?

Subscr 3 Receive: +COPS: 0,0,"CC 234 NC 05"

Subscr 3 Receive:

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Query RSA status and SAP connection .

\*\*\*\*\*

Subscr 3 Send: AT^SRSA?

Subscr 3 Receive: AT^SRSA?

Subscr 3 Receive:

Subscr 3 Receive:

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Activation of RSA.

\*\*\*\*\*

Subscr 3 Send: AT^SRSA=2,2,3,1

Subscr 3 Receive: AT^SRSA=2,2,3,1

Subscr 3 Receive: ^SRSA: 0

Subscr 3 Receive:

Subscr 3 Receive: OK

Subscr 3 Receive:

Subscr 3 Receive: ^SRSA: 2,2,0

Subscr 3 Receive:

Subscr 3 Receive: +CREG: 0

Subscr 3 Receive:

Subscr 3 Receive: ^SRSA: 2,2,1

Subscr 3 Receive:

Subscr 3 Receive: ^SCKS: 0

Subscr 3 Receive:

Subscr 3 Receive: ^SCKS: 1

\*\*\*\*\*

Comment: Request current operator.

\*\*\*\*\*

Subscr 3 Send: AT+COPS?

Subscr 3 Receive: AT+COPS?

Subscr 3 Receive: +COPS: 0

Subscr 3 Receive:

Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Query current SIM PIN status.

\*\*\*\*\*

Subscr 3 Send: AT+CPIN?

Subscr 3 Receive: AT+CPIN?  
Subscr 3 Receive: +CPIN: SIM PIN  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Enter current SIM PIN (now SIM PIN from the mobile phone is required).

\*\*\*\*\*

Subscr 3 Send: AT+CPIN=2529  
Subscr 3 Receive: AT+CPIN=2529  
Subscr 3 Receive:  
Subscr 3 Receive: OK  
Subscr 3 Receive:  
Subscr 3 Receive: +CREG: 2  
Subscr 3 Receive:  
Subscr 3 Receive: +CREG: 1  
Subscr 3 Receive:  
Subscr 3 Receive: ^SSIM READY

\*\*\*\*\*

Comment: Request current operator.

\*\*\*\*\*

Subscr 3 Send: AT+COPS?  
Subscr 3 Receive: AT+COPS?  
Subscr 3 Receive: +COPS: 0,0,"T-Mobile D"  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Query RSA status and SAP connection .

\*\*\*\*\*

Subscr 3 Send: AT^SRSA?  
Subscr 3 Receive: AT^SRSA?  
Subscr 3 Receive: ^SRSA: 2,2,1,3,1,6  
Subscr 3 Receive:  
Subscr 3 Receive:  
Subscr 3 Receive: OK

\*\*\*\*\*

Comment: Deactivation of RSA.

\*\*\*\*\*

Subscr 3 Send: AT^SRSA=2,0,,,0  
Subscr 3 Receive: AT^SRSA=2,0,,,0  
Subscr 3 Receive: ^SRSA: 0  
Subscr 3 Receive:  
Subscr 3 Receive: OK  
Subscr 3 Receive:  
Subscr 3 Receive: ^SCKS: 0  
Subscr 3 Receive:  
Subscr 3 Receive: ^SRSA: 2,2,0  
Subscr 3 Receive:  
Subscr 3 Receive: ^SRSA: 2,0,0  
Subscr 3 Receive:  
Subscr 3 Receive: +CREG: 0  
Subscr 3 Receive:

---

Subscr 3 Receive: ^SCKS: 1  
Subscr 3 Receive:  
Subscr 3 Receive: ^SCKS: 1  
Subscr 3 Receive:  
Subscr 3 Receive: +CREG: 2  
Subscr 3 Receive:  
Subscr 3 Receive: +CREG: 1

\*\*\*\*\*

Comment: Request current operator.

\*\*\*\*\*

Subscr 3 Send: AT+COPS?  
Subscr 3 Receive: AT+COPS?  
Subscr 3 Receive: +COPS: 0,0,"CC 234 NC 05"  
Subscr 3 Receive:  
Subscr 3 Receive: OK

## 2.16.3 RSA connection via serial interface

### 2.16.3.1 Description

This chapter describes how to activate and terminate the RSA connection between two ME via serial interface. One of them acts as SAP server, the other as SAP client. Both are connected to the PC, which runs the application "ComBridge" [14]. This application connects two serial interfaces (left I/O and right I/O) of the PC in such a way, that the output of left I/O is forwarded to the input of the right I/O and vice versa.

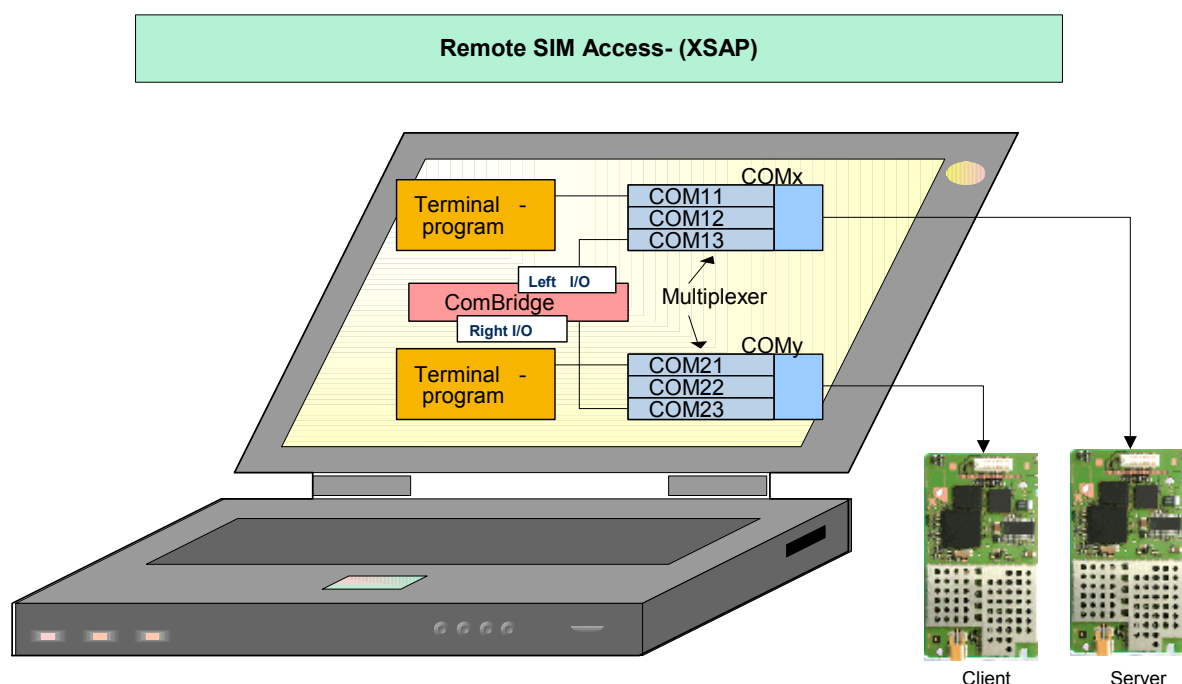


Figure 136: Remote SIM Access (XSAP)

The example below describes the steps, which are required to enable and disable the RSA connection (SAP client and SAP server).

- The AT+COPS command is used to query or select the network operator.
- An RSA session can be activated or terminated with the AT^SRSA command. Please note that as the ME acts as SAP server or SAP client different parameters are required for this command:
  - SAP Client activation: AT^SRSA=2,2,3,0
  - SAP Server activation: AT^SRSA=1,1,3,0

If the connection is started successfully the URC ^SRSA: 2,2,0 for client and ^SRSA:2,1,0 for server is issued. After connecting to an SAP peer the URC will be ^SRSA: 2,2,1 for client and ^SRSA: 2,1,1 for server.

There are two different ways to terminate the SAP connection. The first option is to disable the SAP connection but the ME remains in SAP mode and is ready to re-establish a connection (AT^SRSA=2,0,,,0). Furthermore, the SAP connection is disabled and the ME returns to the local SIM mode (AT^SRSA=2,0,,,1). In this case all calls or active GRPS contexts via a remote SIM will be terminated. This command is identical for client and server.

- After activation of RSA connection you must enter the SAP server SIM PIN (See chapter 2.5 for details).

---

### **2.16.3.2 Used AT commands**

AT+COPS	-	Operator selection
AT+CPIN	-	Enter PIN
AT^SRSA	-	Remote SIM Access Activation
AT^SCKS	-	Query SIM and chip card holder status

For further details about the commands see [2].

### 2.16.3.3 Flow chart

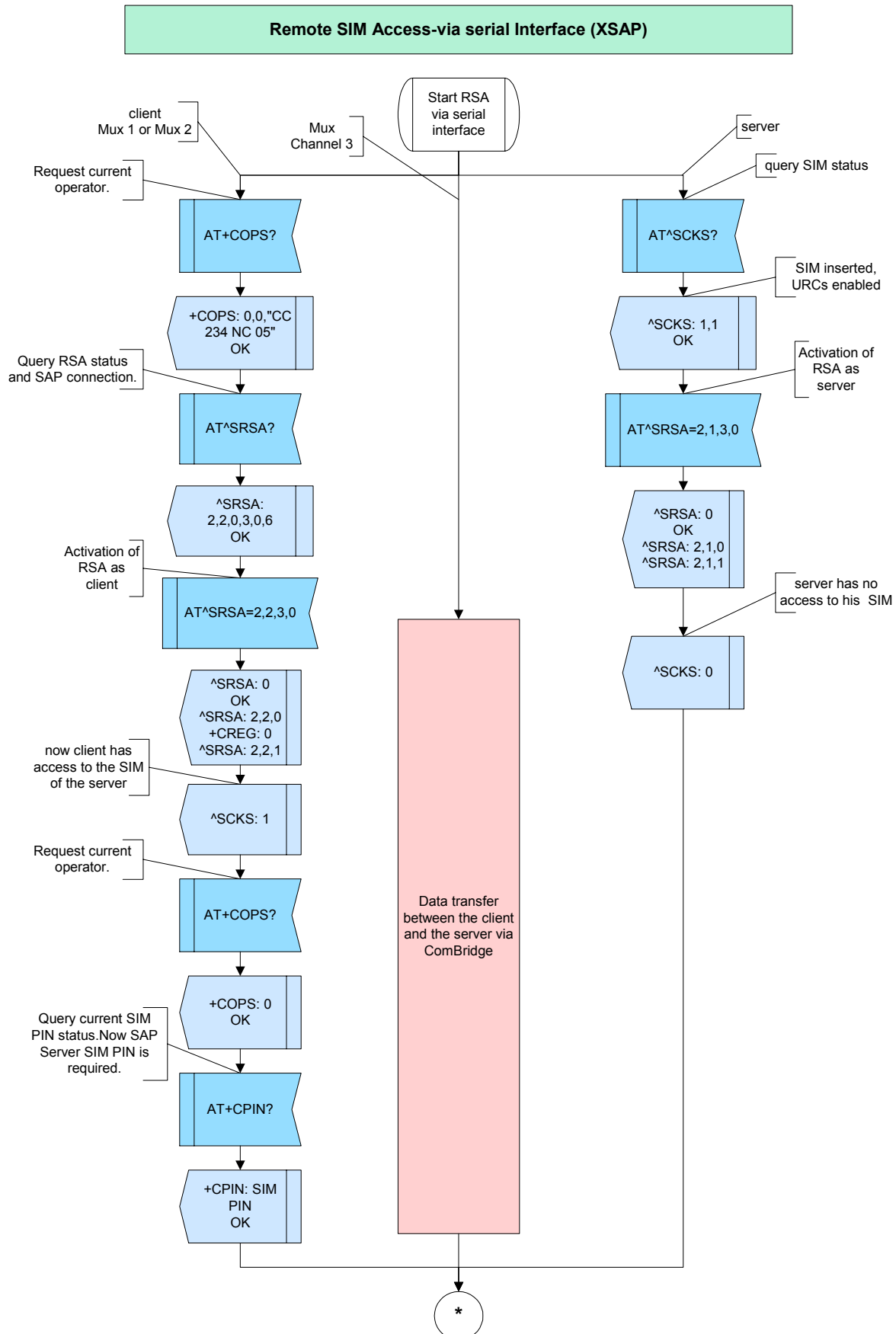


Figure 137: RSA Connection via serial interface part 1



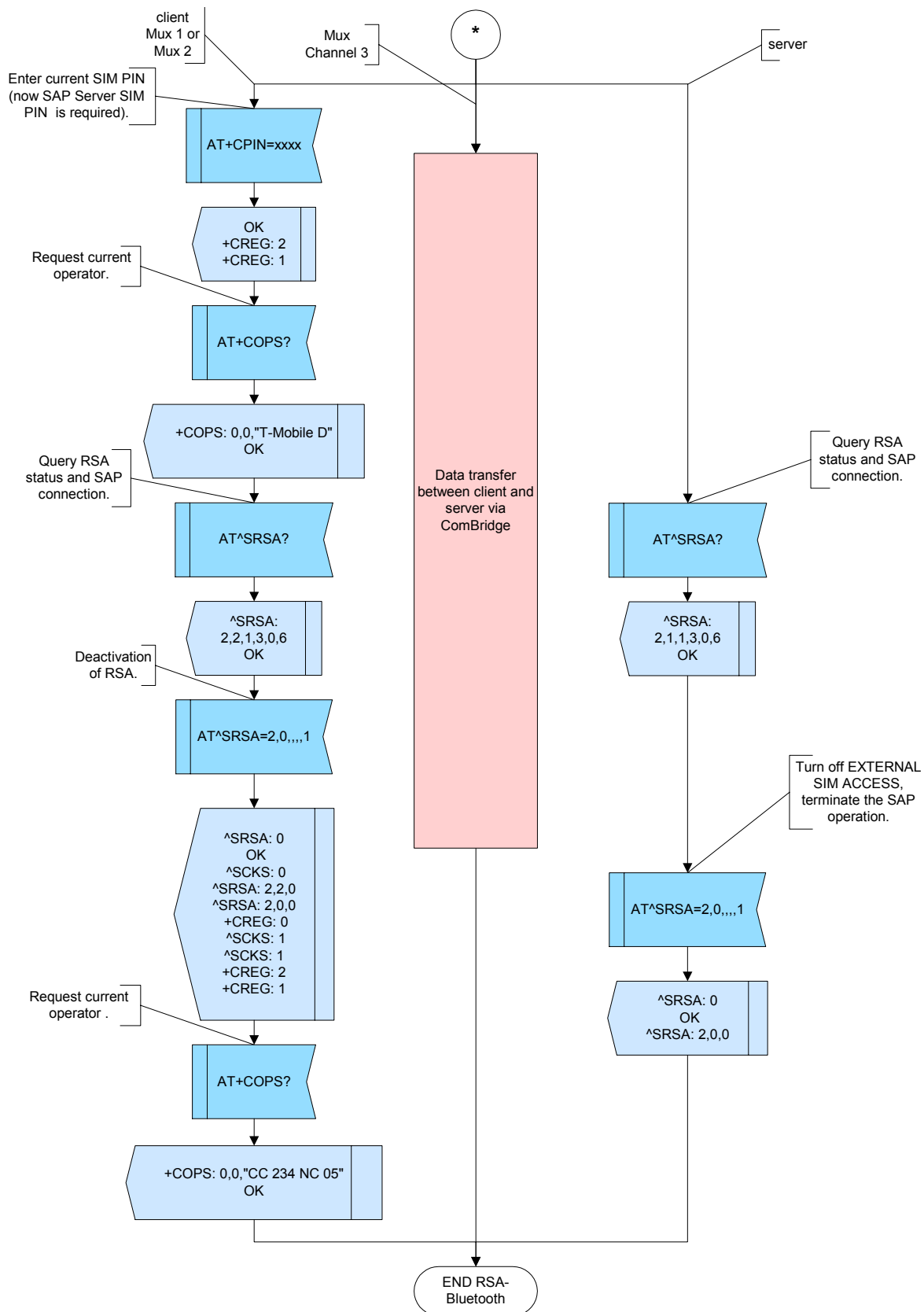


Figure 138: RSA Connection via serial interface part 2

#### 2.16.3.4 Hints

- Note, that all RSA URC's will be displayed on all active serial channels.

#### 2.16.3.5 Example

\*\*\*\*\*

Comment Remote SIM Access (RS232)

Comment

Comment reset client

\*\*\*\*\*

Subscr 1 Send: AT+CMEE=2

Subscr 1 Receive: AT+CMEE=2

Subscr 1 Receive: OK

Subscr 1 Send: AT^SCKS=1

Subscr 1 Receive: AT^SCKS=1

Subscr 1 Receive: OK

\*\*\*\*\*

Comment reset server

\*\*\*\*\*

Subscr 2 Send: AT^SCKS=1

Subscr 2 Receive: AT^SCKS=1

Subscr 2 Receive: OK

\*\*\*\*\*

Comment client: Request current operator

\*\*\*\*\*

Subscr 1 Send: AT+COPS?

Subscr 1 Receive: AT+COPS?

Subscr 1 Receive: +COPS: 0

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment client: Query RSA status and SAP connection

\*\*\*\*\*

Subscr 1 Send: AT^SRSA?

Subscr 1 Receive: AT^SRSA?

Subscr 1 Receive:

Subscr 1 Receive:

Subscr 1 Receive: OK

\*\*\*\*\*

Comment server: Query SIM status

\*\*\*\*\*

Subscr 2 Send: AT^SCKS?

Subscr 2 Receive: AT^SCKS?

Subscr 2 Receive: ^SCKS: 1,1

Subscr 2 Receive:

Subscr 2 Receive: OK

\*\*\*\*\*

Comment client: Query SIM status

\*\*\*\*\*

Subscr 1 Send: AT^SCKS?  
Subscr 1 Receive: AT^SCKS?  
Subscr 1 Receive: ^SCKS: 1,0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment Activation of RSA as server

\*\*\*\*\*

Subscr 2 Send: AT^SRSA=2,1,3,0  
Subscr 2 Receive: AT^SRSA=2,1,3,0  
Subscr 2 Receive: ^SRSA: 0  
Subscr 2 Receive:  
Subscr 2 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: ^SRSA: 2,1,0

\*\*\*\*\*

Comment Activation of RSA as client

\*\*\*\*\*

Subscr 1 Send: AT^SRSA=2,2,3,0  
Subscr 1 Receive: AT^SRSA=2,2,3,0  
Subscr 1 Receive: ^SRSA: 0  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: ^SRSA: 2,2,0  
Subscr 2 Receive:  
Subscr 2 Receive: ^SCKS: 0  
Subscr 2 Receive:  
Subscr 2 Receive: ^SRSA: 2,1,1  
Subscr 1 Receive:  
Subscr 1 Receive: ^SRSA: 2,2,1  
Subscr 1 Receive:  
Subscr 1 Receive: ^SCKS: 1

\*\*\*\*\*

Comment client: Request current operator

\*\*\*\*\*

Subscr 1 Send: AT+COPS?  
Subscr 1 Receive: AT+COPS?  
Subscr 1 Receive: +COPS: 0  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment client: Query current SIM PIN status. Now SAP Server SIM PIN is required.

\*\*\*\*\*

Subscr 1 Send: AT+CPIN?  
Subscr 1 Receive: AT+CPIN?  
Subscr 1 Receive: +CPIN: SIM PIN  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

---

Comment client: Enter current SIM PIN (now SAP server SIM PIN is required).

\*\*\*\*\*

Subscr 1 Send: AT+CPIN=0000  
Subscr 1 Receive: AT+CPIN=0000  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: +CREG: 2

\*\*\*\*\*

Comment client: Request current operator

\*\*\*\*\*

Subscr 1 Send: AT+COPS?  
Subscr 1 Receive: AT+COPS?  
Subscr 1 Receive: +COPS: 0,0,"T-Mobile D"  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment client: Query RSA status and SAP connection

\*\*\*\*\*

Subscr 1 Send: AT^SRSA?  
Subscr 1 Receive: AT^SRSA?  
Subscr 1 Receive: ^SRSA: 2,2,1,3,0,6  
Subscr 1 Receive:  
Subscr 1 Receive:  
Subscr 1 Receive: OK

\*\*\*\*\*

Comment server: Query RSA status and SAP connection

\*\*\*\*\*

Subscr 2 Send: AT^SRSA?  
Subscr 2 Receive: AT^SRSA?  
Subscr 2 Receive: ^SRSA: 2,1,1,3,0,6  
Subscr 2 Receive:  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment client: Deactivation of RSA.

\*\*\*\*\*

Subscr 1 Send: AT^SRSA=2,0,,,1  
Subscr 2 Receive:  
Subscr 2 Receive: ^SRSA: 2,1,0  
Subscr 2 Receive:  
Subscr 2 Receive: ^SCKS: 1  
Subscr 1 Receive: AT^SRSA=2,0,,,1  
Subscr 1 Receive: ^SRSA: 0  
Subscr 1 Receive:  
Subscr 1 Receive: OK  
Subscr 1 Receive:  
Subscr 1 Receive: ^SCKS: 0  
Subscr 1 Receive:  
Subscr 1 Receive: ^SRSA: 2,2,0  
Subscr 1 Receive:

---

Subscr 1 Receive: ^SRSA: 2,0,0

\*\*\*\*\*

Comment server: Turn off EXTERNAL SIM ACCESS, terminate the SAP operation.

\*\*\*\*\*

Subscr 2 Send: AT^SRSA=2,0,,,1

Subscr 1 Receive:

Subscr 1 Receive: ^SCKS: 1

Subscr 2 Receive: AT^SRSA=2,0,,,1

Subscr 2 Receive: ^SRSA: 0

Subscr 2 Receive:

Subscr 2 Receive: OK

Subscr 2 Receive:

Subscr 2 Receive: ^SRSA: 2,0,0

\*\*\*\*\*

Comment client: Request current operator

\*\*\*\*\*

Subscr 1 Send: AT+COPS?

Subscr 1 Receive: AT+COPS?

Subscr 1 Receive: +COPS: 0

Subscr 1 Receive:

Subscr 1 Receive: OK

Subscr 1 Receive:

Subscr 1 Receive: ^SCKS: 0

Subscr 1 Receive:

Subscr 1 Receive: +CREG: 0

## **2.17 Switch off the ME**

### **2.17.1 Power down the ME**

#### **2.17.1.1 Description**

The best and safest approach to turn off the ME is using the AT command AT^SMSO. This procedure lets the ME log off from the network and allows the software to enter a safe state before disconnecting the power supply. Low level of the ME's output pin VDD indicates that the procedure has completed and the ME has entered the POWER DOWN mode. If supported by the type of GSM module, the URC "^SHUTDOWN" will additionally notify that the ME is about to enter the POWER DOWN mode.

From POWER DOWN mode, the ME can be restarted to normal operation when the corresponding hardware pin is tied to ground. Depending on the type of module, this is either the IGT pin or the KEY7 pin. See also Chapter 2.18.3.

For further details on the POWER DOWN mode and instructions of how to enter and quit the mode see [1] and [2].

#### **2.17.1.2 Used AT commands**

AT^SMSO      -      Switch off mobile station

For further details about the commands see [2].

### 2.17.1.3 Flow chart

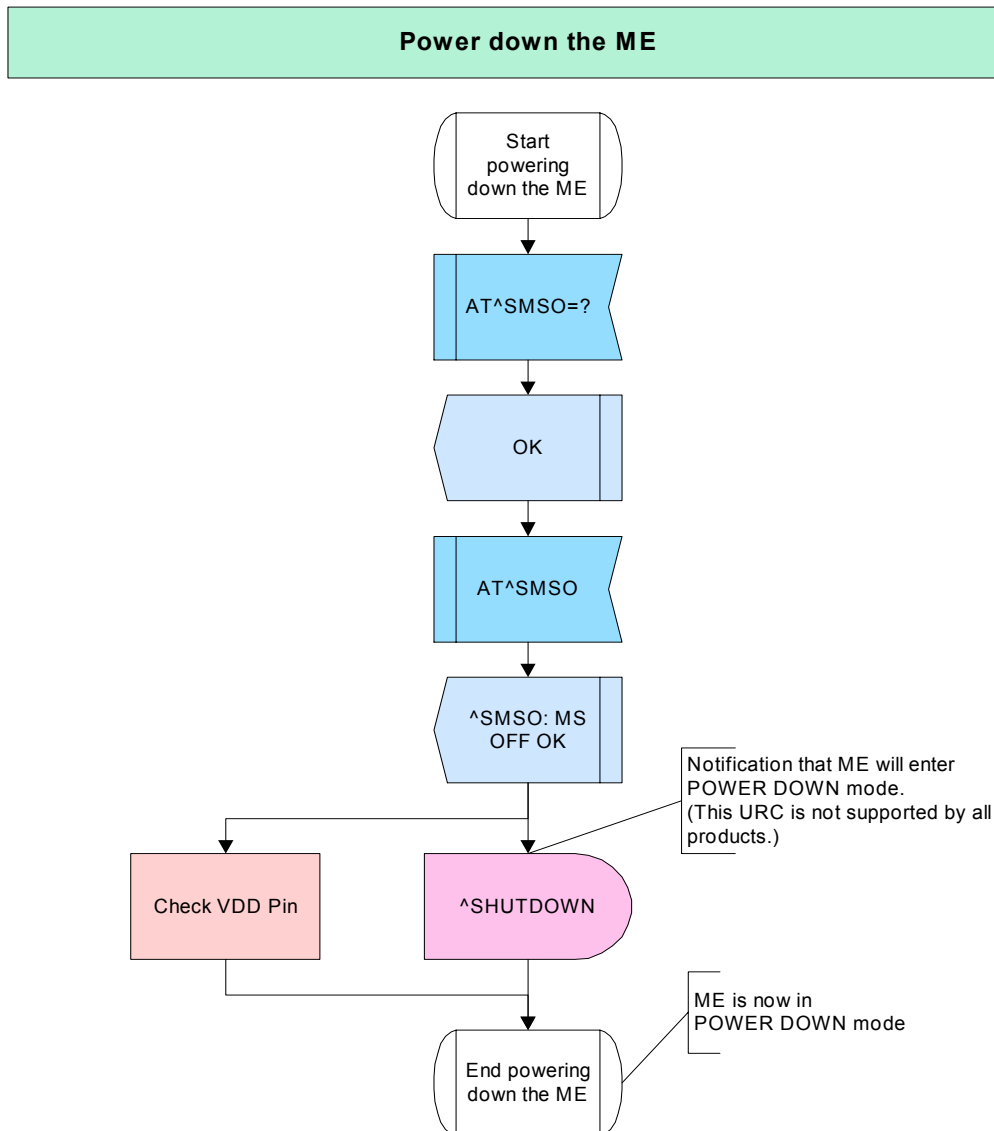


Figure 139: Power down the ME

### 2.17.1.4 Hints

- After using the command `AT^SMSO` it is not possible to send any other AT commands.
- The second way to verify that the ME is turned off, is to monitor the VDD pin.
- The low state of the VDD pin definitely indicates that the module is switched off.

### 2.17.1.5 Example

\*\*\*\*\*  
Comment: Power down the ME  
\*\*\*\*\*

Subscr 1 Send: `AT^SMSO`  
 Subscr 1 Receive: `AT^SMSO`  
 Subscr 1 Receive: `^SMSO: MS OFF`  
 Subscr 1 Receive:  
 Subscr 1 Receive: `OK`  
 Subscr 1 Receive: `^SHUTDOWN` (not supported by all products)

## 2.18 Restart ME

This chapter discusses ways of restarting the ME: manual restart, cyclic restart and restart via the physical pin IGT or KEY7.

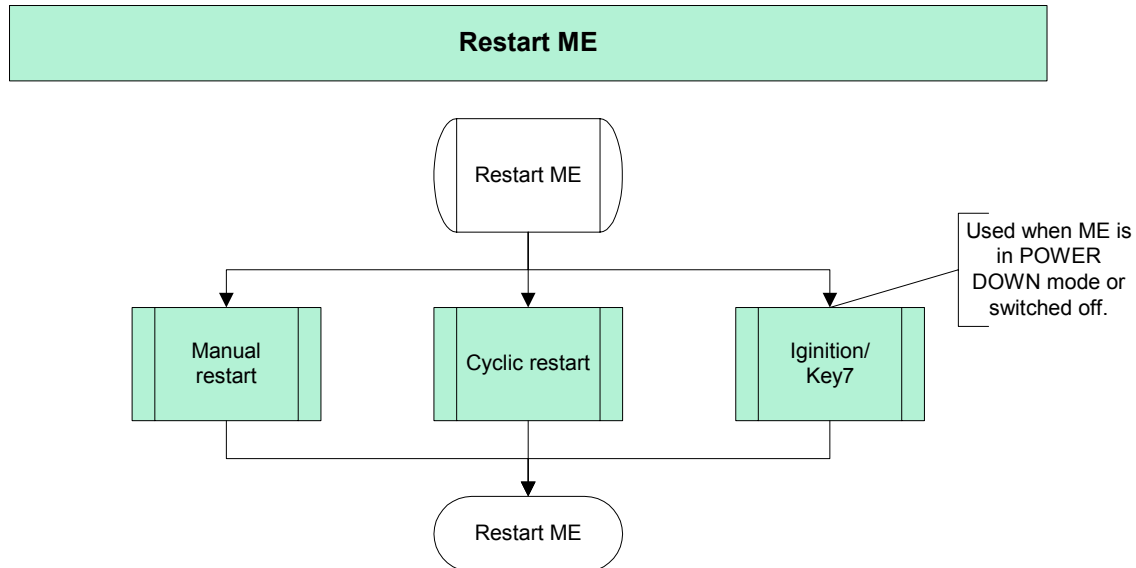


Figure 140: Restart ME

### 2.18.1 Manual restart

#### 2.18.1.1 Description

To reset and restart the ME use the command AT+CFUN. If configured to a fix baud rate (AT+IPR≠0), the ME will send the URC “^SYSSTART” to notify that it is ready to operate. If autobauding is enabled (AT+IPR=0) there will be no notification. In this case, it is recommended to wait 3 to 5 seconds before entering the first AT command. To register to the network SIM PIN authentication is necessary after restart.

#### 2.18.1.2 Used AT commands

AT+CFUN      -      Set phone functionality

For further details about the commands see [2].



### 2.18.1.3 Flow chart

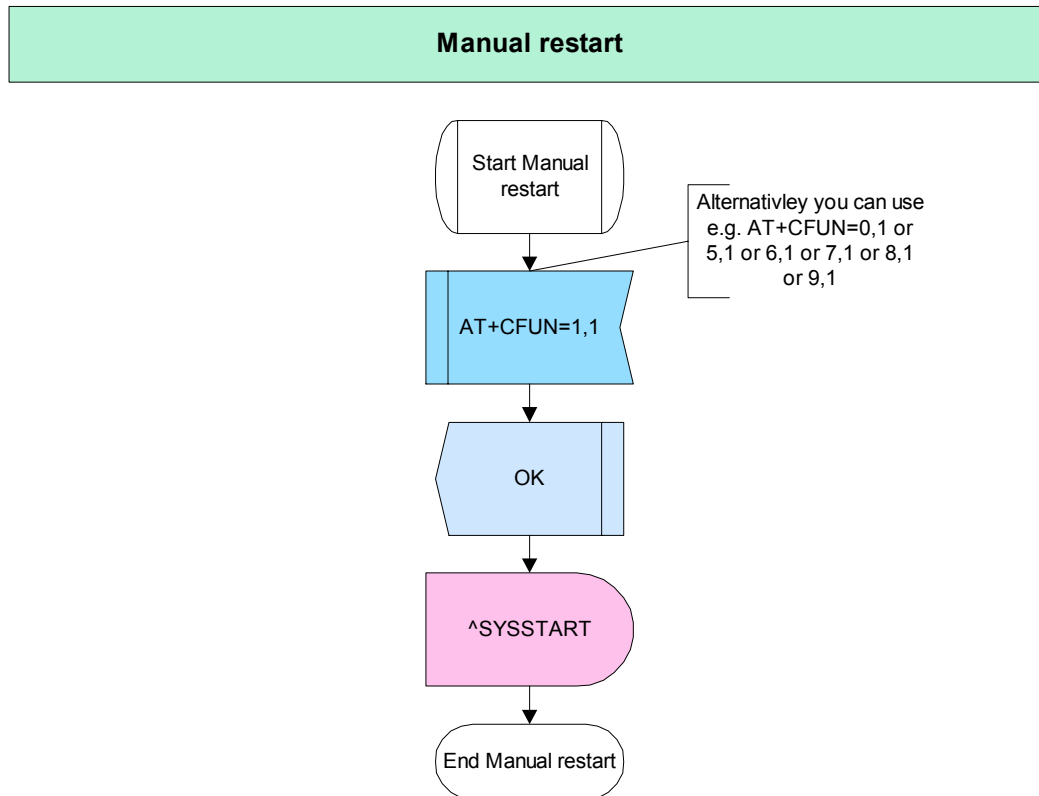


Figure 141: Manual restart

### 2.18.1.4 Hints

Not applicable.

### 2.18.1.5 Example

\*\*\*\*\*

Comment: Manual restart

\*\*\*\*\*

\*\*\*\*\*

Comment: Restart and reset the ME

\*\*\*\*\*

Subscr 1    Send: AT+CFUN=1,1  
Subscr 1    Receive: AT+CFUN=1,1  
Subscr 1    Receive: OK  
Subscr 1    Receive: ^SYSSTART

## **2.18.2 Cyclic restart**

### **2.18.2.1 Description**

This chapter describes how to schedule a cyclic restart of the ME by using the "AutoExec" option of the AT^SCFG command. Cyclic restart is an effective solution for industrial mobile applications (such as telemetry and remote metering) in the event the GSM network deregisters the mobile due to inactivity.

The "AutoExec" option enables the ME to automatically execute any AT command or sequence of AT commands, either when a timer expires or when the DTR signal is toggled. For cyclic restart, the timer driven mode applies. To configure cyclic restart, use the AT^SCFG command to set the timer (maximum 240 hours) and specify the reset command to be executed when the time stamp is reached, in the example below this is the command AT+CFUN=1,1.

IMPORTANT: The "AutoExec" feature is not supported by all Siemens wireless modules. Please refer to [2] for details.

### **2.18.2.2 Used AT commands**

AT+CFUN	-	Set phone functionality
AT^SCFG	-	Extended Configuration Settings (not supported by all products)

For further details about the commands see [2].

### 2.18.2.3 Flow chart

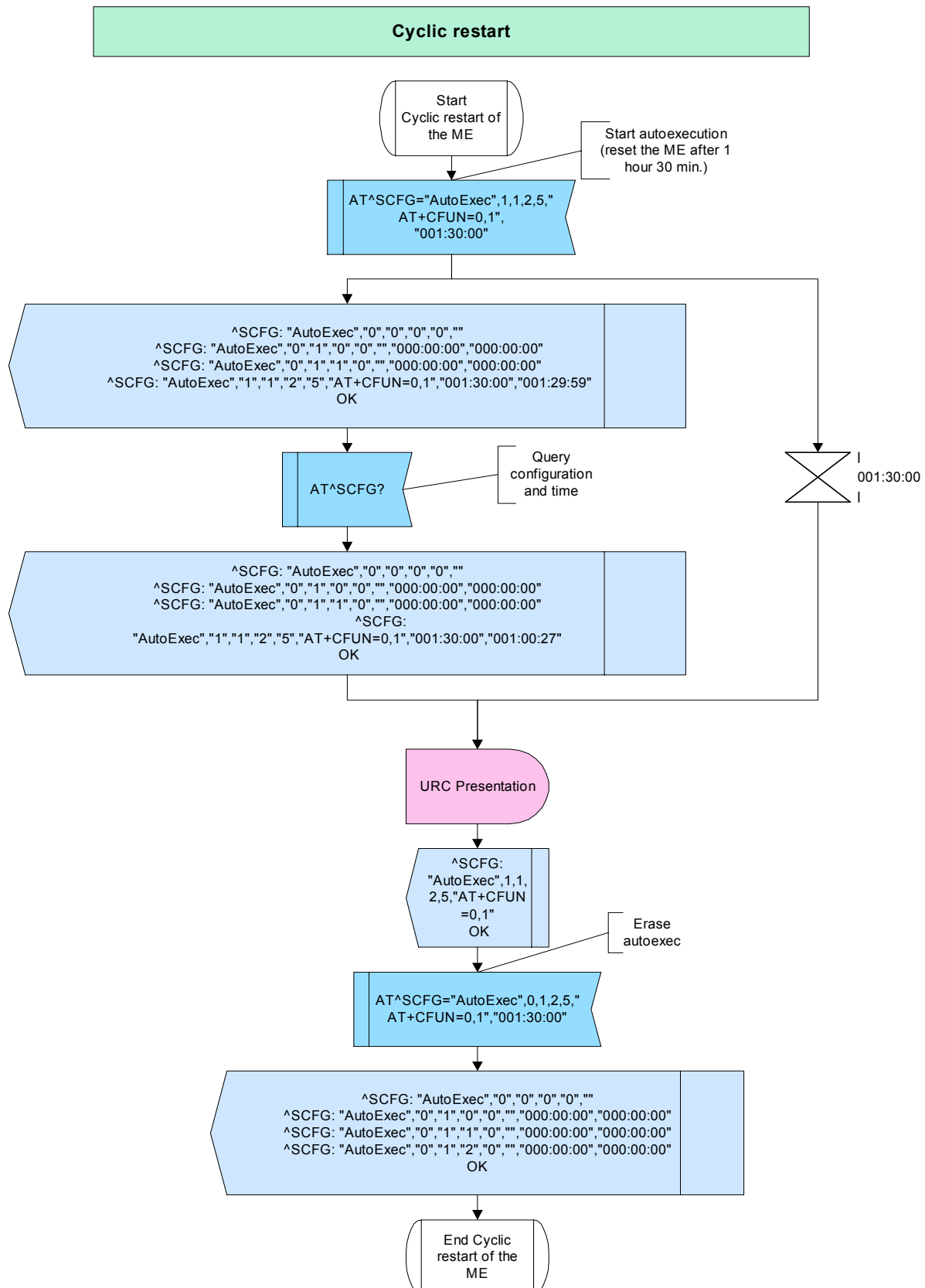


Figure 142: Cyclic restart

## 2.18.2.4 Hints

- Be careful with small period values to shut down or reset the ME, because only little time remains to change these settings again after restart the ME.

## 2.18.2.5 Example

\*\*\*\*\*

Comment: Cyclic restart (not supported by all products)

\*\*\*\*\*

\*\*\*\*\*

Comment: Reset ME after 1 hour 30 min.

\*\*\*\*\*

```
Subscr 2   Send: AT^SCFG="AutoExec",1,1,2,5,"AT+CFUN=0,1","001:30:00"
Subscr 2   Receive: AT^SCFG="AutoExec",1,1,2,5,"AT+CFUN=0,1","001:30:00"
Subscr 2   Receive: ^SCFG: "AutoExec","0","0","0","0",""
Subscr 2   Receive: ^SCFG: "AutoExec","0","1","0","0","","000:00:00","000:00:00"
Subscr 2   Receive: ^SCFG: "AutoExec","0","1","1","0","","000:00:00","000:00:00"
Subscr 2   Receive: ^SCFG: "AutoExec","1","1","2","5","AT+CFUN=0,1","001:30:00","001:29:59"
Subscr 2   Receive:
Subscr 2   Receive: OK
```

\*\*\*\*\*

Comment: Query configuration and time.

\*\*\*\*\*

```
Subscr 2   Send: AT^SCFG?
Subscr 2   Receive: AT^SCFG?
Subscr 2   Receive: ^SCFG: "AutoExec","0","0","0","0",""
Subscr 2   Receive: ^SCFG: "AutoExec","0","1","0","0","","000:00:00","000:00:00"
Subscr 2   Receive: ^SCFG: "AutoExec","0","1","1","0","","000:00:00","000:00:00"
Subscr 2   Receive: ^SCFG: "AutoExec","1","1","2","5","AT+CFUN=0,1","001:30:00","001:00:27"
Subscr 2   Receive:
Subscr 2   Receive: OK
```

\*\*\*\*\*

Comment: Query configuration and time.

\*\*\*\*\*

```
Subscr 2   Send: AT^SCFG?
Subscr 2   Receive: AT^SCFG?
Subscr 2   Receive: ^SCFG: "AutoExec","0","0","0","0",""
Subscr 2   Receive: ^SCFG: "AutoExec","0","1","0","0","","000:00:00","000:00:00"
Subscr 2   Receive: ^SCFG: "AutoExec","0","1","1","0","","000:00:00","000:00:00"
Subscr 2   Receive: ^SCFG: "AutoExec","1","1","2","5","AT+CFUN=0,1","001:30:00","000:29:09"
Subscr 2   Receive:
Subscr 2   Receive: OK
```

\*\*\*\*\*

Comment: Query configuration and time.

\*\*\*\*\*

```
Subscr 2   Send: AT^SCFG?
Subscr 2   Receive: AT^SCFG?
Subscr 2   Receive: ^SCFG: "AutoExec","0","0","0","0",""
Subscr 2   Receive: ^SCFG: "AutoExec","0","1","0","0","","000:00:00","000:00:00"
Subscr 2   Receive: ^SCFG: "AutoExec","0","1","1","0","","000:00:00","000:00:00"
Subscr 2   Receive: ^SCFG: "AutoExec","1","1","2","5","AT+CFUN=0,1","001:30:00","000:00:01"
Subscr 2   Receive:
```

---

Subscr 2 Receive: OK  
Subscr 2 Receive:  
Subscr 2 Receive: ^SCFG: "AutoExec",1,1,2,5,"AT+CFUN=0,1"  
Subscr 2 Receive:  
Subscr 2 Receive: OK

\*\*\*\*\*

Comment: Erase autoexec.

\*\*\*\*\*

Subscr 2 Send: AT^SCFG="AutoExec",0,1,2,5,"AT+CFUN=0,1","001:30:00"  
Subscr 2 Receive: AT^SCFG="AutoExec",0,1,2,5,"AT+CFUN=0,1","001:30:00"  
Subscr 2 Receive: ^SCFG: "AutoExec","0","0","0","0", ""  
Subscr 2 Receive: ^SCFG: "AutoExec","0","1","0","0", "", "000:00:00", "000:00:00"  
Subscr 2 Receive: ^SCFG: "AutoExec","0","1","1","0", "", "000:00:00", "000:00:00"  
Subscr 2 Receive: ^SCFG: "AutoExec","0","1","2","0", "", "000:00:00", "000:00:00"  
Subscr 2 Receive:  
Subscr 2 Receive: OK

## 2.18.3 Restart via Ignition / Key 7

### 2.18.3.1 Description

When the ME is in POWER DOWN mode or switched off, it can be restarted to normal operation when the corresponding hardware pin is tied to ground for at least 100ms. Depending on the type of module, this is either the /IGT pin or the KEY7 pin. If the ME is in Charge-only mode the pin needs to be tied to ground for 1s. See also [1].

### 2.18.3.2 Used AT commands

Not applicable.

### 2.18.3.3 Flow chart

Not applicable.

### 2.18.3.4 Hints

Not applicable.

### 2.18.3.5 Example

In some applications without battery it may be useful to switch on the module immediately after applying battery power. Figure 143 shows a sample circuit which considers the timing conditions of /IGT with respect to BATT+ as specified in [1].

BATT+ (or VBATT+) is the main power supply of the module. The capacitors and resistors form a special delay line. The transistor forms a digital pulse for /IGT.

Autoignition can be used for automatic switch-on after applying power.

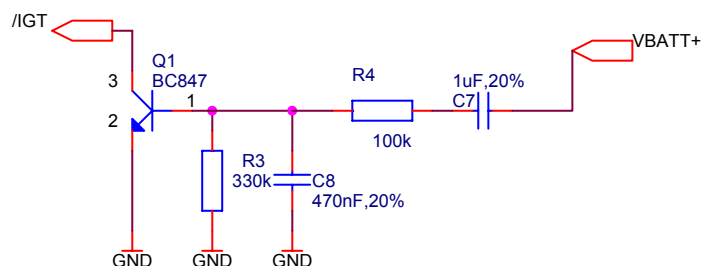


Figure 143: Autoignition